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Human Characteristics, Causality, Methods, and Public Opinion on Suicide: Case Report

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ABSTRACT

Objective: Suicide is the second leading cause of death among people aged 15 - 29 years in many countries. Suicides in Wonogiri District increases every year and occurs in all age sex. Man dominated in suicide cases. This study is aimed to identify human characteristics, causality, methods and public opinion on suicide.

Method: A qualitative study design was used grounded theory on suicidal family. Sampling technique used purposive sampling. The number of informants is 3 primary informants and 3 secondary informants.

Results: The human characteristics of suicide were male with range age 15 until 65 years, introvert man, middle to lower economic status and have suicide ideation. The risk factors of suicide were economic, genetic, bullying, depression due to chronic disease, few family support, and loneliness. The suicide methods which is used with hanging their self by a rope. The public opinion about suicide said that suicide is sin.

Conclusion: Suicide was caused by depression and lack of family support. Although suicide was sin, the community was still buried and pray the man of suicide.

Keywords: Human Characteristics, Causality, Methods, Public Opinion, Suicide

INTRODUCTION

Suicide was a person way to end his life. There was some risk factor of suicide, it included: instability of socio-economic conditions, poverty and unemployment, the orientation of individualism and collectivism. Based on World Health Organization (WHO) report in 2015, suicide was the second leading cause of death among people aged 15 - 29 years. Every year 800,000 people was die from suicide. WHO also noted, every 40 seconds one person in the world died from suicide with a ratio of 11.4 per 100,000 population.1

Based on the average statistics, in a day there was 2 to 3 people committed suicide in Indonesia. The Indonesia Central Bureau of Statistics (BPS) in 2015 recorded 812 suicides. Central Java became the province with the largest number of suicide cases, there were 331 cases.7

According to the Wonogiri District Police Completion Report in 2016 there were 21 suicides, 14 cases (66%) occurred in males and 7 cases (34%) in women. Cases of suicide in 2017 up to April were 8 cases, 6 cases (75%) in males and 2 cases (25%) in women. The age of suicide is 10 - 84 years, the majority of individuals are male.

Based on that phenomena, the purpose of this study aimed to identify the human characteristics, causality, methods and public opinion on suicide behavior in Wonogiri district. This study could reduce the number of suicides.

METHODS

A qualitative study design was used grounded theory on suicidal family16. The sampling technique used purposive sampling.16 The primary informant were a family with suicidal man, all of range age, they were 3 peoples. The secondary informant was a counseling teacher for high school, a nursing lecturer and a religious leader. The data collection techniques used interviewed and observation. The analysis was used Miles and Huberman. 23

ETHICS

Some ethical issues that must be considered by the researcher were requesting a inform consent to informants to provide information during the research process, conveying that the research was not harmful, maintaining the confidentiality of informant identity and not disseminating images or information outside the research interests.

RESULTS

Human Characterisits

Based on interviewed result with primary informants was moslem suicide, male, age 15 years, 45 years and 65 years old. The suicide do
not pray five times. The first suicide was student in high school. He was 15 years old, he was an orphan who lived with his two brothers. His counseling tutor said that his feeling were shy, inferior and anxieties about his education fee because he was always late to pay his education fees. The second suicide was graduated in elementary school. He was 45 years old, he was as head of the family who works as a food seller, he lived with his wife and two children. His wife had kidney failure who needed dialysis once a week. The third suicide was graduated in high school. He was 65 years old, he was an unemployment who had stroke, he lived with his wife and two children. The all of suicide victims were introvert person. They had suicide ideation before ending his life.

Causality

The interviewed result about causality of suicide with primary informants were a low economic status and lack of family support. Most of their feel were lonely. The most of suicidal family activity were busy to work, finally they have no time to communicate with another family members. That condition caused lack of family support.

The first suicide victim has a story with a father who died with suicidal history. His mother was remarried and than she died. He got bullied at his school. He has a depression sister who has an angry, destructive and emotional person, his sister have been patient on mental hospital. Based on that condition, the causality of first suicide victim was genetic factor.

The second suicide depressed because his wife has kidney failure, she must get dialysis therapy once a week. He could not pay his wife therapy. According to this condition, he depressed and he have negative thinking to end his self. The causality of second suicide victim was a low economic status.

The third suicide has a stroke. His wife did not want to sleep together, she have a boyfriend. Every day he has a conflict with his wife. He felt sad and lonely. The causality of third suicide victim were chronic illness, unemployment, lack of family support, and loneliness.

The interviewed result with secondary informants of a mental nursing lecturer said that men have a higher risk than women to suicide. Age characteristics also have an influence in suicidal behavior. The failed human development tasks could lead to depression. Depression was one of the mental health disorders that occurred for at least two weeks or more that affect the mindset, feelings, mood and how to deal with daily activities. Depression could make our lives useless and suicidal behavior.

METHODS

The suicide methods which is used with hanging their self by a rope in the bed room.

Public opinion

According to primary informants, suicide is a sin. They have an opinion that any problem should not be solved by suicide but must communicate with the family. The suicidal family in this study felt embarrassed and covered the cause of death. They did not report the case to the police. They explained that the causality death of family members which due to illness. The family and society still treated suicide victims with well funeral ceremonies. According to a secondary informant who was a religion leader believed that some people who have strong religion belief avoided suicide. When they prayed, their pray would give the strength and increase belief to god. However, family support also has an important role, both of which must be balanced. The dogma said that death caused by suicide would go to hell. The negative impacts of suicide occured on families because they would be ostracized by the community.

DISCUSSION

This is the first study that has investigated suicidal behavior in Wonogiri Regency. During the observed period, suicidal behavior whereby the increase number was in 2016 until 2017 year.

Human Characteristics

The result showed that human characteristics of suicide were male with range age of 15 until 65 years, introvert man, middle to lower economic status, have chronic disease. One of the suicide is unemployed. Attempted suicide rate in man was associated with higher unemployment rate. They had suicide ideation before ending his life. The latter two remained robust in predicting newly developed suicidal ideation.9,18

Causality

Based on several study, depression was one of the mental health disorders that occurs for at least two weeks or more that affect the mindset, feelings, mood and how to deal with daily activities. Depression could make our lives useless and suicidal behavior. 14,24

According Lita Arfandiyah Kusuma Dewi et al study, the third problems of young adolescents who suicidal behavior are depressed, self-concept and lack of family relationships. The first is
severe depression caused suicide.\textsuperscript{14} This conducted of Pan YJ studi about for depressed adolescents, being obese was associated with a three-fold increased risk of having suicidal ideation. For non-depressed adolescents, physical maltreatment, afeeling of not being cared about and sub-threshold depressive symptoms were the risk factors\textsuperscript{15}. Several study said that the few of family support caused suicidal behavior. The man who have chronic illnes, unemployed and lack of family support could have suicidal ideation.\textsuperscript{1-7} This study same with Lidija Injac stevovic about the average age of males who attempted suicide was 38.35 min 15 and max 88 years of age. Attempted suicide rate in man was associated with higher unemployment rate.\textsuperscript{13} The lack of family support casused suicidal behavior related with Allen J study about protective factors at the individual, family, community, and peer influences levels lead to later change on the ultimate prevention of reasons for live protective from suicide risk and reflective processes about alcohol use consequences protective from alcohol risk.\textsuperscript{3} When person did not get family support and he was victim of bullying that caused depression. This condition was same with Shireen et all study The risk of suicide attempts was higher in girls, who were involved in bullying, either as the victims or perpetrator, than in boys. Depression, feelings of hopelessness and loneliness can develop in the child after being bullied for long periods of time, these feelings are indirectly related to suicidal ideation and attempts. Involvement in bullying increases the likelihood of suicidal ideation and attempts in children and teenagers.\textsuperscript{21} Low income could be precipitated to suicidal behavior. The victim of suicide have poor perceived health status. This study conducted to Ahra Jo ett all study about the prevalence of suicidal ideation in young and middle-aged adults was 4.4% and 5.6% respectively. For young adults, suicidal ideation risk was higher among those with low income or heavy drinking habits. In midle-aged adults, low income, poor perceived health status, negative perception of peer-compared health status, and negative social perspective were the major risk factors.\textsuperscript{2} The other causality of suicide was genetic factor. Base on AA Sagung et all study there was relationship between genetic factor and suicidal behavior. Suicidal behavior higher on family whose suicidal history.\textsuperscript{1} This study conducted with Burrel LV et all about bereaved offspring with low social support, indicated by offspring’s single status and repeated changes in marital status and residence, had a significantly increased suicide risk compared to bereaved offspring with high social support. Moreover, low socioeconomic status, having an immigration background, having list both parents and loss due to suicide significantly increased suicide risk.\textsuperscript{4}

**METHODS**

There were some methods of suicide to end their life. In this study, most of suicide victim ended their live used with hanging their self by a rope. They assumed that this methods was classically and succesfully. This was conducted with Rahesli Humsona study about the methods used rope, sarong, cloths, and belt. The methods used by all of range age.\textsuperscript{20}

**Public Opinion**

The public opinion about suicide is a sin. The family and society still treated suicide victim well in funeral ceremonies. This conducted with Rahesli Humsona study about public opinion on suicide. The study said that in community, suicide was a scary act and have a negative impact to the victim and their family. Although suicide have negative impact to family, but the family still treated victim very well on their funeral.\textsuperscript{20}

**CONCLUSION**

The human characteristics of suicide were male with range age 15 until 65 years, introvert man, middle to lower economic status and have suicide ideation. The risk factors of suicide were economic, genetic, bullying, depression due to chronic disease, few family support, and loneliness. The suicide methods which is used with hanging their self by a rope. The public opinion about suicide said that suicide is sin. One of the most effective suicide prevention strategies is to educate community on how to identify suicidal signs and increase the social supports. It is important to provide a safe environment in shool and at home.

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**REFERENCES**


The Return of a Correctional Tuberculosis Nurse’s Professional Values: a Narrative Study

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ABSTRACT

Tuberculosis (TB) is a main health problem in penitentiary institution as TB reservoir whereas its incidence higher than in the community. Correctional nurses’ values influence nursing care in prisons particularly in enhancing prisoners’ TB treatment completion. Limited study revealed a detail process of a correctional nurse in regaining her professional values particularly. This paper presented a story of regaining a correctional TB nurse’s professional values. The study method was a narrative study conducted in a prison in Jakarta, Indonesia through a dialogue between the researcher and the participant. The procedure was conducted based on Paulo Freire’s method by investigating the background of present values and questioning the participant how it differed from the previous one. The findings narrates a story of regaining a correctional nurse’s professional values from her previous one to the present including previous perceptions about current situation of TB care in the prison, background of the previous nurse-prisoner relationship, consequences of the interaction, ideal situation of nurse-patient relationship and the consequence, and consciousness as a nurse. The study recommends a mechanism to support professional nursing values for correctional nurse in providing TB care.

Keyword : tuberculosis, nursing care, prisoner

INTRODUCTION

Tuberculosis (TB) is still one of global health problems. The target in reducing TB prevalence by 50% contrasted with a baseline of 2015 has been achieved. However, there are some barrier in TB eradication in 2014 in which about 9.6 million new cases emerged, 37% cases were unrecognized in a year, about 480,000 individuals advanced multidrug-resistant TB (MDR-TB), and TB with HIV is the major mortality cause.1 This disease also become a big issue in penitentiary institution as TB reservoir whereas its incidence higher (ranged from 4 to 81 times) than in the community. The high TB risk is due to poor ventilation, overcrowded situation, increase human immunodeficiency virus (HIV) infection and rapid advanced of latent tuberculosis infection (LTBI), injecting drug users, and inadequate nutrition.2-4 This condition is severed with the advanced and spread of drug-resistant TB involving overpopulation, late case detection, inadequate contact screening, poor infectious disease treatment, elevated inmate turnover, inadequate TB infection control protocol, and limited healthcare service accessibility become TB control barrier in this setting.3

Ethical professional is one of required components for nurses’ commitment towards TB patients.5 Therefore, correctional nurses’ values influence nursing care in prisons particularly in enhancing prisoners’ TB treatment completion. Several studies show correctional nurses cannot perform caring behavior since dilemmatic situation. Correctional system influences the dinamic relationship between nurses and prisoner-patients. Nursing is caring environment and on the other hand imprisonment works on forensic perspective. Policies exist that prevent nurses from engaging in typical caring behaviors, such as touch, hugging, and self disclosure.6 Nurses’ caring was experienced as an attempt to negotiate the boundaries between the cultures of custody and caring. Facing complex challenges and a number of limitations on the nurse–patient relationship, nurses strived to find a way to care for their inmate patients. Environmental risk meant that caution and vigilance were essential and these nurses demonstrated courage
and persevered for the sake of their inmate patients.\textsuperscript{7}

Besides having to work and experience emotional labor in relationship with prisoner patients, other staff and institution, correctional nurses have contradictory internal communication with self. This study suggested a development of emotional intelligence using reflective practice,\textsuperscript{8} which can be performed by dialogue to achieve this. Limited study revealed a detail process of a correctional nurse in regaining her professional values particularly using a dialogue. The purpose of this narrative study was to describe a story of a correctional TB nurse in regaining her professional values.

\section*{METHOD}

The study design was a narrative study to describe how a nurse’s professional value was regained. The researcher involved a correctional nurse working in a prison in Jakarta, Indonesia. The dialogue was conducted based on Paulo Freire’s method using semi-structured interview guidelines by investigating the background of present values and questioning the participant how it differed from the previous one. The researchers narrated the finding in a chronological story so readers can understand the process of the regaining the nurse’s professional values. To enhance, trust and worthiness of the data, the researcher built trust with the participant so she provided the true data and attached the raw data so the readers are able to follow the researchers’ point of view in displaying data.

\section*{RESULTS}

\subsection*{1.1. Previous perceptions about situation of TB care}

The dialogue began with the nurse’s evaluation on her performance related to TB program influencing post-release TB treatment completion. Emerged themes consisted of: (1) the nurse did not intensively monitor and recognize TB patients and (2) nurse’ role focus on TB program recording and reporting.

\subsubsection*{1.1.1. The nurse did not intensively monitor and recognize TB patients}

2. The nurse expressed that she did not intensively supervise TB patients’ progress in the prison. She paid attention on patients in the inpatient care ward required particular interventions such as injection or infusion because she could directly see the patients. However, for other TB patients, she used term “black and white” to indicate that she did not well recognize TB patients as mentioned:

3. “…. didn’t intensively monitor it, may be? For example, there are 23 patients, sometimes they bear resemble faces and I don’t see them every day… Looking their faces. Have they consumed the drugs? …. we cannot monitor the patients, except if he gets injections, or something else like infusion. In that case, we can see, automatically we know the patient, right? However, for general patients with anti TB drugs, I’m still black and white. I mean, who is he? He consumes anti TB drugs but I don’t know his name.”

\subsection*{3.1.1. Nurse’ role focused on TB program recording and reporting}

4. The nurse said that she focused on TB program recording and reporting. She realized that she did not well monitor TB program and provided an example while she could find anti TB drugs anymore. Actually, anti TB drug supplies for each patient must be separated in his own box. In fact, the treatment observer mixed them (one box of anti TB medicines shared for many patients). After noticing it, she began to reorganize the supply. She conveyed:

5. “…. I focus on the recording and reporting. So for interacting with patients, until yesterday, I really felt that I do not really monitor it. Until TB drugs, “Where is the drugs? Is it finished?” In fact, the drug observers took one box for all patients. Finally, I don’t remember when. Monday or Tuesday, I reorganized all, then put here.”

6. Additionally, she told that the physician handled all patients as mentioned:

7. “The focus is that, so the patients… (Laughing). Fortunately, all patients were taken care by dr. D.”

\subsection*{7.1. Background of the previous nurse-prisoner relationship}

The researcher explored the background of nurse-patient relationship in the prison. This was important to understand critical situations and modify them. Generated themes in this topic were: (1) Nurse-prisoner relationship in prisons is different with nurse-patient relationship in hospitals because of uniform, education, and system, (2) Difference previous work experiences in a hospital and the prison, and (3) Perception that correctional nurse’s roles were similar with PHC nurses’ roles i.e. do not provide direct care to patients due to no specific nurse’ job description.
7.1.1. Nurse-prisoner relationship in prisons is different with nurse-patient relationship in hospitals because of uniform, education, and system.

8. The nurse compared nurse-patient relationship in the prison with the previous hospital where she worked before. She revealed that they were different in which she claimed as a “true nurse” in the hospital as stated:

9. “Actually, I don’t know prisoner-nurse relationship here. It is not like in hospitals, true nurses.... Yes, it’s true, for society, TB patients as well. I think for hospital, PHC, and prisons contexts.... For prisons and for hospital contexts, it is very different. It’s impossible to be similar, completely different, for PHC, slightly....”

10. She reflected that her different feeling because of the uniform, education, system. Uniform made her felt as similar with other correction staff. She said:

11. “But here... Uniform... education.... I feel... Hum.... For us, feeling different..... It should be like that. But here is different, feeling different... Actually the same, only because of the system, we feel different.”

12. She claimed that prisoners perceived the similar impression with her as well. Untrustly feeling also influenced the nurse-patient relationship and aggravated by the uniform. Because of the uniform, they felt as directed persons when interacted with healthcare providers in the prison. The uniform made nurse-patient relationship became correction staff-prisoner relationship in the prison. She expressed:

13. “First, the patient, the prisoner, I think prisoners are directed persons. Then, they consider us not as nurses or physicians, but similar... similar with other staff. Perhaps that condition, right? The system, right? .... Feeling as directed persons, right? Then he considers similar, because from the uniform. Similar... It’s not like a nurse with her patient, right? .... Because he didn’t trust us. Moreover, we use uniform.”

13.1.1. Difference previous work experiences in a hospital and the prison

14. The nurse contrasted hospital atmosphere which influence nurse attitude by looking back her working experience in hospitals. She conveyed that nurses had to performed hospitality to patients although they talked about the patients much behind them.

15. “Because of SMILE, “Do you need any helps, Mam?” (Performing with a gentle voice) although in the nurse station, “That lady is always talking.” However, in front of the patient, “Do you need any helps, Mam?” When I was working in hospitals, working is working. “Is there any pain, Mam?” We say yes, if yes, and no if no because we have responsibilities. Additionally, in small hospitals in Bakti Mulya was not similar with private hospitals that really provide best services. Just like Pertamina Hospital which had great seniority, visiting patients must bla...bla...bla... The work was different.”

16. While comparing with the prison atmosphere she claimed that her nursing knowledge was useless since they had to perform other task as correctional staff such as conducting body inspection and fricking visitor stuffs. She did not execute nurses’ role since her initial work in the prison for three years until she moved to the clinic.

17. “After that, working here, nursing knowledge is useless. For the first three years, because in the Custody Division. The job was only frisking stuffs, bodies. After 2009, I moved to the clinic. Initially, I am in the Guard Division. Not here, from 2006 to 2009, then in the clinic. Yea.... Yea... Not like general patients suffering a disease, this... this... Yea... yea... (Excited)”

18. This duty has been performed until now once a week and written in her job description list on her desk mentioned that the nurse involved in visitation activity to cells i.e. performing visitors body inspection.

18.1.1. Perception that correctional nurse’s roles were similar with PHC nurses’ roles i.e. do not provide direct care to patients due to no specific nurse’ job description

19. The nurse also perceived that the nurse-patient relationship in the prison was not too close because of they did not frequently communicate with patients. It was like the nurse-patient relationship in PHCs i.e. only interact with patients when they come to the service and then went back to their home. In hospital wards, nurses in hospitals 24 hours supervise patients. On the other hand, nurses in evening shift of holiday services supervising patients in inpatient care unit. In fact, they monitored them by asking to associate prisoners in charge in the ward. She explained:

20. “It should be... However, actually here is not inpatient care. He should not be our patient in inpatient care. Actually, the function is like a PHC, so general people only coming, getting medication, and then going back home. We don’t follow up or something like that... Actually.... It’s similar with in PHC, right? Only interact when patients come, then going back home. After
getting medicines, then finish. Just like here. Not like true nurse in hospitals who really monitoring them 24 hours. Here, in the inpatient unit, only nurse working at evening or holiday services. They are only told that the patients are bla... bla... bla... only asked, not directly to the patients. For this, directly contact with patients.”

21. Moreover, the nurse stated there was no specific standard operating procedure (SOP) in correctional facilities and she questioned about this. SOP in this context meant no specific detail standard for each nursing intervention procedure such as in hospitals. She conveyed:

22. “Does it mean nursing SOP in prisons/jails? Yea... How is the SOP? There is no SOP.... Here, we have service SOP. Medical services, doctors and nurses together. It doesn’t tell that nurse job description is bla... bla.... bla.... yea... yea...”

22.1. Consequences of the interaction

In a reflection of the consequence of the relationship on the TB treatment completion, there were themes generated including: (1) patients did not recognize the nurse and (2) no patient’s motivation to consume anti TB drug.

22.1.1. Patients did not recognize the nurse

23. The nurse mentioned one of consequences of the relationship was patient did not recognize nurses. She conveyed:

24. “Don’t acknowledge us.”

24.1.1. No patient’s motivation to consume anti TB drug

25. The relationship also influenced TB treatment completion since patients might have no encouragement to consume the medicine. She expressed:

26. “He has no motivation to consume the drugs.”

26.1. Ideal situation of nurse-patient relationship and the consequence

When the researcher stimulated her to reflect regarding ideal nurse-patient relationship, a theme emerged i.e. nurse should be kind so patients will routine consume anti TB drug.

26.1.1. Nurses should be kind so patients will routine consume anti TB drug

27. The nurse stated that healthcare providers including nurses should be “kind” to treat TB patients. This term indicated hospitality in treating patient that could encourage them to consume anti TB medicine routinely. She expressed:

28. “It should be kind (Laughing).... For TB patients, the positive effect is they will routinely consume the drugs because the nurse and physician are kind, right? If we are grumpy, they will feel not like to consume the drugs.”

28.1. Consciousness emersion

In the dialogue process, the researcher explored the nurse’s values related to nursing practice and shared Islamic values related to the context. The nurse reflected those ideas to her personal values and practice. Generated themes involved: (1) Considering trust need in assessing patients’ drug consumption and problem, and (2) Professional value consciousness as a nurse.

28.1.1. Considering trust need in assessing patients’ drug consumption and problem

29. When the researcher stimulated her to identify unimplemented values to be applied in the future practice, there was a “self-conversation” by her reflection on the main value which might influence TB patients to routinely consume their medication. She thought that “closeness” lead to “trust” never been built due to “the uniform” indicating oppressed feeling from “officers”. Term “officers” refered to correctional staffs who caused “afraid” or insecure. She revealed:

30. “What are they? (Thinking). Is it closeness? Trust? If they don’t believe us, they won’t consume the drugs. But, the trust is for explore, right? We haven’t built it yet. I mean assessing the patient, right? Whether he consumes the drugs or not, because of consuming the drugs, and see what problems have to be dealt. Never do it.... Yes, because it was called not like nurse but officer. Because they considered us, “the uniform is like that”. So, what is trust for? I wonder if they are afraid officers will oppress them or something. Sometimes they are also introvert to us.”

30.1. Consciousness as a nurse

31. Other consciousnes came up in the dialogue was related to ethical values particularly as a Muslim nurse. She shared an experience regarding her colleagues’ attitude talking about patients’ behaviour in the nurse station, then the researcher reflected how Muslim nurse should perform, she responded it should not be be behaved. In other words, nurses must treat patients sincerely. She conveyed:

32. “Nurse must not be only kind in front of the patients because it’s not sincere. It must not be performed. Because it is not sincere. Yea...
two-faced. It is different in front and in the back.”

33. Moreover, her ethical value consciousness as a nurse has risen. She became aware her value developed during working in the Guard Division and conducting body inspections occurred until the present time caused her felt not as a nurse. She only performed motorik skills such as injection and infusion. Her spiritual and psychological values has disappeared. She mentioned:

34. “I’m aware.... mental handiwork, right? The first time engaged in the Guard Division, everything.... I think, if I reflect, “Actually for this time, I am not a nurse.” I mean not like a nurse who.... Only inject-infuse.... That’s right. I do start feeling that I am a nurse. Moreover, the first mental handiwork has been in the Guard Division, meeting women, “Mam, body checking. Bla.... bla.... bla....” Moreover, finding many things that made us angry. Every person here is like that as well, right? “Is X comes late... Late! Bla...bla...bla....” That’s all... So, as time goes by I think that I’m not a nurse. Only has skill, able to inject, able to infuse. However, spiritually, psychologically, I don’t think so. Everything has gone. What is a nurse? Right.”

35. She also compared with her performance in home. She still her feeling as a nurse in this circumstance. In that moment, her excited about this awareness. She expressed:

36. “It will be different in my home. If my neighbor is sick, asking for blood pressure measurement, “What is your complaint?” “This is the drug.” In that moment, I feel the soul, “I’m a nurse. I can cure this...” But here, if we have use the uniform... yes, Sis, right!!! (Yealing and laughing)”

DISCUSSION

The result showed that the nurse did not intensively monitor and recognize TB patients because her role focused on TB program recording and reporting. This situation was contrast with the nurse’s roles as the frontguard in TB prevention, care and treatment. It also shows a gap of correctional nurse’ roles provide primary care, emergency care, health promotion, patient advocacy, and care coordination. Several activities can be performed by nurses in TB care including patient care; health education for patients, families, and community; treatment observation; sputum collection; management or co-coordination; contact screening; and research.

The limited interaction between the nurse and prisoner-client occurred due to several backgrounds. In general, it was because of different boundaries of working in hospital and correctional settings. The result showed that the participant claimed that the similar uniform between nurses and other prison officers influenced the nurse-client relationship. Crampton and Turner mention that correctional nurses experience dilemma between ideal and real situations. It is because of the nurses have to deal with many barriers to provide care in the environment that emphasizes on punishment.

The participant considered her had a similar value with other prison staff to control prisoner’s behaviors. This was a false consciousness whilst an individual can misperceive an unauthentic word due to oppressed situation in which he/she is unable to see the truth. This situation also happens in correctional nursing practice whilst correctional nurses have to deal with unexpected behaviors of prisoners such as manipulation and intimidation, or a penitentiary system that contradictory with caring environments as an ideal situation for providing nursing care. The nurses might perceive that they should not perform as “normal” nurses that show their passion in caring patients.

Concientization is developed through reflection and action. In the decodification, this process of conscientization is at perception level. The researchers tried to externalize participants’ consciousness by sharing the researchers view and make a dialog with participants regarding participants’ and researchers’ point of view and they will reflect those ideas in their thinking. This is called as dialectical confrontation that will produce meaningful themes which is a new way of thinking as a process of enlightenment. The nurse realized the negative effects of the limited nurse-client relationship including patients did not recognize the nurse and no patient’s motivation to consume anti TB drug. The nurse professional value was returned when there was a dialogue in the nurse self by contrasting her behaviors as a nurse in caring her neighbor and her behavior in the prison setting whereas she did not feel as a nurse but a prison staff.
CONCLUSION
The findings narrates a story of regaining a correctional nurse's professional values from her previous one to the present including previous perceptions about current situation of TB care in the prison, background of the previous nurse-prisoner relationship, consequences of the interaction, ideal situation of nurse-patient relationship and the consequence, and consciousness as a nurse. The study recommends a mechanism to support professional nursing values for correctional nurse facilitating by a dialogu

REFERENCES
5. Franco E, Cavalcante DO, Maria D, Vieira G 2016 Nurses’ commitment to the care of tuberculosis patients Texto Context Enferm 25 1-10
6. Christensen S 2014 Enhancing nurses’ ability to care within the culture of incarceration. J Transcult Nurs. 5(3):223-231
8. Walsh E 2009 The emotional labor of nurses working in her Majesty's (HM) prison service. J Forensic Nurs. 5 143-152
Peer Educators’ Competences for Inmates with HIV/AIDS: a Systematic Review

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ABSTRACT
HIV/AIDS is a global health issue contributing mortality particularly in correctional settings. Peer education is considered as an effective intervention in modifying behaviours of prisoners with HIV/AIDS. There was a limited review revealed peer educators’ competences for inmates with HIV/AIDS. This literature review aims to describe competences of peer educators for inmates with HIV/AIDS. The study method was a systematic review of seven (7) papers (from 1997 to 2017) selected from data bases (EBSCO, Science Direct, and Google Scholar) with PICO method in screening papers. The data extracted and analyzed qualitatively in emerging categories related to the study goal. The findings show three peer educators’ competences for inmates with HIV/AIDS including (i) knowledgeable about HIV and related disease such as TB and STDs, (ii) good communication skill in educating and interacting with some parties in the correctional facilities and community, and (iii) well-behaved in HIV treatment and prevention, daily life, and learning process support. Peer educators’ competences for inmates with HIV/AIDS involve knowledge, communication, and behaviours related to HIV/AIDS and learning process in adopting behaviours. The study suggested a comprehensive peer educator recruitment and curriculum for peer educators in changing behaviors of inmates with HIV/AIDS.

Keywords: inmates, peer educator’s competences, HIV/AIDS

INTRODUCTION
Human Immunodeficiency Virus (HIV) continues to be a major public health problem in the world. In 2015, World Health Organization (WHO) claimed more than 36.7 million people lived with HIV, 2.1 million new HIV cases emerged, and 1.1 million death occurred due to AIDS. Globally, the trend decrease compared with 2010. In contrast, elevating HIV infection occurs in correctional setting and its prevalence is greater than the general population. HIV/AIDS prevalence in prison populations is estimated to be 5 times higher than the general population in the United States. Estimated reports Ministry of Health of the Republic of Indonesia in 2009, from 140 thousand inmates in Indonesia there are about 5 thousand (3.6%) has been infected with HIV and 24 times higher than HIV prevalence in the general population. The inmate is increasingly recognized as a subgroup that is at high risk of HIV/AIDS infection and other sexually transmitted infections.

HIV/AIDS is one of the most common causes death of inmates in the United States. HIV/AIDS in Indonesian prisons has also been one of the leading causes of deaths of inmates in 2005-2009. Consequently, the epidemic situation of HIV/AIDS in this setting leads to escalation of deaths. Due to their HIV/AIDS status inmates with HIV/AIDS are often exposed to discrimination and breaches of privacy and privacy rights, have no access to appropriate medical care, so treatment often hampered. Many prisoners serve short punishment, and recidivism to prison is common. Consequently, HIV-positive people (and at-risk individuals) move frequently between prisons and their home communities. When people living with HIV are released from incarceration, prison health issues necessarily become community health issues.

Some risky behaviors that cause prisoners to be infected by HIV/AIDS in correctional setting is injector drug use, sharing drug needles. Other risk factors for blood-borne infections include the sharing or reusing tattoo and body piercing equipment, sharing blade for shaving, blood-sharing “brotherhood” rituals and sterilization or inexact reuse of medical or dental equipment. HIV infection among female prisoners is likely to occur before their detention,
the risk factor is high-risk relationships with partners and a history of domestic abuse and sexual. Although most of the risky behaviors are infected prior to detention, some imprisoned women engage in risky behavior in prison facilities. Factors that affect the risk of HIV transmission through sexual activity in prison include: the prevalence of infection in the correctional setting; the prevalence of various forms of sexual activity, example unprotected sex, sex with same-sex relationships, violent forms of anal or vaginal intercourse, including rape; and whether commodities, such as condoms, lubricant and dental dams, are provided and accessible to inmates. Factors infrastructure and correctional setting management provide indirectly to susceptibility to HIV and other infections. That is overcrowding, hardness, gang activities, deficiency of protection for susceptible or young inmates, correctional setting staff that lack edification or may be corrupt, and bad medical and social services. The insufficiency of access to prevention HIV in many correctional setting, can effect in fast transmission of HIV. There were early sign that spacious HIV transmission could develop in correctional setting.

The World Health Organization’s Guidelines on HIV Infection and AIDS in Prisons recommends that both inmates and prison staff be informed about prevent HIV transmission. Inmates and staff should join in the development of educational materials. Some evaluations show increase of knowledge and self-reported behavioural change as an outcome of prison based educational. Peer educators can appear a crucial role in educating other inmates. Peer education is a method of health education conducted by fellow members in the target group called peer educator and effective for behavior change intervention in health promotion. This method is effective when first provided training and mentoring to peer educator. The psychological proximity between the target group and the peer educator is achieved, so the material or message is more easily communicated. Health education on HIV/AIDS is effective among inmates men when done by colleagues as professional educators. Peer education is also proven to increase knowledge about HIV/AIDS prevention for the inmates. Groups educated by HIV-negative educators perform slightly better than those in groups with educators HIV-positive peers, peer education programs may be effective in reducing risky behavior among inmates who will soon be released.

Peer education programs provide many benefits to prisoners, peer educators and correctional administrators. This program makes prisoners trust other inmates; speak the same language; has the same background, has a complete population availability (especially on weekends, evenings, and holidays when civilian staff are not present). Peer educators can overcome the difficulties of life imprisoned through other peer educator networks, find useful experiences, give them meaningful time and goals in prison, improve their listening and communication skills, be aware of risky behaviors that occur in prison (eg unprotected sexual activity, abuse syringe and addiction), reducing risky behavior and maintaining a healthy lifestyle. In addition, peer participants serve as a link between prisoners and prison staff, allowing services to be delivered more effectively. Peer education can be considered a valuable tool for maintaining or improving health and wellbeing in the penitentiary, with positive effects seen in knowledge and behavior introductory and inmate peer and very cost effective. Major studies regarding the great benefits of peer education in HIV/AIDS prevention and treatment are not parallel with availability information regarding peer educators’ competences for inmates with HIV/AIDS. This literature review aims to describe competences of peer educators for inmates with HIV/AIDS.

METHODS

The research design is systematic review to meet the study objective. The PICo method was used to focus the component of this review including population (inmates in all ages and sex), interest (peer education), and context (HIV/AIDS prevention and treatment behaviours). Then, the researchers conducted a literature search strategy using an article search system through EBSCO, Medline, Google Scholar, and Science Direct. The keywords used to search for articles were “peer education”, “HIV/AIDS”, “correctional setting”, “inmates”, and “prison”. The researchers limited the paper criteria involving articles published in 1997-2017, full text, and in English. The data were extracted and analysed qualitatively in the emerging category related to the research objectives.

RESULTS

The searching from EBSCO (Medline), Science Direct, and Google Scholar resulted in 34, 199, and 15,200 articles consecutively. The total journal articles obtained was 15,433. The final result to get relevant papers was 9 papers and
two of them were excluded since they are not research paper. The findings show three peer educators' competences for inmates with HIV/AIDS from the seven papers.

The three peer educator competencies are:
Knowledgeable about HIV and related disease such as TB, HCV and STDs.

Some of the competencies needed for peer educators are about knowledge about HIV, perceived risks to HIV, prevention of HIV transmission, knowledge about HIV/AIDS management; STD and STI knowledge; knowledge of nutrition and prevention of TB; knowledge of alcohol and other drug abuse, knowledge of sexuality and gangsterism, knowledge of the use of videos to educate prisoners (containing: the practice of condom use before sex, the needle cleaning process, testimony from HIV-positive people and HCV).5,13–16

Good communication skill in educating and interacting with some parties in the correctional facilities and community.

Competence of peer educators can be seen from good communication skill in educating and interacting with some parties in the correctional facilities and community, often talked to other inmates about HIV and AIDS. Incorporating multiple learning modalities (somatic, auditory, visual, and intellectual); Addressing different phases of human learning: preparation (interest arousal), presentation (new information or skills), practice (integration of new information or skills), and performance (application of new information or skills).17,18

(iii) Well behaved in the treatment and prevention of HIV, daily life, and support of the learning process.

Peer educators set a benchmark for compassionate care for those who are HIV positive; provide support and education to women with HIV/AIDS related fears, questions and needs; acts as a liaison with community groups to help HIV-positive women as they reenter the community.15 Provide examples of scenarios that show condom negotiations and confront drug-trained friends and offer them; and, positive and negative comments that indicate what other addicts / perpetrators are doing in the same situation.16
<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Study Design</th>
<th>Population/ setting</th>
<th>Intervention</th>
<th>Outcome</th>
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</thead>
<tbody>
<tr>
<td>(1) Bryan, 2006</td>
<td>USA</td>
<td>Pre-test and Post-test design (one group only)</td>
<td>196 serving prisoners in maximum and minimum security prisons, 90% male, mean age 30.4 years</td>
<td>Peer education HIV prevention</td>
<td>Knowledge; Perceived risk; Condom attitudes; Condom norms; Condom self-efficacy; Condom intentions; Attitudes for not sharing needles; Norms for not sharing needles; Self-efficacy for not sharing needles; Intentions to not share needles; Peer education attitudes; Peer education norms; Peer education self-efficacy; Peer education intentions; Peer education behaviour.</td>
</tr>
<tr>
<td>(2) Martin, 2008</td>
<td>USA</td>
<td>RCT</td>
<td>N= 343, mean age 34 years 86% male in 3 sites (Delaware, Kentucky, &amp; Virginia)</td>
<td>Peer education HIV and HCV prevention</td>
<td>Condom use during sex</td>
</tr>
<tr>
<td>(3) Ross, 2006</td>
<td>USA</td>
<td>Pre and Post test design</td>
<td>36 Texas State prison units. Peer educators and students were predominantly male, aged 34–43 years Peer educators N = 590 and at follow-up 9 months (N = 257)</td>
<td>Peer education HIV/AIDS and HCV (&amp; other infectious diseases)</td>
<td>HIV–related knowledge; self-assessed educator skills among peer educators;</td>
</tr>
<tr>
<td>(4) Sifunda, 2008</td>
<td>South Africa</td>
<td>Pre and Post test design</td>
<td>4 medium-sized correctional facilities (male) in South Africa. Number housed comparable in size to UK prison, N =263. Mean age 27 y (range 17–55). Mean</td>
<td>Peer education HIV/AIDS and HCV (&amp; other infectious diseases)</td>
<td>Knowledge and beliefs; Attitudes; Sexual communication, social norms about gender relations and sexual violence; Self-efficacy; Intentions</td>
</tr>
<tr>
<td>(5) Greens tead, 1997</td>
<td>USA</td>
<td>RCT</td>
<td>2,295 male inmates at a large state prison for men in California</td>
<td>Peer education HIV/AIDS</td>
<td>The two intervention groups had similar outcomes, both outperforming the no intervention group in intention to use condoms and to be tested for HIV. There was also a significant difference between the intervention groups and the no intervention group in their perception of risk. Inmate preference overwhelmingly favored HIV+ peer educators over other types of educators.</td>
</tr>
<tr>
<td>(6) Boudin, 1999</td>
<td>USA</td>
<td>Qualitative Study</td>
<td>750 female prisoners in Bedford Hills Correctional Facility</td>
<td>Peer education and Counseling Program (ACE)</td>
<td>The Power of AIDS Counseling and Education Program (ACE) in meeting the medical and psychosocial needs of prison populations on HIV/AIDS. The role of nurses in correctional settings and peer health workers can make effective teams meet the challenges of the AIDS epidemic in correctional settings.</td>
</tr>
<tr>
<td>(7) Collica, 2007</td>
<td>USA</td>
<td>Quantitative &amp; Qualitative</td>
<td>All prisoners in USA were covered by the survey.</td>
<td>Peer Education HIV/AIDS and HCV (&amp; other infectious diseases)</td>
<td>The correctional setting were asked to report on: 1. Number of HIV positive inmates in their prison. 2. If they instructed HIV testing; 3. If they furnish prison-based peer programming on HIV. If answer to Q3 was YES: Extent of HIV peer education, and other services.</td>
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DISCUSSION

This article discusses about peer educator's competence in HIV/AIDS prevention behavior in prisons from various literatures. Competence is a fundamental characteristic of an individual related to the size or reference of effective or not performance in a particular job or situation. Competencies can be used to predict performance, i.e., who performs well and less well depending on the competency they have, measured by the criteria or standard used.19 Peer education involves the development of communication, education, and skills that occur between individuals who have the same nature or type of experience with the goal so that knowledge and awareness of health issues increase and influence the changes in health behavior. Peer education has been implemented in prisons in a number of countries, especially in HIV prevention and risk reduction, where changes in knowledge, attitudes, and behaviors surrounding sexual health and intravenous use of drugs. Peer education interventions typically involve formal training of inmates designated peer educators to improve their knowledge and skills, thereby providing immediate health benefits to the individual. The role of peer educators is to convey the components of formal education to fellow inmates, for example, running group sessions in planning HIV risk reduction and informal education through social interaction in correctional setting.20

Some of the competencies necessary for peer educators are about HIV knowledge, perceived risk for HIV and decreased intentions to engage in HIV risk behavior.14 Educate inmates about preventive measures of transmitting HIV; Establish compassionate care standards for those who are HIV positive; Provide support and education to women with fears, questions, and needs related to HIV/AIDS; Act as a liaison to community groups to assist HIV-positive women when they reenter society.15 Peer educators should also know the use of DVDs in the practice of condom use for HIV/AIDS prevention. The video contains: an introductory video segment delivered by a former addict/offender; A demonstration of the needle cleaning process; Testimonials from HIV and HCV positive persons; scenarios/skits that demonstrate condom negotiation and confronting a friend who has drugs and is offering them; and, positive and negative commentaries that showcase what other addict/offenders have done in similar situations.16

Peer educators present HIV and STD information upon entering the prison, during the period of detention, and before releasing them. Prerelease HIV / STD prevention education is also offered at every youth facility and all adult transitional centers every month.4 Competence of peer educators can be seen from how often a participant had talked to friends about HIV and AIDS, how often they talked to other inmates about HIV and AIDS, and how often they had other inmates ask questions about HIV and AIDS.17 Incorporating multiple learning modalities (somatic, auditory, visual, and intellectual); Addressing different phases of human learning: preparation (interest arousal), presentation (new information or skills), practice (integration of new information or skills), and performance (application of new information or skills).18

The curriculum of peer education covered the following topics: HIV and AIDS, STIs, nutrition and TB prevention and management, alcohol and other drug abuse, sexuality and gangsterism, and manhood and general life skills.13 Other peer educator competencies are able to communicate well; honest; encouraging inmates to HIV VCT; knowledge about HIV transmission, HIV testing, effects of HIV/AIDS on individuals, family and the community; provided with information on hepatitis, tuberculosis, and other STD; responsible for educational presentations on the transmission and prevention of HIV; maintaining the peer education classroom; completing paperwork for VCT; directing those with advanced questions to other health resources is located in the classroom.21

Regarding peer competencies, an organization must educate peer educators effectively and efficiently in order to fulfill their tasks well. Peer education also raises three ethical issues: accountability, peer competence, and confidentiality. Regarding liability, clear procedures should be developed and applied to determine who is responsible for the provision of care. Furthermore, if peer education is not properly managed, professionals may feel ignored by offenders, who may be more comfortable accessing peer-led programs. This may result in prison officers no longer providing counseling, reducing rehabilitation services, and/or reducing professional referrals. As a result, it can reduce the morale and professionalism of the organization, and can have a negative impact on the overall implementation. Failure to prepare co-workers adequately may place them at the risk of receiving negative reactions from fellow offenders and staff. Peers should also respond to capabilities within the limits of their training and use an established referral process for problems beyond their means.22
CONCLUSION

The findings from seven artikel show three peer educators' competences for inmates with HIV/AIDS including (i) knowledgeable about HIV and related disease such as TB and STDs, (ii) good communication skill in educating and interacting with some parties in the correctional facilities and community, and (iii) well-behaved in HIV treatment and prevention, daily life, and learning process support. Peer educators' competences for inmates with HIV/AIDS involve knowledge, communication, and behaviours related to HIV/AIDS and learning process in adopting behaviours. The study suggested a comprehensive peer educator recruitment and curriculum for peer educators to change the risk behavior of prisoners to prevent further HIV/AIDS transmission. Preferably peer educator training, as well as their support and supervision, should continue and include an initial and ongoing competency evaluation. In addition, a peer educator should be included in the design or adaptation of the training curriculum and supporting materials to ensure the relevance of the training and ownership of the program. Peer educators of HIV/AIDS are expected to play an important role in HIV/AIDS prevention both in prisons and in the general population.

REFERENCES

16. Martin SS, Connell DJO, Inciardi JA, Surratt HL, Maiden KM. Integrating an HIV / HCV Brief Intervention in Prisoner Reentry : Results of a Multisite Prospective Study Integrating an HIV / HCV Brief


Mindfulness as Balancing for Workers in a Working Health Perspective: A Systematic Review

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ABSTRACT

Background: Indonesia is a productive country where almost all of its people work. There are various sectors of employment in Indonesia such as agriculture, offices, and factories. High public interest in a job without a balanced self-care in the form of self-awareness and self-acceptance, can lead to health problems, especially stress.

Purpose: The purpose of this systematic review is to describe mindfulness method to reduce the level of stress or depression in workers.

Methods: This study is a systematic review conducted by investigating articles searched through the databases of EBSCO, Google Scholar, and Science Direct. The search was limited to the articles published in 2007-2017. Seven articles that meet the inclusion criteria were used in this review.

Results: There are many methods of mindfulness such as mindfulness based stress reduction, mindfulness-based cognitive therapy, mindfulness compassion, and web stress reduction management. This therapy combines awareness and acceptance without judgment. Thus, it is very effective to reduce psychological stress, anxiety, fear, anger and much more which occur at work.

Conclusion: There are several methods in mindfulness including MBSR, MBCT, Mindfulness Compassion and Web Based Stress Management which can be applied. All methods reported similar effects, that is lowering the level of stress or depression by self-acceptance, focus on current and non-judgmental events. An innovation which combines these methods with an application containing techniques to reduce cognitive, affective and psychomotor stress can be further developed.

Keywords: Mindfulness, stress, worker

INTRODUCTION

Indonesia as a productive country where almost all of its people work. There are various sectors of employment in Indonesia such as agriculture, offices, and factories. Workers are among the groups in the community who are at risk of health problems. Based on data from the International Labor Organization (ILO) in 2013, one worker in the world dies every 15 seconds due to workplace accidents, and 160 workers were suffering from labor-related illness. Efforts to improve health and safety of workers are getting attention from around the world with the priority of occupational health in the policy of Health People 2000 program. This global policy is shown to improve workers’ health status, reduce risk factors in the workplace, and reduce the occurrence of accidents and occupational diseases (Permatasari, Komunitas, Ilmu, & Universitas, 2005). The high interest of the community towards the work without balanced with self-care in the form of self-awareness and self-acceptance can lead to problems, especially health problems such as stress.

Job stress is an excessive workload, feelings of distress and emotional tension that impede individual performance. Job stress is influenced by organizational conditions, such as the determination of direction and organizational policies, changes in organizational strategy, and finance, job demands, responsibility for others, changes in working time, poor relationships between work groups and role conflict. As a result, the work concentration is disrupted, performance is less than satisfactory, and the individual cannot meet the demands of his job because of the lack of social support. Therefore, nurses must be able to solve the problem in the form of work stress in the community that can lead to health problems for workers (Ummu Hany Almasitoh, 2011).

According to the conceptual system model developed by Betty Neuman, stress can be reduced by giving intervention in the form of primary, secondary and tertiary prevention (Alligood, 2014). This is in accordance with the efforts undertaken by nurses where services are provided to improve health status through
promotive efforts, preventive, without ignoring curative and rehabilitative actions. The efforts in dealing with stress can be applied in meditation techniques so that people can be aware and can change their deviant behavior. One of the meditation techniques that can be developed to overcome stress is mindfulness. Mindfulness therapy can make individuals have social and emotional intelligence to control self-ego and serve reality with productive responses. This therapy can also create a feeling of relaxation and comfort in work that can increase the mental health (Ilmia, 2016).

PURPOSE
The purpose of this systematic review is to describe mindfulness method to reduce the level of stress or depression in workers.

METHODS
Design of review
The study is a systematic review, which identifies, evaluates, and interprets all relevant studies based on the existing research questions, topics, areas, or phenomena. This systematic review presents facts and evidence taken from some relevant studies that can be used to determine policy. The steps in the systematic review include identifying appropriate research questions, identifying relevant studies, assessing the quality of the studies, combining study results, and explaining the results found.

Inclusion criteria
The inclusion criteria included the articles with quantitative studies, respondents were workers, used mindfulness interventions, results included decreased levels of stress, self-acceptance, and emotional control. Furthermore, the articles should be published in 2007 to 2017 and were written in English.

Literature Search Strategy
Searching the literature was done through electronic medical databases of EBSCO, Google Scholar, and ScienceDirect. The screening strategy of the article is tailored to the inclusion criteria, i.e., mindfulness. The results of the articles should be related to the effectiveness of the therapy. Therefore the keyword for this literature search is "Mindfulness," "workers," and "stress."

RESULTS
After searching the articles through the online databases of EBSCO, Science Direct and Google Scholar, 78 articles were taken. The articles are of quantitative and qualitative designs. After further review, with an adjustment to the inclusion criteria, seven articles were selected and used for this study.

DISCUSSION
This review was conducted to describe the effectiveness of mindfulness spiritual therapy on workers. Mindfulness was first applied in the Buddhist religion. Mindfulness emphasizes the view of what is happening at this moment without any assumptions, expectations, and emotions. Mindfulness changes our perspective where life is more simple and natural without manipulation so we can open our minds and accept ourselves (Hyland, Lee, Mills, Hyland, & Lee, 2015).

There is a phenomenon that physicians often meet workers experiencing burnout due to overwork (Finkelstein, 2015). In this review, the author outlines the results of the mindfulness therapy given to the workers. From some articles, it is identified that mindfulness gives effects on the spirit, happiness, focus on work, improving the quality of sleep, and reducing anger, fear and stress. Respondents in the studies under this review were workers, teachers, health workers, and private employees.

Mindfulness is not only a meditation course, but it is developed in various programs such as Mindfulness Based Stress Reduction (MBSR), Mindfulness Based Cognitive Therapy (MBCT), Mindfulness Self Compassion, Web Based Stress Mindfulness Management and many others. Mindfulness based stress reduction (MBSR) is a meditation program to help individuals with physical and psychological problems to be more accepting and non-judgmental. This program is usually held for eight weeks which contains meditation and training instructions. In this mindfulness training class, participants are asked to practice meditation and are guided to reduce excessive action, blaming being more adaptive so that all maladaptive responses that have become habitual can change (Keng, Smoski, & Robins, 2011). The procedure in this MBSR begins with meditation or yoga, after which it will be given the exercise changes, the mindfulness exercise and ends with the assignment. Kinzin-zin in Trifoglio (2016) stated that the essence of this mindfulness activity is that we know, are fully focused and conscious of what we are doing right now.

Another therapy program is Mindfulness Based Cognitive Therapy (MBCT). MBCT is an intervention that can provide antidepressant effects in people who are depressed. MBCT is
usually given to participants who already have health problems both acute and chronic (Alderen, 2016). In most workers, the physical complaints that usually arise from stress and depression include the changes in heart rate and breathing, increased blood pressure, headaches and heart attacks (Pascasarjana, 2015). The procedure in MBCT is performed through practice programs, discussions and support which will result in cognitive changes in the face.

of stress since behaviors and attitudes are more effective when exposed to stress (Kuyken & Evans, 2014).

In addition, there is another developed intervention of mindfulness, i.e., Mindfulness Self Compassion (MSC). This MSC is almost identical to Buddhist psychological conceptualization of mindfulness and western psychological conceptualization of mindfulness. MSC is a combination of mindfulness that focuses on self-awareness and self-compassion which means being open and treating oneself well as a protective factor that can lead to maladaptive states such as stress, depression, and anxiety (Bluth & Eisenlohr-moul, 2017). The procedure in this program is conducted through a meditation on compassionate training where feelings of acceptance and warmth are emphasized on the individual to increase emotional resources to deal with current and future emotional challenges (Neff & Germer, 2012).

Another type of mindfulness is the Web Based Stress Management, i.e., a mindfulness meditation training by using audio either video or MP3. The procedure in this therapy is similar to that of MBSR. The only difference is that the participant is not directly provided the therapy by the facilitator, but through the program that is downloaded via the application (Allexandre et al., 2016).

The review of several articles in this study found that some methods of mindfulness therapy have their respective advantages in which the final result is decreasing stress and depression. Various methods of mindfulness therapy can be interconnected which will result in new therapeutic methods. The MBSR, MBCT, Mindfulness Compassion and Web Based Stress Management can be combined into an application that sums it all up. It is expected that if this application is developed, it will be more effective in reducing stress or depression level in workers since the therapy is not only physically but also psychologically performed by both facilitators and participants.
<table>
<thead>
<tr>
<th>Place of Study</th>
<th>Participant</th>
<th>Intervention</th>
<th>Duration of time</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boston</td>
<td>Teachers</td>
<td>Mindful Self Compassion</td>
<td>6 months</td>
<td>Self-compassion, mindfulness, and compassion for others significant to social connectedness, life satisfaction, and happiness, as well as decreased depression, anxiety, stress, and avoidance.</td>
</tr>
<tr>
<td>Kristin D. Neff., Christopher K. Germer (2012)</td>
<td></td>
<td>Mindfulness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Massachusetts' stress reduction clinic</td>
<td>Employee</td>
<td>Mindfulness based stress reduction</td>
<td>2 weeks</td>
<td>Mindfulness training programs have evidenced sustained enhancement in a variety of domains, including physical, psychological, cognitive, and conative realms.</td>
</tr>
<tr>
<td>Employees, students, and patients</td>
<td>Employee</td>
<td>Buddhist psychological conceptualizations of mindfulness</td>
<td>7-8 section</td>
<td>Mindfulness brings about various positive psychological effects, including increased subjective well-being, reduced psychological symptoms and emotional reactivity, and improved behavioral regulation</td>
</tr>
<tr>
<td>Finland Employee health care unit</td>
<td>Employee</td>
<td>Mindfulness and Acceptance and commitment therapy based homework</td>
<td>8 weeks</td>
<td>Mindfulness is effective in changing one's perspective by increasing awareness in the present moment, by changing one's attitude and by helping to recognize and to disengage from unhelpful thoughts and habits.</td>
</tr>
<tr>
<td>Valentina Trifoglio (2016)</td>
<td></td>
<td>Treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ohio Employees and most employees are debt collectors</td>
<td>Employee</td>
<td>Web-based stress management program based on mindfulness meditation and weekly group meeting (WSMg1)</td>
<td>8 weeks</td>
<td>A self-directed mindfulness program with group practice and support can provide an affordable, effective, and scalable workplace stress management solution. Engagement may also benefit from combining web-based and traditional CD delivery.</td>
</tr>
<tr>
<td>Didier Alexander., Adam M. Bernstein., Esteban Walker (2016)</td>
<td></td>
<td>Web-based stress management program based on mindfulness meditation, weekly meeting and expert clinical support (WSMg2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pennsylvania Teachers and educators</td>
<td>Teacher</td>
<td>Mindfulness Based Stress Reduction (MBSR)</td>
<td>8 weeks</td>
<td>MBSR program they have initial goals, such as to: deal more effectively with stress, reduce anxiety, improve sleep, or cope with pain.</td>
</tr>
<tr>
<td>Jennifer L. Frank., Diane Reibel., Patricia Broderick (2013)</td>
<td></td>
<td>Mindfulness Based Stress Reduction (MBSR) in different place</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mindfulness Based Stress Reduction (MBSR)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CONCLUSION

There are several methods in mindfulness therapy, including MBSR, MBCT, Mindfulness Compassion and Web Based Stress Management where all have the similar outcome that is lowering the level of stress or depression by self-acceptance, focus on current and non-judgmental events. Innovations that can be made is to combine these methods into one application which contains techniques to reduce stress both cognitive, affective and psychomotor that can be called an advanced mindfulness application.

REFERENCES

The Effect of Modified “Dolanan Bocah” Dance to Dynamic Gait Index in Obese Children Aged 7-10 years old

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ABSTRACT

Introduction: Obesity will significantly change body movement and balance. The risk of falls, associated with balance and postural control, will increase in obese children. Modified Dolanan Bocah Dance is a traditional Javanese dance which contains moves that can improve postural control, ROM and balance. This study investigates the effects of modified Dolanan Bocah dance on balance disturbance that obese children tend to suffer.

Method: This study was a randomized controlled pre and post experimental study. A total of 30 obese children (7 to 10 years of age) were randomly assigned into 2 groups: experimental and control group. The first group practiced the dance for 10 minutes 3 times a week for 6 weeks while the latter group performed their usual daily activities. Dynamic gait index (DGI) score was measured before treatment and at the end of the 6th week of the treatment.

Results: There was a significant difference on the mean of the DGI scores between the experimental group (20(18-20)) and control group (18(16-19)), p = 0.000 (p <0.01) at the end of the 6th week of treatment.

Conclusion: Modified Dolanan Bocah dance could improve balance and postural control of obese children and reduce the risk of falls.

Keywords: Obese children, balance, dolanan bocah dance

INTRODUCTION

In the last three decades the prevalence of overweight and obesity has risen significantly. Globally, around 170 million children (below 20 years old) are estimated to have obesity problems. The 2013 Indonesian Basic Health Research showed that nationally the number of obese children aged 5 to 12 years was still high, 18.8 %, consisting of 10.8 % overweight and 8.8 % obese. In 2010 the obesity prevalence of school age children (6 to 12 years old) in Central Java province was 10.9 %, which was higher than the national prevalence.

Obesity will significantly change how human body moves by changing body anthropometry. The increase of weight and body mass changes how extremities and whole body react to balance. The excessive adipose tissue also disturbs interactions in musculoskeletal system which are important for functional capacity and postural balance. The effects are mostly the disturbance on the range of motion, muscle fatigue and postural control deviation. The range of motion is the most important part in performing functional motion. The range of motion capacity of the trunk and low extremity can influence the ability to maintain and recover balance. This is relevant in obese children since their range of motion will be limited and it causes balance disturbance. The center of gravity then moves to the feet which results in excessive burden that it causes pain and feet fatigue in obese children.

The increasing adipose tissue in obese children mechanically increases total body weight needed to work with the strategy of postural control and balance. The excessive body weight burdens body joints which causes the decrease of physical coordination and increases the risk of falling and fracture.

Dance is an activity which can improve the development of basic movement in children. Dancing is basically an activity of moving body rhythmically accompanied by sound or music. The narrow definition of dance is an arrangement of regular moves purposely designed to achieve a certain impression, while the general definition of dance is an effort to create beautiful arrangement of moves and rhythm in the form of compositions. Dancing requires balance, coordination of body movement, flexibility, good fine and gross motor movement, which is then combined with music.
which accompanies each dance move. A research of using Greek traditional dance to children with mental retardation revealed a significant increase in balance that it decreased the risk of falling.

A dance choreography cannot be separated from step patterns or rhythmical movepatterns. The flow of step patterns becomes the foundation to change places. Dance movement includes locomotor motion such as walking, running, hooping, skipping, galloping, sliding, chasing, balancing and dodging. That move patterns can be found in a Javanese traditional dance like lumaksana (walking), trisik (running), and onclangkanan-kiri (skipping). Besides locomotor motion, there are also balance motion and postural stability in the form of axial movement which includes bending, stretching, twisting, turning, reaching, lifting, falling, curling, pushing and pulling. Those move patterns are equal with some moves in traditional Javanese dances like mendhak (bending) and ngayek (turning).

Obese children are susceptible to the risk of falling due to their balance and postural control so that the researchers would like to examine the effect of modified “DolananBocah” dance to the risk of falling in connection with balance measured with Dynamic Gait Index score.

MATERIALS AND METHODS

This study was a randomized controlled pre and post experimental, carried out at Bendungan elementary school located on Veteran street No. 1 Semarang in April 2017. The subjects were 30 elementary school students aged 7 – 10 years old with obesity. The inclusion criteria were fulfilling the obesity criteria based on 2000 CDC curve (IMT ≥ percentile 95), aged 7 – 10 years old, able to understand instructions, DGI score < 20. While the exclusion criteria were muscle weakness at lower extremity, deformity at low movement organs, surgery history at low movement organs ≤ 6 months, fracture history, dislocation at low movement organs ≤ 6 months, vision trouble < 3/60 (WHO blindness criteria), history/clinical signs of heart and lung illness. The sample were randomly selected. Thirty students fulfilling the inclusion criteria became the research sample. The subjects who attended less than 80% of total 18 times practice sessions, did not come to practice 3 times in a row, did not come when DGI score was measured, were dropped out. This study obtained ethical clearance from the Etiquette Commission of Medicine Research of Medical Faculty of Diponegoro University/Dr. Kariadi Hospital.

The subjects were divided into two, experimental and control groups. The experimental group was given a 10-minute modified Dolanan Bocah dance program, with frequency 3 times a week for 6 weeks while the control group performed usual daily activities. A 5-minute warming up was given before treatment and a 5-minute cooling down was given after treatment. The experimental group was given the modified Dolanan Bocah dance one week before the actual treatment, with the frequency of 3 times a week to familiarize them with the dance patterns. DGI score was measured before treatment and at the end of 6th week of treatment.

Homogeneity test performed to the characteristics of the subjects. To analyze the difference of the mean change of Dynamic Gait Index between the experimental and control group t unpaired test was given if the data distribution was normal, or Mann-Whitney if the data distribution was not normal. To analyze the difference of the mean of the DGI score before and after treatment to each group, t pair test was given if the data distribution was normal or Wilconox test if the data distribution was not normal. All data was computed using SPSS version 16.0. The significance of the study was obtained if p < 0.05 with the interval trust 95%.

RESULT

The subjects of the study were 7 to 10-year-old students of Bendungan elementary school, fulfilled the inclusion and exclusion criteria and finished the program of 18 times dancing the modified Dolanan Bocah dance. The subjects of the study were 30 children who were randomly grouped into two, 15 children in the experimental group and 15 in the control group. There was no drop-out.

Before the treatment, the subjects received information, the subjects’ approval was obtained after they received explanation, pre-treatment-data was taken and the experimental group received one-week modified Dolanan Bocah dance practice program before actual treatment with the frequency of 3 times a week to familiarize them with the dance patterns. The treatment was given 18 times, 3 times a week on Monday, Wednesday and Friday. The study was carried out from February 2017 until March 2017. The post-study was taken on the last day of the treatment.

Characteristics of the subjects

There is no significant difference in the mean of the age (p=0.847), in the sex (p=0.715) and in the DGI score (p=0.775) between experimental and
The mean of body mass index (BMI) shows no significant difference between the two groups (p=0.852). The profile of physical activities of the experimental group does not significantly differ from that of the control group on week 2 (p=0.282), week 4 (p=0.646) and week 6 (p=0.485) (Table.1).

Dynamic Gait Index (DGI) Score

The balance of the two groups was measured with Dynamic Gait Index (DGI). There was no significant difference in DGI score before the treatment between the two groups (p=0.77). There was a significant difference in DGI score after the treatment between the two groups (p<0.00). There was a significant difference in DGI score between before and after treatment in experimental group (p=0.00), but no significant difference in control group (p=0.26).

DISCUSSION

The difference in DGI scores between before the treatment and at the end of week 6 in experimental group is higher than that of control group. Based on statistical test, there is a significant difference in DGI score between before and after the treatment in the experimental group (p=0.00), but there is no significant difference in the control group (p=0.26). Based on the statistical test, there is a significant difference in DGI score after the treatment between experimental and control group (p<0.00) (Table.2). This shows that modified Dolanan Bocah dance improves the balance of obese children. The result of this study is similar with the studies done by Tsimaras et al, Fotios et al, and Mavrovouniotis et al, that reported a significant increase in balance to the groups that received traditional dances treatment that lowered the falling risk factor in children.

Obese children have high prevalence of falling risk. The falling risk is caused by the poor balance of obese children that increase the rate of morbidity and mortality injury like fracture, head injury and joint dislocation. In this study, the experimental group that received modified Dolanan Dance treatment showed the significant increase in balance before and after the treatment at the end of week 6 in which the DGI score changed from 18(16-18) to 20(18-22). This shows that the treatment of modified Dolanan Bocah can increase balance that decreases the risk of falling in obese children.

The modified Dolanan Bocah dance involve steps of dance movements like lifting one foot, tiptoeing, bending and squatting to standing that aim to increase balance. Those movements involve various direction of moving area: forwards, backwards, side and aslant. They will activate synergic muscles and agonies tungkai which are responsible to locomotion. The side movement (to the right or left), forward or backward are through the ankle and hip strategy. Ankle strategy moves the center of gravity while maintaining the foot positioning by contracting gastrocnemius muscle or tibialis anterior muscle (responding perturbation forwards or backwards). The body's anterior sway is balanced by gastrocnemius muscle's activities that pulls the body posteriorly. On the other hand, the body's posterior sway is balanced by the contraction of tibialis anterior muscle. The lateral perturbation involves abductor muscles or abductor hip. The ankle strategy is believed to be effective in maintaining static posture. If the ankle cannot control the excessive perturbation, the hip strategy is available to help control motion from the gravity center. The hip strategy in responding to forward or backward perturbation is marked by the hip muscle activation.

The movements of modified Dolanan Bocah dance like tiptoeing, squatting to standing, lifting one foot, spinning, jumping and bending the body trigger somatosensory system through the receptor of muscle spindle and golgi tendon organs to send the signal to columna dorsalis medulla spinalis then to cerebral cortex that finally stimulate balance and proprioceptive feedback so that the decent postural control and range of motion can be obtained to prevent body from falling. Besides, the visual system and body vestibular also help maintain the postural control and balance especially when one lifts one foot so that the center of gravity (COG) remains in the same one straight line with the base of support (BOS).

The strength of the low extremity muscles also play an important role in maintaining the balance and increasing the ability to prevent falling. When performing the dance movements like tiptoeing and squatting to standing, synergic activation of agonies muscles and coactivation antagonis muscles from extensor and flexor muscle group at low extremity will take place which will increase the strength of low extremity so as to maintain balance that prevent body from falling. Mavrovouniotis et al also carried out a research by giving a combination of Greek traditional dance and palates to blind children. The result showed a significant increase in the strength of low extremity muscles measured with handheld dynamometer and in static and dynamic balance.
The movements of spinning, jumping, squatting to standing in modified Dolanan Bocah dance are parts of gross motor skills that involve the movement of legs, arms, and whole body, while tiptoeing and bending increase flexibility that will increase postural control and static and dynamic balance. This is in line with the research of Derri et al that reported a positive effect of dance towards gross motor skill, flexibility, and balance in 6 to 12 year old children who received dance program.

The research by Tsimaras et all statesthat the advantages of traditional dance for children lie on the difference of rhythmical moves according to the music so that increases coordination between eyes and arms and coordination between eyes and legs at the different speed, formation and combination of arms and legs that trigger the dynamic and static balance. It also creates joy and the feeling of togetherness developsalong with the expression of emotion as well as the level obedience in performing moves after moves in which children will not get bored easily, especially when they do it in group at school. This is what differentiates dance from other balance exercises like bridging board or balance board.

There is no serious side effect of the modified DolananBocah dance treatment. The simple dance moves and no need of special equipment make the participants welcomed the dance. The participants were enthusiastic and no one quit during the research.

The limitation of this study is each item of balance assignment that underwent repair during DGI examination is not counted so it cannot be determined precisely which assignment item has improved with the modified Dolanan Bocah dance treatment.

ACKNOWLEDGMENT

The authors thank to Bendungan elementary school, for the participation, my corresponding author Sri Wahyudati, MD, Physical Medicine and Rehabilitation Specialist for the suggestion, and also staffs and residents of Physical Medicine and Rehabilitation Medical Faculty of Diponegoro University, Kariadi General Hospital, Semarang, Indonesia.

### Table 1. The Subjects Characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Experimental Group (n=15)</th>
<th>Control Group (n=15)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td>8.67 ± 1.113</td>
<td>8.73 ± 1.163</td>
<td>0.847£</td>
</tr>
<tr>
<td>Sex:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Male</td>
<td>7 (46.7%)</td>
<td>8 (53.3%)</td>
<td>0.715£</td>
</tr>
<tr>
<td>- Female</td>
<td>8 (53.3%)</td>
<td>7 (46.7%)</td>
<td></td>
</tr>
<tr>
<td>IMT (kg/m²)</td>
<td>26.56 ± 2.757</td>
<td>26.87 ± 5.387</td>
<td>0.852£</td>
</tr>
<tr>
<td>DGI score</td>
<td>18(16-18)</td>
<td>18(16-18)</td>
<td>0.775¥</td>
</tr>
<tr>
<td>Physical Activities in 24 hour (KKal):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Week 2</td>
<td>1477.4 ± 160.01</td>
<td>1541.2 ± 158.76</td>
<td>0.282¢</td>
</tr>
<tr>
<td>- Week 4</td>
<td>1554.6 ± 151.65</td>
<td>1524.4 ± 190.89</td>
<td>0.646¢</td>
</tr>
<tr>
<td>- Week 6</td>
<td>1517.1 ± 146.3</td>
<td>1562.4 ± 200.81</td>
<td>0.485¢</td>
</tr>
</tbody>
</table>

¥ Mann Whitney test; £ Pearson chi square; ¢ independent t-test

### Table 2. Comparison of DGI Score in Experimental and Control Group.

<table>
<thead>
<tr>
<th>DGI Group</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>Control</td>
</tr>
<tr>
<td>1. Before Treatment (pre)</td>
<td>18(16-18)</td>
</tr>
<tr>
<td>2. After Treatment (post)</td>
<td>20(18-22)</td>
</tr>
</tbody>
</table>

P 0.00*|b | 0.26|b  

* Significant p < 0.05; a Mann Whitney test; b Wilcoxon
REFERENCES
The Comparison of Efficacy Between Hatha Yoga and Tai Chi at FEV1 And FVC in COPD Patients

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ABSTRACT

Aim: To analyze the differences in the effectiveness of Hatha Yoga and Tai Chi at the FEV1, FVC and FEV1/FVC in patients with COPD.

Methods: This study was quasi-experimental two groups pre and post design. The target population is adult patients diagnosed with COPD in the BKPM Semarang. FEV1 and FVC were measured before and after Hatha Yoga and Tai Chi exercise.

Results: The effectiveness of Hatha Yoga and Tai Chi at the FEV1, FVC and FEV1/FVC was not significantly different between groups. Both breathing exercises have the same principle in training respiratory muscles in a slow motion rhythm.

Conclusion: Hatha Yoga and Tai Chi can be used as a training program in COPD patients since both are safe, inexpensive and do not need a special place to do. Both exercises have the same effectiveness in improving the functional capacity of the lungs in patients with COPD.

Keywords: Chronic Obstructive Pulmonary Disease (COPD), Forced Expiratory Volume in 1 second (FEV1), Forced Vital Capacity (FVC), Hatha Yoga, Tai Chi.

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is one of the major causes of morbidity and mortality worldwide. In 2002, COPD was the fifth leading cause of death. It is estimated that by 2030, COPD will be the third leading cause of death worldwide. The impact of COPD is a disruption to the quality of life and health status of a person. Furthermore, it will get worse with the frequency of exacerbations.

Assessment of COPD is aimed not only to diagnosis, but also to determine the degree of severity, consequently on the patient's health status and the risk of incident exacerbations, hospital care and death, and to determine its management.

Spirometry is a simple test to measure the amount of air exhaled by a person and the amount of time it takes. Spirometry measurements are needed to confirm the diagnosis of COPD, assess the degree of severity and progression of the disease. (Decramer M et al., 2016). FVC (Forced Vital Capacity), FEV1 (Forced Expired Volume in one second) and FEV1 / FVC are spirometry components used to reach that purpose.

The management of COPD includes both medical and non-medical management. Medical management is done with the use of bronchodilator drugs such as short acting beta agonists, long acting beta agonists, short acting anticholinergic, long acting anticholinergic, methylxanthines, and corticosteroids. Other drugs may be added according to symptoms of mucolytic and antibiotics in signs of infection.

Non-medical management is done primarily by reducing risk factors and rehabilitation programs. COPD patients may benefit from regular exercise programs, with increased exercise tolerance and improvement of symptoms of breathlessness and fatigue. The minimum time for an effective rehabilitation program is 6 weeks, but the patient will get sustainable good health status above the previous condition if the rehabilitation program is continued at home.

The rehabilitation program includes three main components of physical exercise, psychosocial, and breathing exercises. Hatha Yoga and Tai Chi are a form of breathing exercise. Previous research has proven the benefits of both Hatha Yoga and Tai Chi exercises in patients with COPD. This study would like to analyze about the comparison of efficacy between Hatha Yoga and Tai Chi on functional lung capacity in COPD patients assessed by spirometry.

METHODS

This research was conducted at Community Lung Health Center (Balai Kesehatan Paru
Masyarakat) Semarang from May to September 2016 by using 24 samples. This research is a randomized controlled pre and post experimental study. Twenty four samples were previously diagnosed with COPD. They were selected by consecutive sample drawings which were divided into 2 groups, 12 samples for Hatha Yoga (HY) and 12 samples for Tai Chi (TA). Both groups were given training twice a week for four weeks.

Each group underwent spirometry measurements before the treatment to measure FEV1, FVC and FEV1 / FVC by using standard spirometry examination standards by the researcher. Then each group performed Hatha Yoga and Tai Chi treatment for 4 weeks with 2 times in 1 week frequency. Spirometry measurements with the same components were repeated on each group upon the completion of the full exercise for 4 weeks. The results were then compared between before and after treatment and also between the two groups.

FEV1 dan FVC were tested using spirometry. The subject stood/ sit, then did maneuver after steady state. The examination was done until 3 acceptable results were obtained and 2 of them were reproducible. Acceptable results are is good/smooth start, finish examination, expiration time of at least 3 seconds, flow-volume chart has peak. Reproducible is accepted if from 3 acceptable maneuvers, the difference largest value is less than 5% or less than 100 ml for FVC and FEV1 values. Maximum repetitions were 8 times. If it failed, it would be repeated the next day.17

The Hatha Yoga exercise consists of breathing exercises, it is called sukhasana (sitting comfortably) or sleeping on the back with a relax (shavasana). Respiratory exercises may include Abdominal Breathing, Clavicular Breathing, Natural Breathing, Thoracic Breathing, Nadi Shodhana Pranayama (covering the nose). After the main breathing exercise proceed, it is then continued by Asana which consist of standing asana and sun salutation, and ends with relaxation (Shavasana, Advasana, Makarasana, Matsya Kridasana). The Hatha Yoga exercise was led by a certified trainer.12,18,19

The Tai Chi exercise consists of the first 5 minutes of warm-up with Tai Chi Chuan practice (movement 1), 20 minutes of main training with Tai Chi Chuan practice (movement 2-9) and last 5 minutes of cooling with Tai Chi Chuan practice (movement 10). The Tai Chi Exercise is led by a certified Tai Chi master.11

RESULTS
The study was conducted at BKPM from 23 September to 31 October 2016. The total numbers of study subjects were 16 people with simple randomized group division. The group that followed the Hatha Yoga exercise was eight people, hereinafter referred to as group I. The group that followed the Tai Chi training was eight people, hereinafter referred to as group II. Three persons from group I and two persons from group II were dropped out because they did not come up three consecutive exercises due to illness and incompatibility between workout schedules and working hours. Until the end of the study, there were 11 persons as data analyzed. Group I was five persons and group II was six persons. Characteristics of research subjects can be seen in table 1.

Table 1. Characteristics of research subjects

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group I Hatha Yoga (n=5)</th>
<th>Group II Tai Chi (n=6)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td>63.40 ± 2.30</td>
<td>60.33 ± 5.99</td>
<td>0.33b</td>
</tr>
<tr>
<td>IMT (kg/m²)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking history</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes=20%, no=80%</td>
<td>20.61 ± 5.03</td>
<td>22.10 ± 4.58</td>
<td>0.62b</td>
</tr>
</tbody>
</table>
| IMT = Indeks Massa Tubuh
| Smoking history   |                          |                        |         |
| yes=33.3%, no=66.7%| 20.61 ± 5.03             | 22.10 ± 4.58           | 0.62b   |
| FEV1              | 0.86 ± 0.34              | 0.82 ± 0.40            | 0.86b   |
| FVC               | 1.64 ± 0.41              | 1.78 ± 0.76            | 0.71b   |
| FEV1/FVC          | 0.51 ± 0.13              | 0.47 ± 0.18            | 0.86b   |

*Mann-Whitney

*Independent Sample T Test

Table 1 demonstrates that there is no characteristic differences between the two groups.
Table 2. Differences FEV1 before, after and the difference in the changes according to research group

<table>
<thead>
<tr>
<th>FEV1</th>
<th>Average±SD</th>
<th>Group I Hatha Yoga (n=5)</th>
<th>Group II Tai Chi (n=6)</th>
<th>p a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>0,86 ± 0,34</td>
<td>0,82 ± 0,40</td>
<td>0,86</td>
<td></td>
</tr>
<tr>
<td>Post</td>
<td>0,95 ± 0,56</td>
<td>1,10 ± 0,25</td>
<td>0,58</td>
<td></td>
</tr>
<tr>
<td>p b</td>
<td>0,68</td>
<td>0,02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delta (post-pre)</td>
<td>0,09 ± 0,47</td>
<td>0,28 ± 0,19</td>
<td>0,40</td>
<td></td>
</tr>
</tbody>
</table>

a Independent Sample T Test
b Paired-Samples T Test

Table 2 shows that FEV1 in both groups after both Hatha Yoga and Tai Chi exercises improved with a significant increase in the Tai Chi group.

Table 3. Differences of FVC before, after and difference of change according to study group

<table>
<thead>
<tr>
<th>FVC</th>
<th>Average±SD</th>
<th>Group I Hatha Yoga (n=5)</th>
<th>Group II Tai Chi (n=6)</th>
<th>p a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>1,64 ± 0,41</td>
<td>1,78 ± 0,76</td>
<td>0,71</td>
<td></td>
</tr>
<tr>
<td>Post</td>
<td>1,71 ± 0,37</td>
<td>2,06 ± 0,60</td>
<td>0,29</td>
<td></td>
</tr>
<tr>
<td>p b</td>
<td>0,05</td>
<td>0,10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delta (post-pre)</td>
<td>0,08 ± 0,06</td>
<td>0,28 ± 0,33</td>
<td>0,20</td>
<td></td>
</tr>
</tbody>
</table>

a Independent Sample T Test
b Paired-Samples T Test

In table 3, it can be seen that FVC in both groups after exercise both Hatha Yoga and Tai Chi has increased but not significant.

Table 4. Differences FEV1/FVC before, after and difference of change according to study group

<table>
<thead>
<tr>
<th>FEV1/FVC</th>
<th>Average±SD</th>
<th>Group I Hatha Yoga (n=5)</th>
<th>Group II Tai Chi (n=6)</th>
<th>p a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>0,51 ± 0,13</td>
<td>0,47 ± 0,18</td>
<td>0,86 a</td>
<td></td>
</tr>
<tr>
<td>Post</td>
<td>0,54 ± 0,31</td>
<td>0,56 ± 0,15</td>
<td>0,91 b</td>
<td></td>
</tr>
<tr>
<td>p b</td>
<td>0,67 c</td>
<td>0,11 d</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delta (post-pre)</td>
<td>0,03 ± 0,29</td>
<td>0,09 ± 0,12</td>
<td>0,66 b</td>
<td></td>
</tr>
</tbody>
</table>

a Mann-Whitney
b Independent Sample T Test
c Wilcoxon Signed Rank Test
d Paired-Samples T Test

Table 4 shows that the increase in FEV1/FVC change in both groups was not significant as were the differences between the two groups.

DISCUSSION

Research by Gao Dongqing and Aileen W.K. Chan stated that there was significant improvement in lung function after performing Tai Chi exercises for three months. Sodhi C in his study stated that in patients with asthma who were given yoga exercises for eight weeks experienced significant improvement in lung function. Mandanmohan’s study states that yoga exercises for six months can improve lung function.7,10,20

The three pulmonary function parameters FEV1, FVC and FEV1/FVC in both groups (tables 2, 3 and 4) increased from before and after treatment. Only FEV1 from group II was statistically significant. This may be due to less time training, compared with previous studies.

In COPD case occur respiratory muscle weakness, inefficient contribution to shortness of breath and decreased exercise capacity. The increase in FEV1/FVC in Hatha Yoga and Tai Chi exercises occurs because in both exercises
there are elements of respiratory muscle exercises that work selectively against the inspiratory muscles to resist resistance so as to increase strength, endurance and efficiency. Slower respiratory patterns in both exercises can improve chest wall mechanics, allowing complete expiration and lowered air trapping. The breathing exercise aims to make the patient breathe more efficiently, replacing rapid superficial breathing patterns that can exacerbate gas exchange.14

All pulmonary functional parameters were not significantly different between groups I and II. Nevertheless, it appears that the improvement of functional parameters in Group II is better than group I. Both exercises have the same practice principle of emphasizing stretching, the work of the breath and chi, called prana in yoga. Both exercises seek to integrate body, subtle energy and mind and can help calm the mind and overcome the stress.

Differences in both movements show that Tai Chi is a smooth flowing motion that relaxes to get stretched, while the movements in Hatha Yoga are more stretching for relaxation. Stretching movements in Hatha Yoga can cause difficulties to the elderly, so the goal of exercise becomes unattainable.

CONCLUSION

Hatha Yoga or Tai Chi exercise can be used as one of the preferred exercise programs in patients with COPD, which is safe, inexpensive and can be done anywhere. Their effectiveness is equally good statistically. Both exercises are significantly smoother than the usual Western training methods and sports. To get an optimal result, the exercises should be extended at least eight weeks long. Further research with larger number of subjects and longer research time period is required.

REFERENCES


16. Yan JH, Guo YZ, Yao HM, Pan Lei. 2013. Effects of Tai Chi in Patients with Chronic Obstructive Pulmonary Disease :


Effectiveness of Self-Help on Reducing Stress in Adolescents: A Systematic Review

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ABSTRACT

Background: Stress in adolescents during the developmental phase can bring negative effects on the health outcomes. Interventions to reduce stress are needed to help the adolescents manage their stress. Self-help can reduce stress in adolescents.

Purpose: This study was aimed to describe the effectiveness of self-help on reducing stress in adolescents.

Methods: This study was a systematic review. Which conducted through an advanced search using standardized search protocol in six electronic databases to identify the relevant via CINAHL, Pubmed, Medline, PsycINFO, Google Scholar and Elsevier. The search was limited to the articles published in 2007 to 2017. After the reviews, we identified 12 articles that met the inclusion criteria and were included in this study.

Results: We identified ten studies related to the development of adulthood mental and physical health. Adolescence is a period of multiple stressors, and coping strategies need to be developed to deal with stress throughout the lifespan. Education, health, and social interventions should be empowered in managing stress in adolescents. Self-help were evident to be effective in managing and decreasing stress in adolescents.

Conclusion: Several study of studied result that getting to word that self help can help deep down stress on adolescent and self help can develop behaviour on adolescent.

Keywords: Adolescent, stress decrease, self-help

INTRODUCTION

Adolescence is a general second decade of life (i.e., 10-19 years old) (WHO, 2014). Adolescence is a life period which is full of challenges marked by rapid cognitive, physiological, and neurological changes (Giedd, 2008), as well as increasing emotional and social demands. Thus, interventions that can lead to stress prevention and well-being are particularly important in adolescence (Donovan et al., 2016). The world population data show that 29% of the world’s population is teenagers, and about 80% of them live in developing countries. The result of population census in Indonesia in 2005 reported that the adolescents aged 10-19 years were as many as 41 million (20% of the total population of Indonesia in the same year (IDAI, 2013).

Adolescence is a period where mood can change very quickly, which can be due to homework, school or daily activities at home (IDAI, 2013). The prevalence of adolescents with mental health problems worldwide is reported to be between 10% to 20% (Kieling et al., 2011). Psychological problems in adolescents are still highly significant with many negative implications on adolescent development with mental health (Jonsson et al., 2011; Kessler et al., 2015). Recent studies in the UK show that the prevalence of mental health problems in adolescents in the UK has increased over the last 20 years (Collishaw, et, al 2010). From the perception of the mental health community, adolescence is a very necessary challenge to be handled (Chinaveh, 2013).

Mental health problems are teenagers’ issues that need to be addressed. During this time, teenagers will not be looking for professionals to help their problems, but they often use internet services to help them solve the problems, ask the closest people and tend to seek for help (Blakemore & Mills, 2014; Gould et al., 2000). Interventions in reducing mental health problems in adolescents are a major target (Dray et al., 2017).

For adults, self-prevention interventions have been made and offered over the internet and are proven to be very effective in reducing mental health problems (Spek et al., 2007; Zetterqvist, et, al. 2010). Self-help therapy can be described as a psychological standard in medicine by
helping and facilitating oneself through potential and cost-effective interfaces. Self-help therapy is an appropriate way to do with individual groups (Christensen & Griffiths, 2002). Mental health in adolescents requires septic intervention in reducing mental burden experienced by adolescents either in the form of support via the internet or face-to-face individuals. Self-help greatly assists adolescents in reducing mental health problems they experience.

Sources of Stress in Adolescents
Sources stress on adolescent causes in daily hasless, emotional traumatic dan stress causes disease (Ford 2011, Gerson & Rapaport, 2013). Sources stress who identified by school, family and friend (Wright, Creed and Zimmer Gembeck, 2010). Sources stress can be regard to environmetal, psychological and social to evoke positive and negative to individual respon from stress (Kai Wen, 2010).

Stress Outcomes
Research of stress who experienced by stripling will get to evoke behaviour who that beresiko can to health as utilize alcohol and substance use (King, Molina, & Chassin, 2009; Wills, Sandy, Yaeger, Cleary, &Shinar, 2001), as well a smoking (Finkelstein, Kubzansky, & Goodman, 2006).

OBJECTIVE
This systematic review aimed to describe the effects of self-help in reducing stress on adolescents and development to behavoiur adolescents.

METHODS
Systematic Review who utilized by meruapakan of some study from studi literature by undertaking review of 10 research that is utilized to compare among effect self help on adolescent. Systematic Review this utilize Rendomized Controlled Trial’s method (RCT) and Meta Analyses the so called with PRISM (Liberati et al., 2009). To the effect of PRISM constitutes to know equipment and transparent of reporting many research those are utilized researcher. Focus on research was a effect self help on reducing stress adolescents in 2007-2017.

Research Question
The review of literature was designed to answer the following research question in systematic reviews is:
1. What type design from research that is utilized in study from self help which is utilized deep management stress on adolescent?
2. How is characteristic of research as loading as, setting, method and so long research) one that is utilized deep self help in downs stress on adolescent?
3. What yielding one is gotten from self help on adolescent?

Determining information inclusion in accordance with systematic review who is done was use in four phase in PRISMA, which is indetification, screening, eligibility and included (Liberati et al., 2009).

Identification
The search was conducted by exploring online databases, i.e., CINAHL, Pubmed, Medline, PsycINFO, Google Scholar and Elsevier, to identity relevant literature using a standardized search protocol. Keywords used in the searching were “self help OR Self Help Group” “Adolescence OR Youth OR Adult OR Young,” and “stress.” In the title, abstract and keywords were all entered into a single search and were connected to the Boolean “AND” and “OR.” After the initial reviews were completed, we performed a hand search of the references in the articles we found through our databases. We reviewed these additional references and included all eligible articles in this review. The databases were assessed in July and Agustus 2017.

Screening
All research result already were screened for duplicates accomplishes inclusion criteria or exclusion criteria. If doesn't accomplish inclusion criteria or were duplicates was remove from dataset.

Eligibility
The final search is 10 articles that corresponding to systematic review to inclusion criteria or exclusion criteria that measures up from articles that is utilized up to articles search. Data suitably and up the mark is chosen applicable as systematic review. inklusi's criterion that is used corresponds to that at review who writing to utilize English Language, one that is publicized among 2007 until 2017, one self help's intervention in downs stress on adolescent with age 11-24 years) was inclusion criteria exclusion criteria is included on books, thesis, reports or is clinical guidelines
Procedure

After article was done to identification, screening and determining eligibility of all article list, already been done search of all incoming article in report. The is article final that is utilized in review article that is utilized. Data was done by ekstrasi of some article already being done by review with dataset. According to research question that is utilized, all article is read each independent ala by one insider utilizes ekstarksi data. Then data that gets to be analysed and done by sintesis in report systematic review.

FINDING

Figure 1 the summary from articles suitably on each phase that of data that identifies, screening, eligibility and accords inclusion criteria. Sought after articles with utilizes " self help OR Self Help Group " " Adolescence OR Youth OR Adult OR Young," and " stress." Get severally applicable research in systematic review.

**Fig. 1.** Flowchart of the selected articles self help on reduce stress adolescents
The final result from hand search of reference for sample of 10 articles werer included criteria in the review.

Study Design


Sample Sizes and Attrition


Settings and Method of Delivery

Three studies utilizes intervention Cognitive Behaviour (Lloyd, et, al. 2012, Trautmann & Kro,
Intervention Length

Data abstraction
The abstraction included information on the study design, objective, sampling method, type and source of data, participant characteristics, and the intervention of self-help in adolescents

CONCLUSION
Intervention Outcomes
Ninth studies that found gets to increase self efficacy on client with various health problem and one study is not signifikans deeping to down health problem on client. Of many study have to usufruct already clear by word of intervention result those are gotten from result suitably deep down mental health problem that experienced by client which is as on client with chronic fatigue syndrome, downing headache, symptom's depression, emotional problem, reduce depersi and anxietas, stress, stress's purpose and one research can't down partially remitted disorder up to 6 minngu interventions

Statistically Significant Results
Result from statistic from studies which is gotten of 10 literature that is utilized in review gets to usufruct that signifikans. Result study Lloyd, et,al, 2012, declaring for result that significant increase in school attendace was found pre treatment and follow up this 6 month, the effect estimate wa=1,38 (0,76,2,00), a. medium effect size (d= . 0.48), minimal telephone based guided self help is can be acceptable intervention by use of efficacy in down's fatigue on adolescents. Was Result, Trautman et al, 2012 A signifikans to reduction headache frequency, duration and pain catastrophizing but can't down headache intensity, depression,psychopathological symptom or health related quality life post assessment. NNTs werw 2.0 for the comparison CBT and EDU, 5.2 for the comparison of AR and EDU.

Result study Merry et, al 2012, a signifikans Per protocol analyses (n=143) showed that SPARX was not inferior to treatment as usual. Post-intervention, there was a mean reduction of 10.32 in SPARX and 7.59 in treatment as usual in raw scores on the children's depression rating scale-revised (between group difference 2.73, 95% confidence interval −0.31 to 5.77; P=0.079), were significantly higher in the SPARX arm (n=31, 43.7%) than in the treatment as usual arm (n=19, 26.4%) (difference 17.3%, 95% confidence interval 1.6% to 31.8%; P=0.030) and response rates did not differ significantly between the SPARX arm (66.2%, n=47) and treatment as usual arm (58.3%, n=42) (difference 7.9%, −7.9% to 24%; P=0,332), PARX is a potential alternative to usual care for adolescents presenting with depressive symptoms in primary care settings and could be used to address some of the unmet demand for treatment. Was Two result studies from Hoeks 2009 & Hoeks 2012 data points out quality step-up live social anxiety and cost effectivenessThe followingvariables is examined for their moderating role's acre: demographics, motivation, treatment credibility and expectancy, externalizing behaviour, perceived social support from parents and friends, substance use, the experience of important life events, physical activity, the quality of the therapeutic alliance, and satisfaction.

The result study Litvendt et al, 2011 significant data with intervention in 2 month with internet self help that really effectivc cost in follower everyone. And Was Result study Clarke et al, 2010 pointing out result that signifikans from effect of group of 0 week to 32 week by use of sample (n=160; d= 20, 95% CI=0.00 0.50), with effect moderate of female (n=128; d=. 42, 95% CI=0.09 0.77), effect from self help so achievable and signifikans in health in common public health.

The Result study from songprakun et al 2012, point out distinctive one so signifikans between group with lanjut's action (p= 0,001), with intervention group that compared with by result from control group. signifikans's result so ascendant with post test (p< 0. 001), of baseline to follow up (p< 0. 001), but not of place test to act lanjuti (p = 0.288). Was result study Antonson et al, 2017 internet self help program is no signifikans yang yang sangat potensial dari effect internet-based self help programwas not possible to examine ti low compliance rates. Stripling has to increase compliance by use of self help with cost from they own. Was Study from Willinger, et al menunjukkan usufructs that signifikans of two groups from treatment by use of BDI But Not To HRSD 17.
### Table 1. Summary of the selected studies

<table>
<thead>
<tr>
<th>No</th>
<th>Author, Year</th>
<th>Place of Study</th>
<th>Methodology</th>
<th>Intervention</th>
<th>Control</th>
<th>Duration of Time</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Lloyd, et al. 2012)</td>
<td>London</td>
<td>RCT</td>
<td>11-18 years old n=137, (assigned intervention n=63, ineligible n=49, and not interest n=25) adolescents</td>
<td>Cognitive Behavioural Psychotherapists or clinical psychologists (CBT) with supervision by a cognitive behavioral therapist (TC)</td>
<td>No Control Group</td>
<td>6-months follow-up treatment</td>
</tr>
<tr>
<td>2</td>
<td>(Trautmann &amp; Kro, 2010)</td>
<td>Germany</td>
<td>RCT</td>
<td>36 female and 30 male adolescents</td>
<td>Cognitive Behavioural Training (CBT) and Applied Relaxation (AR) and Educational Group (EDU)</td>
<td>Waiting List</td>
<td>6-months</td>
</tr>
<tr>
<td>3</td>
<td>(Merry et al., 2012)</td>
<td>New Zealand</td>
<td>RCT</td>
<td>187 adolescents</td>
<td>94 participants were allocated to SPARX</td>
<td>93 Treatment as Usual</td>
<td>4-7 weeks</td>
</tr>
<tr>
<td>4</td>
<td>(Hoek, et al. 2009), Netherlands</td>
<td>RCT</td>
<td>Adolescents (12-18 years old) general population who report mild to moderate depressive and/or anxiety</td>
<td>The Internet-based self-help intervention group</td>
<td>Waiting-list control group (WL)</td>
<td>12-months</td>
<td>Depressive and anxiety symptom is declined in both group, Internet-based PST was efficacious in reducing depression and anxiety in comparison to the waiting list control group and finding could represent lack of power</td>
</tr>
<tr>
<td>5</td>
<td>(Hoek, et al. 2012)</td>
<td>Netherlands</td>
<td>RCT</td>
<td>45 adolescent participant the two conditions</td>
<td>The Internet-based self-help intervention group</td>
<td>Waiting list control group (WL)</td>
<td>12-months</td>
</tr>
<tr>
<td>6</td>
<td>(Lintvedt et al., Australia)</td>
<td>RCT</td>
<td>163 students young adult</td>
<td>Early Intervention and Self-Help and</td>
<td>Waiting list control</td>
<td>2 Months Follow-</td>
<td>Internet based intervention can be effective without tracking and</td>
</tr>
<tr>
<td>No</td>
<td>Author, Year</td>
<td>Place of Study</td>
<td>Methodology</td>
<td>Participant</td>
<td>Intervention</td>
<td>Control</td>
<td>Duration of Time</td>
</tr>
<tr>
<td>----</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Study Design</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011)</td>
<td>(Clarke, et al., 2010)</td>
<td>Portland Rando-</td>
<td>18 to 24 adolescents (n=160 participant)</td>
<td>Pure Self-Help internet programs for depression adults (CBT) dan Treatment-as-usual (TAU) Control (n=77 participant)</td>
<td>Interventio n condition (n=83 participant)</td>
<td>32-week</td>
<td>Reduction depression with two measure to modest intervention they were observed to background of substantial TAU depression pharmacotherapy and Psychosocial service to low cost with self-help intervention to have potential deliver are significant to public health benefit.</td>
</tr>
<tr>
<td>8 (Songprakun &amp; McCann, 2012)</td>
<td>Thailand RCT paralle l group</td>
<td>56 participant of moderate depression</td>
<td>n=27 participant intervention (self-help manual plus standard care and treatment)</td>
<td>n=29 participant control (standard care and treatment)</td>
<td>12-week</td>
<td>Self-help therapy contributes to increased resilience in people with moderate depression, and mental health standard care and treatment.</td>
<td></td>
</tr>
<tr>
<td>9 (Antonson, Thorsén, Sundquis t, &amp; Sundquis t, 2017)</td>
<td>Swedish RCT</td>
<td>Adolescent 15 to 19 years old n=202 participant</td>
<td>Internet based Therapy (iMT) and Mindfulness-based intervention (iMBI)</td>
<td>No control group</td>
<td>10 minutes 6 days a week</td>
<td>Two internet-based self-help program is very low in adolescents, to potential positive effects of the mindfulness program on psychiatric symptoms stress most likely are related to compliance rates.</td>
<td></td>
</tr>
<tr>
<td>10 (Willinger et al., 2014)</td>
<td>Austria RCT</td>
<td>90 participant adolescent</td>
<td>guided self-help plus with psychopharmatherapy HRSD (n=49)</td>
<td>BDI with psychopharmatherapy alone (n=41)</td>
<td>3-week run in period and 6-week treatment period</td>
<td>Guided self-help did not significantly reduce symptom in patient partially remitted disorder after 6-week intervention; the intervention leads to a reduction of negative stress-coping strategies.</td>
<td></td>
</tr>
</tbody>
</table>
DISCUSSION
Stress is changed happening adolescence biologis, psychological and sosial (Depkes,2004), it will evoke soul health problem. Healths invasive problem soul be still very tall and frequent one to be become on striping as worry as, stress and depression. Adolescence is a crucial developmental period wherein adolescents experience multiple stressors and develop the skills to cope with stress throughout the lifespan. Education, health, and social service professionals need current evidence available to them when developing school, clinic, and community-based interventions aimed at empowering adolescents to manage stress.

Result of systematic review was study to applicable result in downs stress on adolescent. Intervene this was led to develop stress on adolescent one is expected will get to build physiological of adolescent deep downs stress. self help constitutes intervention that really been reached applicable by all striping with stress problem. Self help constitutes developed strategy deep management stress on adolescent by use of relaxation technique, mindfulness etc by use of self help.

Limitations of Current Body of Literature and Directions for Future Research
After literature which is utilized deep Systematic Review of year 2005 until 2017, already at identification as much 10 article that have a purpose to settle stress on adolescent. Intervention already have once there is is utilized basal deep seeking literature who is utilized. Usable intervention really helps deep increase striping developing. Management stress who is utilized is self help. Studies who is utilized is subject to be down stress. intervention that is utilized for intervention to striping (Broderick & Metz, 2009).

All result review utilizes study about limit metodelogis from review. Severally study utilizes sample that weeny to know marks sense influence from self help. All articles which utilized by menggunaka Randomized Controlled Trials (RCT) in down stress's zoom by use of control and intervention group as much 9 study and not utilize controls as much 1 articles. Severally articles to settle stress's problem by use of development on adolescent. Self help as shaped as intervention in downs stress on adolescent and so effective.

Result from review articles also utilizes severally instrument as measuring instrument in downs stress striping. Measuring instrument from instrument which is utilized is utilize holistic's mode in downs stress on adolescent by use of intervention self help (Rew et al. 2014).

Finally from study from review already at identification with individual adolescent target deep does changing. Severally intervention which is utilized deep downs stress really needs is done and can't divorce from striping. In management stress as source of intervention of theory already being identified from source internal and external on striping (e.g., family support, community resource) with down stress's source and empowers striping (Rew et al. 2014).

CONCLUSION
Reference that is utilized in review articles as intervenisi management stress on adolescent by use of intervention self help so effective. stress management that is utilized on striping really gets focus in develop skill and developing theory by use of study from review in mengatassi increases stress. Studi Literatur is the other is subject to be develop intervention and tests intervention in reduce indigenous stress development source internal and external as support of friend, family and environmentally surrounding.

ACKNOWLEDGMENT
The authors would like to thank Dr. Meidiana Dwidiyanti and Diyan Yuli Wijayanti, who have given their support in preparing and completing this review.

REFERENCES


Christensen, H., & Griffiths, K. M. (2002). The prevention of depression using the Internet, 177(October).

Clarke, G., Kelleher, C., Hornbrook, M., Debar, L., & Dickerson, J. (2010). Randomized Effectiveness Trial of an Internet, Pure Self-


Kai-wen C. A Study of Stress Sources among College Students in Taiwan. J Acad Bus Ethics. 2010:1-8


Effects of Spiritual Mindfulness on Coping Ability in Dealing with Stress in Pregnant Women: A Systematic Review

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ABSTRACT

Background: Stress during pregnancy increase the risk for poor childbirth outcomes and postnatal mood problems and may interfere with mother–infant attachment and child development. Another reason, various pregnancy complications like hypertension, preeclampsia have been strongly correlated with maternal stress. A positive coping mechanism to reduce stress in pregnancy and early postpartum can be performed through mindfulness with a spiritual approach.

Purpose: This study aimed to describe the effects of spiritual mindfulness on coping ability in dealing with stress in pregnant women.

Method: The present study is a systematic review. The search of the literature was carried out by exploring articles through the databases of EBSCO, PubMed, ScienceDirect and Google Scholar. The articles were limited to publication in 2007 to 2017 and employed the RCTs and non-RCTs research designs with a mindfulness intervention. Ten articles that met the inclusion criteria, i.e., pregnant women >10 weeks of gestation, and aged 18-50 years old, were used in this review.

Results: This study identified 861 articles in the scientific literature, but only nine articles were classified as eligible according to the previously established criteria. Pregnancy is a very sensitive stage of every woman’s life, and it needs proper care. Some methods of mindfulness, including Mindfulness-based Cognitive Therapy (MBCT), MindBabyBody program, Mindfulness-Based Prenatal Yoga, Islamic spiritual-based mindfulness, Mindful Motherhood intervention (adapted from MBCT and MBSR), and mindfulness meditation were evident to be effective to reduce the day-to-day perceived stress in pregnant women.

Conclusion: From the study, it was evident mindfulness significantly decreased stress in pregnant women. Mindfulness therapy with a spiritual approach would be a good intervention to a pregnant woman to reduce stress in pregnancy.

Keywords: Mindfulness, stress, pregnant woman

INTRODUCTION

Severe emotional stress in pregnancy can affect the baby in the womb because the physiological changes experienced by the mother affect the blood flow to the uterus and the levels of oxygen available (Upton, Penney, 2012). The results of Dunkel Schetter & Tanner, Lynlee (2012) study suggests that stress in pregnancy is a risk factor due to adverse maternal and childhood. Stress during pregnancy can cause premature birth (PTB), low birth weight (LBW), or infant disorder. In addition, the mother tends to experience disorders during the postpartum period.

In their study, Bardacke, Nancy, Duncan & Larissa (2009) suggest that teaching mindfulness skills for the preparation of childbirth and parenting during the perinatal period can provide psychological and physical benefits for maternal health, with the health promotion of both psychological and stress responses (perceived stress and coping) and physiological (neuroendocrine and autonomic). This shows that spiritual mindfulness is important for pregnant women to maintain her maternal health and the infant health.

PURPOSE

This study aimed to describe the effects of effects of spiritual mindfulness on coping ability in dealing with stress in pregnant women.

METHODS

This study is a systematic review of published studies and is adhered to the preferred reporting items for systematic review criteria. Literature searching through the databases of EBSCO, PubMed, Science Direct and Google Scholar was
conducted. The searched articles were the publication in 2007 to 2017. The inclusion criteria were pregnant women of >10 weeks of gestation and were of aged 18-50 years old. Furthermore, the studies should have employed mindfulness therapy as the intervention. The exclusion criteria were articles which are not full-text of pdf format, and the respondents were out of the inclusion criteria. Articles with the provision of intervention other than mindfulness were also excluded.

All titles that are deemed appropriate for the study were made one and screened whether the title of the article is similar or not and whether there are insignificant results in the provision of mindfulness therapy. Initial selection based on title/abstract was conducted by one of the researchers. The full text of potentially relevant studies were retrieved for further assessment. After the screening, nine articles that met the inclusion criteria were finally selected.

Fig. 1. Flowchart of articles selected for the systematic review
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<th>Title/years</th>
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<th>Population and Inclusion Criteria</th>
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<tr>
<td>A Comparative Study of Mindfulness Efficiency Based on Islamic-Spiritual Schemes and Group Cognitive Behavioral Therapy on Reduction of Anxiety and Depression in Pregnant Women / 2015</td>
<td>Elahe Aslami; Ahmad Alipour; Fatemeh Sadat Najib; Alireza Aghayosefi</td>
<td>The age range of the participants was 24-38 years. Pregnant women in the 16th to 32nd week of pregnancy who referred to the Shiraz health centers (Simple randomized controlled clinical trial on 75 pregnant women)</td>
<td>3 months (June to August 2015)</td>
<td>Treatment of mindfulness based on Islamic spiritual schemes (8 weeks with a maximum two-hour session per week. Kabat-Zinn treatment protocol and homework of 45 minutes a day and six days a week. The treatment of cognitive behavioral therapy for 12 weeks with a maximum two-hour session per week.</td>
<td>The means ±SD age was 29.4±3.8 (mindfulness) and 27±3.2 (cognitive behavior therapy) and 28.6±4.3 control groups. The significant levels of all tests reveal that between the anxiety and depression of pregnant women in the experimental and control groups, at least in one of the dependent variables in the P&lt;0.001 level.</td>
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<td>Mindful Pregnancy and Childbirth: Effects of a Mindfulness-based Intervention on Women’s Psychological Distress and Well-Being in the Perinatal Period / 2012</td>
<td>Cassandra Dunn &amp; Emma Hanieh &amp; Rachel Roberts &amp; Rosalind Powrie</td>
<td>Treatment group participants were outpatients receiving antenatal care at a large metropolitan Women’s and Children’s Hospital in Australia (12 and 28 weeks gestation). Inclusion criteria were the ability to attend at least seven of the eight sessions and not psychosis or active substance abuse.</td>
<td>8 week</td>
<td>Baseline to end of treatment and baseline to post-partum for treatment and control group participants</td>
<td>Edinburgh Postnatal Depression Scale (EPDS) DASS-21 Mindful Attention and Awareness Scale (MAAS) Self-Compassion Scale (SCS)</td>
<td>Three of four treatment group participants (75%) experienced a clinically reliable decrease in stress symptoms from baseline to post-treatment.</td>
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<td>Effect of Mindfulness Meditation on Perceived Stress Scores and Autonomic Function Tests of</td>
<td>Shobitha Muthukrishnan, Reena Jain, Sangeeta</td>
<td>The study included 74 pregnant women from Department of Obstetrics and Gynaecology, HAH</td>
<td>One year from July 2013 to July 2014</td>
<td>Group I(n=37): Control group. Participants in the control group were not offered any intervention in the research project.</td>
<td>This study shows that mindfulness meditation reduces sympathetic tone and can be a powerful modulator of sympathetic</td>
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| Pregnant Indian Women / 2016                                  | Kohli, Swaraj Batra                 | Centenary Hospital, Jamia Hamdard, New Delhi  
Inclusion criteria: Pregnant Indian women of 12 weeks gestation, ≥18 years of age or older, able to read, write and understand English or Hindi and able to verbalize a source of social support. |              |                     | control group received their usual obstetric care.  
Group II (n=37): Study group. Participants in the study group received mindfulness meditation intervention along with their usual obstetric care  
Following were the parameters used for assessments: health history, Perceived Stress Scale (PSS) and autonomic function tests. | nervous system and thereby reduce the day-to-day perceived stress in pregnant women |
| Effectiveness of Mindfulness Based Cognitive Therapy on Anxiety, Stress, and Depression of Pregnant Youths: a Randomized Clinical Trial / 2014 | Mohamad Narimani, Seyed Khadjeh Seyed Musavi | The population included all the of pregnant youths younger than 20 age years old. Sample includes 30 pregnant youth females who got high scores in depression, anxiety and stress scale (DASS21) |              | 4 months (Feb-May 2013) | State-trait anxiety questionnaire (comprised 40 items and two scales of state (explicit) and trait (implicit) anxiety).  
DASS21 (consisted 21 items, which answered through Likert scale. This tool measures anxiety, stress, and depression).  
The intervention included standard eight sessions of MBCT according to the plan proposed by Kabat-Zinn (1990) | The depression means scores and MANOVA results (F [1,29] = 5.81 P < 0.0005) of the treatment group and (F [1,29] = 79.52 P < 0.0005) of the treatment group were significantly lower than the scores of the control group. Therefore, MBCT intervention decreased the stress and depression levels of participants in the treatment group. |
<p>| Randomised Controlled Pilot Trial of Mindfulness Training for Stress Reduction During | Christine M. Guardino, Christine Dunkel Schetter, | Forty-seven women enrolled between 10 and 25 weeks gestation (Mindfulness-Based Practices) |              | six-week mindfulness-based intervention | Mindfulness (Five Factor Mindfulness Questionnaire) Perceived stress (14-item version of the Perceived Stress Scale) Prenatal | This study was a randomised controlled trial of mindfulness meditation training in a Sample of pregnant women |</p>
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<tr>
<td>Pregnancy / 2013</td>
<td>Julienne E. Bower, Michael C. Lu and Susan L. Smalley</td>
<td>classes (n = 24) with home practice or to a reading control condition (n = 23)</td>
<td></td>
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<td>stress/anxiety (four-item scale measuring Pregnancy-Specific Anxiety (PSA) General anxiety(20-item State Anxiety Scale) Demographic and medical risk variables</td>
<td>screened for elevated levels of perceived stress and PRA in the first or second trimesters of their pregnancies. The mindfulness intervention led to greater declines in PSA and PRA from baseline to post-intervention in comparison to a Reading control condition. Perceived stress and state anxiety also declined in the mindfulness intervention group while mindfulness increased in the intervention group; however, these changes were not significantly different from changes in the control group.</td>
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<td>Mindfulness-Based Cognitive Therapy for Psychological Distress in Pregnancy: Study Protocol for a Randomized Controlled Trial 2014</td>
<td>Lianne M. Tomfohr-Madsen, Tavis S. Campbell, Gerald F. Giesbrecht, Nicole L. Letourneau, Linda E. Carlson, Joshua W.</td>
<td>Participants are women over the age of 18 years, who are between 12 and 28 weeks of gestation, with a singleton pregnancy, and who self-identify as experiencing high levels of psychological distress. the ability to speak, read, and write English.</td>
<td></td>
<td>8-week modified Mindfulness-based Cognitive Therapy (MBCT) intervention delivered during pregnancy</td>
<td>Primary (e.g., symptoms of stress, depression, and anxiety), secondary (cortisol, blood pressure (BP), heart rate variability (HRV), and sleep) and other outcome data (e.g., psychological diagnoses) will be collected via a combination of laboratory visits and at-home assessments from</td>
<td>The trial is expected to improve knowledge about evidence-based treatments for psychological distress experienced in pregnancy and to evaluate the potential impact of mindfulness-based interventions on maternal physiology.</td>
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<td>Antenatal Mindfulness Intervention to Reduce Depression, Anxiety, and Stress: A Pilot Randomised Controlled Trial of The Mindbabybody Program in an Australian Tertiary Maternity Hospital / 2014</td>
<td>Hannah Woolhouse, Kristine Mercuri, Fiona Judd, Stephanie J Brown</td>
<td>Inclusion criteria: booked in to give birth at the Women’s; &gt;10 weeks gestation; 18 – 50 years old. 20 women were recruited to the non-randomised trial, and 32 to the RCT.</td>
<td>6-week MindBaby Body program</td>
<td>The study was designed in two parts 1) a non-randomised trial targeting women at risk of mental health problems (a selected population) and 2) a randomised controlled trial (RCT) of a universal population.</td>
<td>This small pilot study provides evidence on the feasibility of an antenatal mindfulness intervention to reduce psychological distress. Major challenges include: finding ways to facilitate recruitment in early pregnancy and engaging younger women and other vulnerable populations.</td>
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<td>The Impact of Mindfulness-Based Prenatal Program on Latino Pregnant Women’s Mindfulness and Stress / 2015</td>
<td>Maira A. Simonian</td>
<td>Fourteen Latino women completed the program. Participants scores were obtained at two-time points- at the beginning of the program (time 1), and at the conclusion of the program (time 2).</td>
<td>10-week Mindfulness-Based Prenatal Yoga</td>
<td>Participants scores were obtained at two-time points- at the beginning of the program (time 1), and at the conclusion of the program (time 2). Data were collected via the Prenatal Psychosocial Profile to measure stress, and the Five Facet Mindfulness Questionnaire to measure mindfulness</td>
<td>The mindfulness-based Prenatal program can be used as an effective resource for stress management by providing a safe and effective intervention to Latino women during pregnancy.</td>
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<td>Effects of a mindfulness-based intervention during</td>
<td>C. Vieten, J. Astin</td>
<td>Women in the second and third trimesters who were between twelve and</td>
<td>8 weeks The training</td>
<td>Reviewing and compiling intervention elements of MBSR (Kabat-Zinn 1990)</td>
<td>Mothers who received the intervention showed significantly reduced</td>
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<td>pregnancy on prenatal stress and mood: results of a pilot study/2007</td>
<td>thirty weeks gestation at the start of the intervention and were able to speak and read English</td>
<td>was 2h in duration per week for 8 weeks and was facilitated by a licensed clinical psychologist trained in mindfulness-based interventions, as well as a certified prenatal yoga instructor. Group sizes ranged from 12 to 20 women</td>
<td>and MBCT theoretical and clinical work on working with mood concerns during pregnancy and acceptance based psychological approaches such as Acceptance and Commitment Therapy developed the Mindful Motherhood intervention</td>
<td>anxiety (effect size, 0.89; p&lt;0.05) and negative affect (effect size, 0.83; p&lt;0.05) during the third trimester in comparison to those who did not receive the intervention.</td>
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RESULTS
After searching the articles through the online databases of EBSCO, Science Direct and Google Scholar, 111 articles were taken. The articles articles using RCT (randomized control trial) and non RCT research designs and were published in 2007 to 2017. After further review, with an adjustment to the inclusion criteria, nine articles were selected and used for this study.

DISCUSSION
Aslami, Alipour, Najib, & Aghayosefi (2017) conducted a study to compare the efficiency of mindfulness based on the Islamic-spiritual schemes and group cognitive behavioral therapy for reducing anxiety and depression in pregnant women. The participants were pregnant women in the 16th to 32nd weeks of pregnancy who referred to the health center. The results showed that there was a significant difference between the mean scores of anxiety and depression in the two groups of mindfulness based on spiritual-Islamic scheme (P<0.001) and the group of cognitive behavioral therapy with each other (P<0.001).

In a study by Narimani, Khadijeh & Musavi (2014), which investigated the effectiveness of Teasdale cognitive therapy (based on mindfulness) on the reduction of anxiety, stress and depression among pregnant woman, it was found that Mindfulness Based Cognitive Therapy (MBCT) was significantly effective in reducing stress, anxiety, and depression of pregnant women who aged below 20.

Muthukrishnan, Jain, Kohli & Batra (2016) also reported that mindfulness meditation is a powerful modulator of the sympathetic nervous system and can thereby reduce the day-to-day perceived stress in pregnant women. In this study, pregnant women of 12 weeks of gestation who were given mindfulness meditation experienced a significant decrease in blood pressure response to cold pressor test and a significant increase in heart rate variability in the test group (p< 0.05, significant) (Muthukrishnan, Jain, Kohli & Batra, 2016).

Woolhouse, Mercuri, Judd & Brown (2014) also conducted a randomized controlled trial study to explore the feasibility of mindfulness intervention to reduce antenatal depression, anxiety, and stress. The results revealed that antenatal mindfulness intervention was able to reduce depression, anxiety, and stress in pregnant women.

Mindfulness is defined as an awareness which arises through paying attention, on purpose, in the present moment, non-judgemental (Kabat-Zinn, 1994). Mindfulness can reduce stress and anxiety in pregnant women. Mindfulness is such an intervention which can be performed to reduce stress in pregnant women since it can function as a modulator of the sympathetic nervous system (Muthukrishnan, Jain, Kohli & Batra, 2016).

The review of several articles in this study found that some methods of mindfulness therapy have their respective advantages in which the final result is decreasing stress and depression. Various methods of mindfulness therapy can be interconnected which will result in new therapeutic methods. The MBSR, MBCT, Mindfulness-Based Prenatal Yoga and Mindfulness meditation can be combined into an application that sums it all up. It is expected that if this application is developed, it will be more effective in reducing stress, anxiety, and depression in pregnant women.

CONCLUSION
There are several methods in mindfulness therapy, including MBSR, MBCT, Mindfulness-Based Prenatal Yoga and Mindfulness meditation where all have the similar outcome that is lowering the level of stress, anxiety, and depression by self-acceptance, focus on current and non-judgmental events, and it can be concluded that mindfulness interventions give significant effects on reducing stress in pregnant women. Innovations that can be made is to combine these methods into one application which contains techniques to reduce stress both cognitive, affective and psychomotor that can be called an mindfulness application.

REFERENCES


A Case Report Primary Brain Lymphoma in a Patient with Chronic Myeloid Leukemia

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ABSTRACT

Introduction: Chronic myeloid leukemia (CML) is a clonal expansion of hematopoietic progenitor cells characterized by exaggerated proliferation of granulocytic lineage, with chronic phase, accelerated phase and blast crisis. Accelerated phase and blast crisis may be associated with extramedullary disease. Extramedullary transformation of CML can be determined both in nodal and extranodal sites. We reported a rare case female patient with chronic phase CML associated with primary brain lymphoma.

Case presentation: A 53-year-old women with BCR-ABL-positive chronic phase CML treated with imatinib 400 mg daily for 4 years. She noted severe headache since 2 months before. Brain CT showed tumor in the cerebellum. Pathological evaluation showed suggested a small round cell tumor non-Hodgkin lymphoma. The immunohistochemistry (IHC) findings revealed LCA (+), CD3 (-), CD20(+) and Ki67 > 30%, that confirmed high grade B cell non-hodgkin lymphoma (small type). The patient was treated with De Angelis protocol every 2 weeks for 5 cycles and whole brain radiation therapy (WBRT), concurrent with imatinib. Post chemotherapy the headache was reduced significantly. PET CT and MRI evaluation indicated significantly reduced in tumor size. Patient still in imatinib treatment and have good quality of life until one year follow up.

Conclusion: We reported a very rare case CML with NHL. Immunohistochemistry test is very important to confirm the correct diagnosis. Further studies are required to clarify the pathogenetic NHL in CML patient treated with Tyrosine Kinase Inhibitor.

Keywords: chronic myeloid leukemia, tyrosine kinase inhibitors, non-hodgkin lymphoma, IHC

INTRODUCTION

CML is a disease of haematopoietic stem cells, arising from a translocation t(9;22)(q34;q11), with the shortened chromosome 22, designated as Philadelphia chromosome, 22q-. The translocation leads to a juxtaposition of the ABL1 gene from chromosome 9 and the BCR gene from chromosome 22, resulting in a BCR–ABL1 fusion gene that codes for BCR–ABL1 transcripts and fusion proteins with high tyrosine kinase activity cause a clonal expansion of hematopoietic progenitor cells characterized exaggerated proliferation of granulocytic lineage, with chronic phase, accelerated phase and blast crisis.\textsuperscript{1,2} Accelerated phase and blast crisis may be associated with extramedullary disease. Extramedullary transformation of CML can be determined both in nodal and extranodal sites. Non-Hodgkin lymphoma is rare in chronic myeloid leukemia and may be misdiagnosed as an extramedullary lymphoid blast transformation; the majorities are T-cell lymphomas with an immature thymic phenotype, while peripheral B-cell lymphomas are rarer.\textsuperscript{2}

Tyrosine kinase inhibitors are the most important drugs in the CML therapy and provide long disease-free survival. Due to the increased survival of CML patients with continual administration of these drugs, the chance of development of secondary malignancies may increase.\textsuperscript{3} The most common secondary malignancies are prostate, colorectal and lung cancer, non-Hodgkin lymphoma, malignant melanoma, non-melanoma skin tumors and breast cancer.\textsuperscript{3,4}

We reported a rare case female patient with chronic phase CML associated with primary brain lymphoma. Hodgkin lymphoma in a known case of CML is very rare and further studies are also needed to know the pathogenetic relationship between the two entities and to assess the risk of secondary Hodgkin lymphoma in CML patients treated with tyrosine kinase inhibitors. CML itself is a risk factor for development of solid cancers and hematologic malignancies.\textsuperscript{3}
CASE REPORT

A 53-year-old woman with BCR-ABL-positive chronic phase CML treated with imatinib 400 mg daily for 4 years. She noted severe headache since 2 months before. Physical examination of patient revealed normal blood pressure, heart rate, respiratory rate and temperature. There were no enlargement of lymph node in the neck. Chest examination showed that the lungs were normal on auscultation and cardiomegaly. Abdominal examination revealed there were no enlargement of liver and spleen.

Complete blood count revealed haemoglobin: 11.8 g/dL, leukocyte: 53000/mm³, platelets: 309000/mm³, hematocrit: 21.5%. The differential count were eosinophils 3% / basophils 0% / band neutrophils 2% / segmented neutrophils 65% / lymphocytes 9% /Monocytes 4%. Peripheral blood smear showed mild anisositosis erythrocyte, dominan neutrophil, positive immature granulocyte, hypersegmented neutrophil, toxic granulation, giant metamielosit and atypical mononuclear cells, positive giant thrombocytes.

The anteroposterior chest X-ray revealed cardiomegaly, abdomen ultrasonography showed no hepatosplenomegaly. Brain CT scan showed that the tumor in the cerebellum was 4 x 3 cm in size (Figure 1).

\[\text{Figure 1. Brain CT revealed that the tumor in the cerebellum was 4 x 3 cm in size}\]

Pathological evaluation of cerebellum biopsy showed suggested a small round cell tumor non Hodgkin lymphoma (Figure 2). The immunohistochemistry (IHC) findings revealed LCA (+), CD3 (-), CD20(+) and Ki67 > 30%, that confirmed high grade B cell non-hodgkin lymphoma (small type) (Figure 3).
Figure 2. Microscopic finding of cerebellum biopsy consist a small round cell tumor non Hodgkin lymphoma: a. Cells with round nucleus, oval, pleomorphic, hyperchromatic, coarse chromatin, thin cytoplasmic, b. The cell-sizes are relatively small, monotonically compact and diffuse.

Figure 3. The immunohistochemistry (IHC) findings confirmed high grade B cell non-hodgkin lymphoma (small type): a. Positive LCA, b. Positive CD3 in a particular focus of tumor cells, c. Positive CD 20 diffuse in most tumor cells, d. Positive Ki 67 > 30%.
The patient was treated with De Angelis protocol every 2 weeks for 5 cycles and whole brain radiation therapy (WBRT), concurrent with imatinib. Post chemotherapy the headache was reduced significantly. PET CT scan evaluation indicated significantly reduced in tumor size (2.7 x 3.2 cm) (Figure 4). Patient still in imatinib treatment and have good quality of life until one year follow up.

**Figure 4.** PET CT scan evaluation indicated significantly reduced in tumor size (2.7 x 3.2 cm)

**DISCUSSION**

Treatment of chronic myeloid leukemia (CML) has been profoundly improved by the introduction of tyrosine kinase inhibitors (TKIs). Imatinib is an important choice of treatment in cases with CML and its clinical use is increasing in daily practice due to its efficaciousness. Long-term survival with imatinib is excellent with a 5- and 8-year survival rate of 90% and 88%, respectively. The increased life expectancy requires closer long-term observation of potential side effects. The most frequently affects the skin, liver, and bone marrow. Although very rare, some secondary neoplasms during imatinib therapy have been reported.4,5

Miranda MD et al, in CML Study IV with a median follow-up of 67.5 months, there were 67 secondary malignancies in 64 patients; 26 of these patients (41%) were female. The median time from CML diagnosis to diagnosis of secondary malignancy was 2.4 years. The CML Study IV had five treatment arms comparing various imatinib doses in combination with interferon-alpha or cytarabine; the secondary malignancy rate was not significantly different across these treatment arms.4

We reported a rare case female patient with chronic phase CML associated with primary brain lymphoma. Hodgkin lymphoma in a known case of CML is very rare and further studies are also needed to know the pathogenic relationship between the two entities and to assess the risk of secondary Hodgkin lymphoma in CML patients treated with tyrosine kinase inhibitors.

Primary CNS lymphoma (PCNSL) is an aggressive malignancy arising exclusively in the CNS, that is, the brain parenchyma, spinal cord, eyes, cranial nerves, and/or meninges. PCNSL is a rare malignancy, represents 4% of intracranial neoplasms and 4%-6% of all extranodal lymphomas but some registry studies suggest that its incidence in immunocompetent patients is progressively increasing. Current evidence-based treatments are based on high dose MTX (methotrexate) based regimens with or without Ara-C. Treatment with MTX intrathecal followed whole-brain radiotherapy proved to improve outcome and improve therapeutic response.6,7,8

The etiology of secondary neoplasias in patients treated with imatinib is not known. The issue of secondary neoplasias in CML is complex, it may be driven by a culmination of various factors, including contributions from cumulative treatment, possibly when radiation, hydroxyurea or busulfan are utilized; immunodeficiency, lifestyle choices, particularly smoking, aging and genetic predisposition.9

Preclinical data demonstrated an interaction of imatinib with DNA repair mechanisms. In studies with rats, neoplastic changes occurred in kidneys, urinary bladder, urethra, preputial and clitoral glands, small intestine, parathyroid glands, adrenal glands and non-glandular stomach. Another Tyrosine Kinase Inhibitor
(TKI) effect that may be relevant for the development of malignancies is the inhibition of T-lymphocytes and dendritic cells. It has been shown that imatinib inhibits the effector function of T-lymphocytes and impairs the differentiation of peripheral blood progenitor cells into dendritic cells. These effects may facilitate the development of lymphatic malignancies during long-term exposure to imatinib.  

One in vitro study reported centrosome and chromosome aberrations in fibroblast cultures in association with varying concentrations of imatinib. These observations suggest a causative role for imatinib in clonal chromosomal aberrations in Bcr-Abl (−) progenitor cells.

In other study, in a breast cancer model in mice, treatment with imatinib was associated with an increased malignant behavior compared to controls. Imatinib could enhance, or facilitate, the progression of secondary neoplasias: a) through the inhibition of ABL, which is a downstream effector of the epinephrine receptors that might have a tumor-suppressor role in breast, prostate, and colorectal cancers b) through an impairment of the immune system, potentially affecting the anti-tumor surveillance.

**CONCLUSION**

We reported a very rare case CML with NHL. Immunohistochemistry test is very important to confirm the correct diagnosis. Further studies are required to clarify the pathogenetic NHL in CML patient treated with Tyrosine Kinase Inhibitor.

**ACKNOWLEDGMENTS**

Acknowledgements to C Hari Nawangsih and Gani Gunawan, Department of Radiology, School of Medicine, Diponegoro University and Dr. Kariadi Hospital, Semarang, Indonesia, and Dik Puspasari, Department of Anatomical Pathology, School of Medicine, Diponegoro University and Dr. Kariadi Hospital, Semarang, Indonesia.

**REFERENCES**


Vegetable Consumption has Stronger Correlation with Blood Pressure in Outpatient of Dinoyo Community Center in Malang, Indonesia: a Case-control Study

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ABSTRACT

Background: Fruits, vegetables and sodium intake have potential effects on blood pressure. There are limited studies on fruits, vegetables, sodium intake of Indonesian hypertensive and non-hypertensive patient.

Objective: To determine the correlation among fruits, vegetables and sodium intake on blood pressure.

Methods: a Community-based case-control study with 43 hypertensive subjects (case group) and 43 non-hypertensive subjects (control group) aged between 25 to 60 years and living in Dinoyo, Malang, Indonesia, selected by purposive sampling. Subjects were recruited between July-December 2011. Fruits and vegetables consumption were obtained using semi quantitative food frequency questionnaire (SQ-FFQ). A portion of fruit and vegetable defined with household measures as outlined by Indonesian Dietitian Association using food models. Sodium intake used single 24-hour recall. Blood pressure was measured by the physician and categorized using The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure. Multiple logistic regression test was used in multivariate analysis.

Results: In case group and control group, the average intake of fruits are 0,97±0,62 portion/day and 2,43±1,19 portion/day respectively, vegetables consumption are 1,03±0,67 portion/day and 3,07±1,32 portion/day respectively, sodium intake are 2241,99±394,45 mg/day and 1718,16±387,91 mg/day respectively. Multiple logistic regression analysis showed that vegetable intake is the most closely correlated to hypertension.

Conclusion: The vegetable consumption have the highest correlation with hypertension among fruits intake or sodium intake. It is important to enhance adequate vegetable consumption in the community to prevent hypertension.

Keywords: Blood pressure, fruit, vegetable and sodium intake

INTRODUCTION

The elevation of blood pressure is becoming health problems in many countries. Hypertension is often called the silent killer because the hypertensive people don't realize their sign and symptoms over for years and can cause a fatal damage such as cardiovascular disease and stroke.1

In Java island, prevalence of hypertension was 41.9% in 2004 and East Java province with the prevalence of 37.4% has been the first rank in 2007.2 Intake of sodium ≥ 10 times higher than individual physiological needs and low potassium intake consider as key factors in the development of hypertension.3 The Dietary Approaches to Stop Hypertension (DASH) shows that the dietary pattern rich in fruits, vegetables, fat-free or low-fat milk and milk products, but low in sodium and alcohol intake has been consistently associated with reduced levels of blood pressure.4 Stage 1 hypertension subjects benefit more to the DASH diet showed by reduction of systolic blood pressure by an average of 11 mmHg and 6 mmHg. The combined effect of DASH diet and lowering sodium intake to 1500 mg/day has the reduction of 8,9/4,5 mmHg.5,6

People in East Java have salty food as culinary culture which is high in sodium intake (for example instant noodles, processed foods, and condiments). Only 6.5% people have adequate fruits and vegetables consumption. They lack consumption of variant fruits and vegetables that rich in potassium, magnesium, vitamin C (affected diastolic blood pressure), vitamin E (affected systolic blood pressure) and phytochemical. This condition might be influence the prevalence of hypertension in Malang. There are limited studies on fruits, vegetables, sodium intake of Indonesian hypertensive and non-hypertensive patient. While fruits and vegetables
consumption has correlation with blood pressure in the United States. This study is aimed to determine the correlation of fruits, vegetables and sodium intake with blood pressure among outpatient at Dinoyo community health center in Malang, East Java - Indonesia.

MATERIALS AND METHODS

A case-control study was conducted among 43 hypertensive and 43 non-hypertensive subjects at Dinoyo community health center upon granting of approval by Medical Research Ethics Committee of Brawijaya University. Subjects were recruited between July-December 2011. Verbal and written consent were also obtained from subjects. Subjects were selected by purposive sampling. Inclusion criteria for hypertensive subjects were aged 25 to 60 years old, completed record of blood pressure from two successive measurement and a summary blood pressure was calculated from the first and second readings and diagnosed as hypertensive maximum one month prior the study, and able to communicate. Inclusion criteria for non-hypertensive subjects were aged 25 to 60 years old, had blood pressure data by two consecutive measurement were recorded and a summary blood pressure was calculated from the first and second readings and had non-hypertension diagnosed maximum one month before study, and able to communicate. Exclusion criteria for hypertensive and non-hypertensive subjects were pregnant, or suffer from diabetes mellitus, and non-essential hypertension such as renal disease, heart disease, stroke and subjects do not cooperate during the study. Subjects were interviewed to obtain information on socio-demographic, hypertension risk factor such as physical activity and smoking status. Fruits and vegetables intake were obtained using semi quantitative food frequency questionnaire (SQ-FFQ) which consist of 39 food items selected form 2 times Focus Group Discussion (FGD) among Dinoyo society. Sodium intake was assessed by single 24-hour recall. Height and weight were measured according to standardize protocols. Weight was measured using a Smic body weight scale (TZ-120, China) to the nearest 0.5 kg and height was measured using microtoise staturement to the nearest 0.1 cm. Body Mass Index (BMI) of each subject was calculated using the following formula: weight (kg)/height (m²) and classified based on WHO criteria (WHO Expert Consultation, 2004). Blood pressure was measured by the physician and categorised using The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (National Heart, Lung and Blood Institute, 2004)(Table 1)

A portion of fruits and vegetables was quantively defined with household measures as outlined by Indonesian Dietitian Association using food models. Then, Fruits, Vegetables and sodium intake was computed using Nutrisurvey for Windows with Indonesian food composition table database and food labelling information to obtained estimated nutrients values and compared to standard recommended by the Indonesian Dietitian Association.

Statistical analyses

Data were entered into the Statistical Package for Social Sciences (SPSS) version 16.0 for Windows. Multiple logistic regression test is used in multivariate analysis at p<0.05, using the backward LR method.

RESULTS

Demographic and Socio-economic Characteristics

Out of the 86 subjects, 52.33% aged between 55 to 60 years old. Most of participants are female (79.1%), Javanese (84%), housewife (50%) and 20.9% are labour. Sodium intake of non-hypertensive subjects are lower than hypertensive subjects. Non-hypertensive subjects had fruits and vegetables intake than hypertensive subjects. The average fruits intake per day is less than national recommendations both hypertensive and non-hypertensive subjects (Table 2). Vegetables intake of female is higher than male. The difference of average intake of fruits, vegetables and sodium based on gender and age do not significant (p>0,
Table 1. Blood Pressure Classifications and Several Intake Recommendation

<table>
<thead>
<tr>
<th>Classification/Intake</th>
<th>Criteria</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controlled</td>
<td>&lt;140/90 mmHg for the patients diagnosed with hypertension only &lt;130/80 mmHg for the patients diagnosed with hypertension, diabetes mellitus and/or renal failure.</td>
<td>JNC 7 (2004)</td>
</tr>
<tr>
<td>Uncontrolled</td>
<td>&gt;140/90 mmHg for the patients diagnosed with hypertension only &gt;130/90 mmHg for the patients diagnosed with hypertension, diabetes mellitus and/or renal failure.</td>
<td>JNC 7 (2004)</td>
</tr>
<tr>
<td>Sodium</td>
<td>&lt; 2300 mg per day</td>
<td>USDA Dietary Guidelines (2010)</td>
</tr>
<tr>
<td>Potassium</td>
<td>&gt;3500 mg per day</td>
<td>NHLBI(2004)</td>
</tr>
<tr>
<td>Fruits</td>
<td>&gt; 3 portion per day</td>
<td>Indonesian Dietitian Association/ASDI (2005)</td>
</tr>
<tr>
<td>Vegetables</td>
<td>&gt; 1,5 portion per day</td>
<td>Indonesian Dietitian Association/ASDI (2005)</td>
</tr>
</tbody>
</table>

Table 2. Characteristic of the subjects

<table>
<thead>
<tr>
<th>Variable</th>
<th>Hypertensive n=43</th>
<th>Non-Hypertensive n=43</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>10 (23,3%)</td>
<td>8 (18,6%)</td>
<td>18 (20,93%)</td>
</tr>
<tr>
<td>Female</td>
<td>33 (76,7%)</td>
<td>35(81,4%)</td>
<td>68 (79,07%)</td>
</tr>
<tr>
<td>Ethnic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Javanese</td>
<td>42 (97,7%)</td>
<td>36 (83,7%)</td>
<td>78 (90,69%)</td>
</tr>
<tr>
<td>Non-Javanese</td>
<td>1 (2,3%)</td>
<td>7 (16,4%)</td>
<td>8 (9,3%)</td>
</tr>
<tr>
<td>Occupational Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>22 (51,2%)</td>
<td>21 (48,8%)</td>
<td>43 (50%)</td>
</tr>
<tr>
<td>Seller</td>
<td>9 (20,9%)</td>
<td>9 (20,9%)</td>
<td>18 (20,93%)</td>
</tr>
<tr>
<td>Labour</td>
<td>12 (27,9%)</td>
<td>13 (30,3%)</td>
<td>25 (29,07%)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-44 years old</td>
<td>5 (11,6%)</td>
<td>4 (9,3%)</td>
<td>9 (10,47%)</td>
</tr>
<tr>
<td>45-54 years old</td>
<td>11 (25,6%)</td>
<td>21 (48,8%)</td>
<td>32 (37,21%)</td>
</tr>
<tr>
<td>55-60 years old</td>
<td>27 (62,8%)</td>
<td>18 (41,9%)</td>
<td>45 (52,33%)</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic</td>
<td>160 (140-200)</td>
<td>120 (90-130)</td>
<td>135 (90-200)</td>
</tr>
<tr>
<td>Diastolic</td>
<td>90 (90-100)</td>
<td>80 (70-80)</td>
<td>85 (70-100)</td>
</tr>
<tr>
<td>Fruits Intake</td>
<td>0,97±0,62</td>
<td>2,43±1,19</td>
<td>1,69±1,19</td>
</tr>
<tr>
<td>Vegetables Intake</td>
<td>0,88 (0,23-2,94)</td>
<td>3,23 (0,39-4,99)</td>
<td>1,71 (0,23-4,99)</td>
</tr>
<tr>
<td>Sodium Intakes</td>
<td>2379</td>
<td>1621,9</td>
<td>1993,4</td>
</tr>
</tbody>
</table>

*significant at p level < 0,05

1 Mean±SD, using independent - sample test
2 Median (minimum-maximum), with Mann Whitney test

Identified Factors Risk of Hypertension
None of the identified risk factors (gender, age, ethnic, obesity, etc) contributed to the occurrence of hypertension between the case and control groups (table 2).

Subjects Characteristics
The average of fruits and vegetables intake non-hypertensive is higher than hypertensive subjects. Sodium intake,
systolic and diastolic blood pressure of non-hypertensive is lower than hypertensive subjects. This result has significant differences (Table 3).

**Table 3. Hypertensive and Non-Hypertensive Characteristic**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Hypertensive</th>
<th>Non-Hypertensive</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age^2</td>
<td>56 (37-60)</td>
<td>53 (37-60)</td>
<td>0.087</td>
</tr>
<tr>
<td>Systolic Blood Pressure^2</td>
<td>160 (140-200)</td>
<td>120 (90-130)</td>
<td>0.000*</td>
</tr>
<tr>
<td>Diastolic Blood Pressure^2</td>
<td>90 (90-100)</td>
<td>80 (70-80)</td>
<td>0.000*</td>
</tr>
<tr>
<td>Body Mass Index^1</td>
<td>25.07±4.23</td>
<td>25.98±3.77</td>
<td>0.294</td>
</tr>
<tr>
<td>Sodium Intake^2</td>
<td>2379 (1390.2-2861.9)</td>
<td>1621.9 (1127.5-2531.2)</td>
<td>0.000*</td>
</tr>
<tr>
<td>Vegetables Intake^2</td>
<td>0.88 (0.23-2.94)</td>
<td>3.23 (0.39-4.99)</td>
<td>0.000*</td>
</tr>
<tr>
<td>Fruits Intake^1</td>
<td>0.97±0.63</td>
<td>2.43±1.19</td>
<td>0.000*</td>
</tr>
</tbody>
</table>

*significant at level p < 0.05

1 Mean±SD, using independent - sample test

2 Data distribution not normal so using median (minimum-maximum), with Mann Whitney test

**Table 4. Nutrient Intake According to Fruits and Vegetables Consumptions**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Hypertensive</th>
<th>Non-Hypertensive</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber^1</td>
<td>3.43±1.94</td>
<td>9.53±3.37</td>
<td>0.000*</td>
</tr>
<tr>
<td>Vitamin A^2</td>
<td>329.37 (43.24-1673.66)</td>
<td>1241.4 (357.69-3019.41)</td>
<td>0.000*</td>
</tr>
<tr>
<td>Carotene^2</td>
<td>0.39 (0.735)</td>
<td>2.07 (0.13-7.98)</td>
<td>0.000*</td>
</tr>
<tr>
<td>Vitamin C^2</td>
<td>50.31 (10.43-170.73)</td>
<td>160.96 (28.29-357.66)</td>
<td>0.000*</td>
</tr>
<tr>
<td>Vitamin E^2</td>
<td>0.05 (0-0.48)</td>
<td>0.22 (0.03-9.24)</td>
<td>0.000*</td>
</tr>
<tr>
<td>Sodium^2</td>
<td>11.49 (2.36-69.99)</td>
<td>45.8 (5.56-107.29)</td>
<td>0.000*</td>
</tr>
<tr>
<td>Potassium^2</td>
<td>269.02 (60.46-1127.26)</td>
<td>1001.7 (173.29-1695.78)</td>
<td>0.000*</td>
</tr>
<tr>
<td>Magnesium^2</td>
<td>29.77 (7.01-144.08)</td>
<td>105.11 (29.92-286.1)</td>
<td>0.000*</td>
</tr>
</tbody>
</table>

*significant at level p < 0.05

1 Mean±SD, using independent - sample test

2 Data distribution not normal so using median (minimum-maximum), with Mann Whitney test

**Factors that Influences Hypertension**

The vegetables intake is the most closely correlated to hypertension (adjusted OR 0.080, 95%CI 0.020 – 0.318, p<0.05). Sodium intake (adjusted OR 0.058, 95%CI 0.011 – 0.296, p<0.05) and fruits intake (adjusted OR 0.047, 95%CI 0.004 – 0.584, p<0.05) which are important determinants in influencing hypertension after adjustment for sex, age group and obesity (Table 5).
DISCUSSION

It is known that age, sex, family history of hypertension, obesity, smoking status and physical activity are the risk factors of hypertension, however none of the factors are influence the occurance of hypertension in this study. The subjects tend to have homogenous similarities and the risk factor often occurrence in essential hypertension.¹⁰

Result of semi quantitative food frequency questionnaire (SQ-FFQ) shown that mean of daily habitual fruits and vegetable intakes is 4.1 portions/day in non-hypertensive patients and 3.4 portions/day in hypertensive patients. The present findings suggests that increase the consumption of fruits and vegetables 5 portions/day will be translated to significantly improved endothelium-depended responses, which may in turn reduce cardiovascular morbidity, although this have to be tested in clinical end points.¹¹

A Clinical trial among hypertensive subjects for 8 weeks, related that diet rich in fruits and vegetables reduced systolic and diastolic blood pressure by 7.2 and 2.8 mm Hg, respectively, than the control diet (P<0.001 and P = 0.01, respectively).¹² This study also shows that vegetables intake is the most closely correlated to hypertension, as subject consume less than 1.5 portions/day have being at risk due to hypertension. Tomatoes become the highest consumption vegetables in non-hypertensive subject, while pare (bitter gourd) and carrot in hypertensive subject. They consume by boiling them. Lycopene, is touted as a powerful antioxidant, -rich in tomatoes extract on blood pressure in hypertensive subjects and has been reduced significantly in the systolic blood pressure. Lycopene, as potent antioxidant, has the ability to mitigate the damaging effects of reactive oxygen species (ROS). Therefore, thought to play an important protective role against CHD. In vitro studies have shown that lycopene can protect native LDL from oxidation and also inhibit cholesterol synthesis.¹³ In another case-control population study, cases that exceed 90th percentile of intima-media thickness for all arterial segments, had lower levels of lycopene.¹⁴

Increasing fruits and vegetables consumption is likely to have numerous beneficial effect due to synergistic effects of bioactive compounds that improve the vascular phenotype but may not readily detected by routine clinical or biochemical examination.¹¹ Fruits contain some bioactive compounds such as watermelon containing natural L-citrulline and L-arginine. L-arginine is the substrate for endothelium nitric oxide (NO) production, a main regulator of arterial blood pressure (BP) via a potent vasodilatatory effect. Endothelial dysfunction in small muscular arteries results in increasing aPP and Alx, as it increases L-arginine availabilty contributes to decrease brachial/aortic BP and Alx. L-citrulline and L-arginine reduced bPP, aSBP, aPP, and aortic wave reflection in middle-aged individuals with prehypertension. Compared to brachial BP, aSBP and aPP have a greater influence on left ventricle afterload and on the progression of cardiovascular disease.¹⁵

Fruits and vegetables associated with the improvements in endothelium-dependent forearm blood flow, can be contrasted with several negative ascorbic supplementation studies. Although the studies have similar vascular assessment technique.¹¹ Fruits and vegetables contain some natural vitamin such as vitamin A, C and E. Serum vitamin A and E are positively and significantly associated with both systolic and diastolic blood pressure, whereas α-carotene and β-carotene were inversely and significantly associated with systolic and vitamin C associated with diastolic blood pressure in multivariate regression analyses.¹⁶ Vitamin C may increase nitric oxide (NO) by protecting it from oxidation and increasing its synthesis. Low plasma vitamin C concentration has been associated with hypertension and impaired endothelial function. Vitamin c presents in fruits and vegetables may protect NO from oxidation and ameliorate endothelial dysfunction.¹⁷

Individuals who have a healthy lifestyle, including high intake of fruit and vegetables, had

<table>
<thead>
<tr>
<th>No</th>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>OR adjusted</th>
<th>95% CI</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fruits Intake</td>
<td>-3.067</td>
<td>1.290</td>
<td>0.047</td>
<td>0.004 – 0.584</td>
<td>0.017*</td>
</tr>
<tr>
<td>2</td>
<td>Vegetables Intake</td>
<td>-2.526</td>
<td>0.704</td>
<td>0.080</td>
<td>0.020 – 0.318</td>
<td>0.000*</td>
</tr>
<tr>
<td>3</td>
<td>Sodium Intake</td>
<td>-2.854</td>
<td>0.836</td>
<td>0.058</td>
<td>0.011 – 0.296</td>
<td>0.001*</td>
</tr>
</tbody>
</table>

OR: odds ratio; CI Confidence Interval; SE Standard Error; B Beta Coefficient
*p < 0.05, multivariate logistic regression at 2-tailed significance

Table 5. Factors that Influences Hypertension
a longer peripheral leucocyte telomere length. Peripheral leucocyte relative telomere length (RTL)-hypertension relationship appeared to be modified by vegetable intake—longer RTL was significantly associated with lower hypertension risk only in those with greater vegetable consumption (OR=0.28, 95% CI 0.14 to 0.57; p<0.001), but not in those with lower vegetable intake (P-interaction=0.008). Telomere length was positively associated with vegetable consumption and dietary intake of nutrient such as vitamin A and β-carotene, vitamin C and dietary fiber.18

Findings in our study support those from an earlier study that showed dietary factors might modify blood pressure on The Dietary Approaches to Stop Hypertension (DASH). This study also shows that sodium intake is one of the important determinants influencing hypertension. High sodium intake is strongly correlated with the development of hypertension. Excessive sodium intake were taken from instant noodles powder, dried salted fish and kerupuk; a traditional salted fermented foods and condiments such as sweet soy sauce “rekap manis”, fish sauce “petis” and shrimp paste “trasi” found in almost dishes. Moreover, adding table salt and MSG, flavoring in daily meal increase sodium intake.19 Sodium intake initiates an autoregulatory sequence that leads in increasing intravascular fluid volume and cardiac output, peripheral resistance, and blood pressure. The elevation in blood pressure results in a phenomenon called pressure natriuresis, in which increase renal perfusion pressure to increasing excretion of fluid and sodium. Reduction sodium intake is an effective interventions for lowering blood pressure in subjects with hypertension. Reductions in dietary salt lessen the amount of sodium the kidney has excreted to restore normal blood volume. Compliance in the aorta and carotid artery in older subjects with hypertension is improved when sodium intake is reduced. Reduction in sodium intake also improves arterial vasodilatation.12

In a subsequent trial, the effect of various levels of sodium intake is studied in the context of the DASH diet. Reducing sodium intake result in a significant incremental reduction in both systolic and diastolic blood pressure in both groups. In a secondary analysis from the sodium trial, the blood-pressure-lowering effects of the DASH diet. Low sodium are accentuated as each age is increased.20 Systolic blood pressure was 12 mmHg higher among subjects between 55 and 76 years old than between 21 and 41 years old when they were given a typical U.S. diet that was high in sodium.12

A long-term (10–15 years) follow-up data of two randomized, controlled trials, TOHP I & II, originally examined the effects of a low-salt diet for 18–48 months on blood pressure. Salt intake was reduced by 2–2.5 g/day, approximately a quarter of the usual intake. After 10–15 years, major cardiovascular events were reduced by a substantial degree, about 30%. This beneficial effect was independent of sex, age, body weight or blood pressure. In most European countries, salt intake depends mainly on processed food. To reduce sodium intake, legislation to label processed food for its sodium ingredient appears mandatory, given the substantial reduction in cardiovascular risk associated with a low-sodium diet.21

Although the correlation between fruits, vegetables and sodium intake with blood pressure among outpatient at Dinoyo are statistically significant, the value of OR adjusted 0.047; 0.08; 0.058 respectively, are not particularly strong, and this suggest that the change in fruits, vegetables and sodium intake only explained 5%, with other factors which influence also. This weak correlation is typical of nonpharmacological dietary interventions and also reflects the natural variability in blood pressure. This study is the simillar with another research that among hypertensive participants, there is a significant relationship between fruits, vegetables consumption and endothelium-dependent vasodilation, with an extra daily portion improving the maximum forearm blood flow response to acetycholine by 6 %,11

There were few limitations in our study. First, the recommended daily servings of fruits and vegetable should be standardized particularly because Indonesian people does not have a standard portion of foods like that in America. Second, there are multiple risk factors that influence the findings such as environment and geographic factor and also fat intake which influence the blood pressure and did not included in this study.22

CONCLUSION
There is a significant relationship between fruits, vegetables and sodium intake between on blood pressure. Vegetable consumption has the most correlation with blood pressure. For future research, the measurement of 24-h urinary sodium excretion is needed to estimate daily excretion of sodium intakes in population survey, not only from dietary sodium intake. The future challenge are healthcare providers, researchers, government officials, and the general public is to
develop and to implement effective clinical and public health strategies that leading to sustainable dietary changes among individuals and whole populations.23

ACKNOWLEDGMENTS
The author thank the Dinoyo Community Health Center for the collaboration during the study.

REFERENCES
14. Irribaren C, Folsom AR, Jacobs DR Jr, Gross, Belcher JD, Eckfeldt JH. Association of serum vitamin levels, LDL susceptibility to oxidation, and


16. Chen J, He J, Hamm L, Batuman V, Whelton PK. Serum antioxidant vitamins and blood pressure in the united states population. Hypertension [Internet]. 2002 [cited 2016 June 28]; 40: 810-816. Available from: http://hyper.ahajournals.org/content/40/6/81 0.long DOI:10.1161/01.HYP.0000039962.68332.59


Preschool Handwashing Practice Through "Magical Box"

Cucu Sopiah

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ABSTRACT

Handwashing is an important daily activity. Many diseases could be protected with this good habit. A proper handwashing method is with rubbing and twisting knuckles, fingernails, thumbs, and wrists. Our survey found that children grade A (aged 4-5 years), and grade B (aged 5-6 years) in preschool lab school UMC in Cirebon (City at Indonesian) cannot wash their hands properly. In this study, we only provide learning action through educational media "Magic Box" for children in class B. The objective of this study is to improve the ability of children's handwashing practice at 5-6 years using educational media "Magic Box". The type of study is Classroom Action Research with three cycles, consist of 2 meetings in one cycle, and each cycle consists of planning, implementation, observation, and reflection. Data collection used descriptive analysis techniques, in the form of documents, and observation. The results showed that this educational media could improve children's handwashing practice. The first cycle of children's handwashing skills began to grow 29% and Evolving as 51% expectations. While the second cycle handwashing skills began to grow 31% and develop as expectations rose to 69%. The third cycle of children's handwashing ability began to grow 16% and Growing as expected 84%. The conclusion is an educational media "Magic Box" could increase the rate of handwashing in children aged 5-6 years, preschool lab school UMC in Cirebon.

Keywords: Handwashing, Media “Magic Box”

INTRODUCTION

Handwashing is an important daily activity. Good handwashing is washing hands according to the right method. Proper handwashing method is by rubbing and rotating the front and back palms, knuckles, fingernails, thumb, and wrist and using soap. Through proper handwashing habits, many diseases can be protected. But in fact, handwashing behavior is not true still high found in children, so it takes increased knowledge and their awareness of the importance of proper handwashing following seven steps of handwashing that can be applied in everyday life. Children are the group most vulnerable to illness as a result of unhealthy behavior. Though of the children is the most important Nation asset for the generation that will come. Butler has done his research with the title "Handwashing Education Program for Preschool through First Grade Students Classroom Education Guide before following the Lather Up For Good Health program, stating how important the practice of handwashing for the child to be free from germ results of his research proves that there around 46 % of preschool lab school UMC surveyed reported knowing what the germs could do, and 53% were not sure what to do to get rid of germs. the research results prove that after following the program lather up for good health, 93% of children understand what can be done germs and 86% understand that we can avoid the germs and stay healthy by handwashing (Colgate-Palmolive Company, 2010).

In 2008 WSP conducted research on children ages 5 to 12 to provide insight into the reality, their daily aspirations, and attitudes toward cleanliness. This research is needed to learn about children's perceptions about their role as change agents in schools, homes and the general public (Dutton, Flórez Peschiera, & Nguyen, 2011). Scott and colleagues examined the behavior of children's handwashing through a national hand wash program in Ghana, the data revealed that the rate of handwashing with soap in Ghana is low, as observed in many places around the world at only 3.5%. Mothers washed hands with soap after defecating after wiping the bottom of the child, only 2.3% (Scott, Curtis, Rabie, & Garbrah-Aidoo, 2007).

His research by Curtis and colleagues found that children who used tossed toilet had no motivation to wash their hands because most parents did not teach their children to wash their hands on the grounds of disgust. Children will get used to doing handwashing practices if the child has a motivation built on the habitual
behavior of the daily (Curtis, Danquah, & Aunger, 2009).

Handwashing practices in early childhood will be easy to understand when presented with an interesting medium. One of the media that can attract children to practice handwashing properly is the media "Magic Box, my hands clean healthy life" according to Meigs (2009) media is very important in learning (Onyenemuzu & Olumati, 2014). Learning will be easily absorbed by the child through the media because it can present the abstract object into a real object that is easily understood the child.

Early childhood can easily learn something through the media. The media provided should be an interesting and tangible medium for children. Handover of handwashing of children through real media can help children easily understand the message of learning. Not only can media help make new content more memorable, but the media can also help bring new content (Media, 2011).

The reason the author made the media "Magic Box, my hands clean healthy life". The media has not been done, so it becomes a factor that affects researchers want to do the research. The material presented in this handwashing practice is by following the seven steps of handwashing hygiene.

The goal of this research is to improve the handwashing ability of Preschool lab school UMC through the media "Magic Box, my hands clean healthy life".

METHOD
This research is conducted by using action research methods that are participatory and collaborative. Location of research in Preschool Lab school UMC. The study was conducted in September 2016 until February 2017. The subjects were 15 children consisting of 8 boys and 7 girls of 5-6 years old. Data collecting technique in this research is through observation and documentation. The planning of this research use the method of action research by Kemmis and Taggart model with four cycles, where each cycle has steps: (1) Planning, (2) Action/Acting, (3) Observation/Observing, (4) Reflection or observation result. Based on this reflection also an improvement of action (planning) is then determined.

RESULTS
Prior to the study, handwashing practices for group B (age 5-6 years) Preschool lab school UMC are still low. Pre-cycle research results show the results of the value of handwashing practices of children who have not grown to reach 55%, began to grow 16% and Develop as expected reach 29%. Acquisition of data in the field shows the practice of washing the hands of the child is done not all the steps done correctly just a few steps the child can do handwashing practices as children do in general as children wash their hands just by wetting a cursory without by rubbing his hands in line with the stage especially with give him soap. Children wash their hands just to get their hands only, without thoroughly twisting and rubbing the back, between fingers, knuckles, thumbs, and wrists.

The results of these observations show that teachers need to improve the quality of learning in improving handwashing skills in children. For that we need the next step to improve learning with class action applies learning media "Magic Box, my hands clean healthy life". With the implementation of all cycle, on a first is two days on Monday 19th and Tuesday 20th September 2016. Then proceed with the second cycle on Monday 26th and Tuesday 27th September 2016. The last cycle held on Monday 3th and Tuesday 4th February 2017

DESCRIPTION CYCLE
Cycle I
The evaluation result of improved handwashing practices through the media "magic box". In group B Preschool Lab school UMC at the beginning of repair cycle I meeting to one reaction improvement handwashing practice of children has not shown satisfactory reaction, where child still focused to observe media only but in second meeting improvement handwashing practice of child have shown improvement that child have there was an improved response to the practice of handwashing by trying to mimic the correct handwashing step. As a child can already wet the palms of the hands using running water and give it soap, rubbing the back of the left hand with the right-hand palm so vice versa, rubbing the palm of the hand with the palm and the sidelines of the finger are intertwined.

But on the ability to put the right finger on the left palm with the fingers locked there are six children who can do it, rub and twist right fingers that right, left on the palm of the left hand and vice versa three children who can do it, rubbing, rotating the right thumb with the left palm, and vice versa there are four children who can do it, and holding the left wrist with the right hand and vice versa twisting and drying there are five children who can do it. From these observations, there are still some children who still pass a few steps to wash hands right.
The final result of cycle improvement 1 handwashing practice was found to be developing value reaching 49%, and developing as expected reach 51% value. The description can be seen in diagram (1.A):

Diagram 1.A
(Preschool Handwashing Practice Through "Magical Box")

Cycle II
The evaluation result of increased handwashing practice through the media "Magic Box, my hands clean healthy life" there is increasing practice of handwashing on group B at preschool lab school UMC on the ability to put right finger on the left palm with finger locked there are eight children who can do it, rub and rotate the right finger that fits right, left on the left palm and vice versa seven children can do it, rub, rotate the right thumb with the left palm, and vice versa there are seven children who can do it, and hold the left wrist with the right hand as well conversely twisting and drying there are eight children who can do it.

At the end of cycle II improvement in the acquisition value of children's handwashing practice began to grow to 31%, and grow as expected reach 69% value. This means that children's handwashing practices have started to show improvement, but still require strengthening by doing the third cycle for the practice of handwashing there is the addition of capabilities for children who are still missed in handwashing practice steps. The description can be seen in the diagram (1.B).
Cycle III
The evaluation result of increased handwashing practice through media "Magic Box, my hands clean healthy life" in group B Preschool lab school UMC at the end of this last cycle of children's handwashing practice showed improvement beyond the prediction of achievement indicator from the initial predictions reaches 75% reaching the final value of 84%.

Ability to put the right finger on the left palm with the fingers locked there are eleven children who can do it, rub and rotate the right fingers that right, left on the left palm and vice versa eleven children who can do it, rubbing, rotating the right thumb with the left palm, and vice versa there are eleven children who can do it, and hold the left wrist with the right hand and vice versa twisting and drying there are ten children who can do it.

The results of the value of handwashing practice of children at the end of the cycle that gained the value of developing began to reach 16%, evolving as expected reaches the value of 84%. The description can be seen in the diagram (1.C):
DISCUSSION

The practice of handwashing through the media "Magic Box, my hands clean healthy life" in group B Preschool lab school UMC can increase. It can be seen that before using the media "Magic Box, my hands clean healthy life", the acquisition value of children's handwashing practice has not grown to reach 55%, and the value developing as expected is still low in 29%, then there is an increase in value Expanding expectations 51%. New in the second cycle there is a rapid increase reached 69% value to grow as expected and in the third cycle of achievement, the value is very enough value is developing as expected reach 84%.

This last cycle exceeds the target of achievement of pre-determined indicator that is 75%. Exceed the specified target from the up to following diagram 1.E

<table>
<thead>
<tr>
<th>Cycle</th>
<th>Growing As Expected</th>
<th>Began To Grow</th>
<th>Undeveloped</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre Cycle</td>
<td>29%</td>
<td>16%</td>
<td>55%</td>
<td>100%</td>
</tr>
<tr>
<td>Cycle I</td>
<td>51%</td>
<td>49%</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Cycle II</td>
<td>69%</td>
<td>31%</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Cycle III</td>
<td>84%</td>
<td>16%</td>
<td>0</td>
<td>100%</td>
</tr>
</tbody>
</table>

His handwashing practice will inhibit all kinds of diseases caused by some kinds of germs. The absence rate of the illness will decrease as long as the hand hygiene instructions are added to the hand hygiene practice. Therefore the application of standard hand hygiene policy is used (Lau et al., 2012).

Handwashing practices in children can be accomplished if the water supply is adequate. Provision of clean water, sanitation, hygiene and waste management in schools has a number of positive effects on health and hygiene that is, the burden of disease among children, staff, and their families is reduced; children learn effectively when the environment is healthy; educational opportunities were created to promote a safe environment at home and in the community; and schoolchildren can learn and practice lifelong positive hygiene behaviors (Adams, Bartram, Chartier, Sims, & Sims, 2009).

If the facility is not available it will be difficult for the child to be able to practice the knowledge
obtained, so the practice of handwashing is not done optimally. This is supported by research from Rao and colleagues who stated that the availability of handwashing facilities in hospitals affected handwashing compliance in Pakistani hospitals which caused the importance of handwashing can’t be practiced optimally (Rao et al., 2012).

Research from Dutton et al. describes both case studies in both countries showing that the practice of washing hands with soap is achieved. Children in Peru are heavily involved in communication so they can pass on knowledge to their brothers about handwashing practices, whereas children in Vietnam are not involved in communication so much that they can’t influence it (Dutton et al., 2011).

Building knowledge of children’s handwashing practices will be easy to imitate when presented with interesting media and by way of playing. Children are very motivated to play, through playing all aspects of development and related learning can develop effective and cognitive domains of children, free play in childhood is an important experience where children learn social, conceptual and creative skills, as well as improve knowledge and their understanding of the world around. Similarly, Schiller (1770-1835), a German philosopher, suggests play is a means to the whole and does not also define the play as a joyless energy expenditure (Santer, Griffiths, Goodall, Bureau, & England, 2007).

In order to optimize the program implemented in school, the school should be able to bring children who are able to practice handwashing can share knowledge with their friends. Children can communicate their hygiene knowledge to peers, families, and communities by spreading knowledge they have learned in school by talking to friends and parents about their hygiene lessons, which both teach children a real example, wash their hands with soap at critical moments, and the latter working together to spread ideas and take action in the community, such as arranging clean days (Friendly & Manual, n.d.).

Sylva (1976) says the play is vital for cognitive development. Children who are given freedom of play will show more thinking ability and solving skills than those who are not given the opportunity to play (Mcquillan, Coleman, & Rowell, 2007). Erikson and 2003 Hurwitz stated that at the time of child play can develop a lasting disposition for learning so that children can have control over the course of learning (White, 2013). Learning that children get when playing, will establish sedentary behavior as an adult child as the child’s behavior when washing his own hands properly.

The involvement of schoolteachers in teaching Handwashing With Soap (HWWS) practices to primary school children shows evidence that children are capable of implementing hygiene behaviors, but school hygiene behaviors can’t be expected to change unless they can be implemented through practical teaching methods and can promote health programs has a stronger focus on creating HWWS Routines at school as well as at home (Re et al., 1996)(Xuan, Rheinländer, Hoat, Dalsgaard, & Konradsen, 2013).

CONCLUSION

Of the class action performed presents conclusions about improving handwashing practices in group B Preschool lab school UMC through the media "Magic Box, my hands clean healthy life". This classroom action study found formative research on handwashing practices is essential for effective behavior change campaigns targeting children washing hands according to the seven handwashing measures recommended by the health service. The role of teachers is very influential on improving the ability to practice washing hands of children in school. They must have the skills to develop interesting learning media.

Improvement of handwashing practices in accordance with the seven correct steps in preschool children depends on the learning approach and creativity of teachers in making learning media as a supporter of the implementation of the learning objectives to be achieved. Teaching approach given by the teacher is through play, while the media created is an educative media "Magic Box, my hands clean healthy life", that makes children motivated to play.

This classroom action research indicates that "The Magic Box, my hands clean healthy life ", makes the children’s in group B Preschool lab school UMC can wash hands according to the correct seven steps.

REFERENCE


Robusta Coffee Beans Increased Level Of IL-1β (Interleukin-1β) Monocytes Against To Streptococcus mutans In Vitro

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ABSTRACT

Introduction: Several studies have proven that coffee beans can inhibit S. mutans growth as they manage to potentially influence immune response to S. mutans such as fagositosis, IL-1β, IL-1α and TNF-α. The result is aimed at analyzing modulation of IL-1β Robusta coffee beans against S. mutans.

Method: Six cc peripheral blood sampling of healthy people was mixed with anticoagulants (heparin). Ficoll-Hypaque centrifugation were suspended in medium RPMI 1640. The cells are placed on a microtiter plate and washed 4 times with medium. Furthermore, monocytes were treated in accordance groups. The control group (K): untreated. KP1: monocytes + S. mutans. KP2: monocytes + coffee 2.5% + S. mutans. KP3: monocytes + Coffee 5% + S. mutans. KP4: monocytes + Coffee 10% + S. mutans. After 24-hour incubation, supernatant was taken for analysis of IL-1β by ELISA technique. Data were analyzed using ANOVA followed by LSD test.

Results: Significant differences across all study groups. Robusta coffee beans steep most increased level of IL-1β, where the higher the concentration is, the more elevated the levels of IL-1β are.

Conclusion: Robusta Coffee Beans steep increased Level Of IL-1β monocytes against Streptococcus mutans in vitro.

Keywords: Robusta coffee beans, dental caries, S. mutans, IL-1β

INTRODUCTION

Coffee plant is one of the leading commodities developed in Jember. Rolas coffee beans are the products of PTP XII Jember. As the district popularly known as the major producer of coffee, Jember possess its own coffee research centre, not only does it focus on the development of coffee product but it also focuses on any other research of different areas. Some research approved that coffee prevents gallstones, improves memory, prevents diabetes, prevents cancer, overcomes depression, increases metabolism. Coffee beans contain flavonoids, xanthine serving as anti-inflammatory, antibacterial. Thus, coffee also provides immunomodulator against dental caries and it can also be used as a prevention or treatment of various diseases. The dental caries immune responds in the form of phagocytosis, IL-1β, IL-1α, and TNF-α. On the other hand, caries should be prevented and resolved as it is the most common dental disease encountered with the main cause of Streptococcus mutans. Bacteria perceptibly excrete virulence media associated with extracellular protein immunomodulators (VIPs, which have mitogenic effects on lymphocytes, suppresses immune response from the host and induces IL-10 production, which is an immunosuppressor cytokine). Thus, VIP is an important virulent factor for the microorganisms produced, closely related to bacterial pathogenicity. Streptococcus mutans are members of oral microbiota involved in dental caries and infective endocarditis. To adapt the environmental stresses facing host defenses, these bacteria use a two-component system which modulates global changes in gene expression. These include VicRK and CovR systems. S. mutans will interact with mononuclear and phagocyte polymorphonuclear (PMN). Phagocytosis may be affected by the role of IL-1β.

As stated previously that some studies have proven coffee beans to be able to inhibit S. mutans growth. It even potentially influences immune response to S. mutans and coffee inhibition zone against S. mutans. Coffee perceptibly inhibits dental caries by modulating the immune response. Namboodiripad, K. Srividya (2009) proves the existence of coffee resistance zones against S. mutans. These bacteria are structurally and antigenetically
express surface proteins called antigen I / II, B, Sr and PAc which have a molecular weight of 185 kDa. This antigen by the investigators play a pivotal role in the pathogenesis of dental caries and is effective as a vaccine in the prevention of dental caries. The antigen I / II S. mutans has adhesive properties, when the bacteria attached to the host component during colonization and infection. These surface protein antigens have an effect on the attachment of S. mutans with acquired pellicles on tooth surfaces. Thus, from the background information, this study aims to analyze modulation of IL-1β Robusta coffee beans against S. mutans.

METHOD

Robusta coffee beans used in this research is coffee steeped from coffee powder of Rolas PTP XII production of Jember East Java. The steeping coffee is brewed coffee beans mashed with hot water (20 g in 200 ml) with a concentration of 10%. Further concentration of 5% and concentration of 2.5%. Initially, isolation and culture of monocytes were performed. Six cc peripheral blood collection of healthy people was mixed with anticoagulant (heparin). Ficoll-hypaque centrifugation and suspended in a RPMI 1640 medium. The cells were placed on a 96-well microtiter plate of 8 x 105 cells/well for 45 minutes 37 °C and washed 4 x with medium.

The inherent cells were monocytes. Furthermore, monocytes were cultured and treated accordingly. Control group (K): untreated KP1: monocytes + S. mutans. KP2: monocytes + S. mutans + the steeping coffee beans 2.5% + S. mutans. KP3: monocytes + the steeping coffee beans 5% + S. mutans, KP4: monocytes + the steeping coffee beans 10% + S. mutans. Furthermore, the supernatant was taken for the analysis of IL-6 by ELISA technique. The supernatant was coated on the base of the microtiter plate (92 well). After washing, reacted with anti-TNF-α 1 (anti human) antibodies. It was then reacted with a secondary antibody labeled a color degrading enzyme and reacted with a chromogenic substrate. The product formed is measured absorbance using ELISA reader. The data were analyzed using ANOVA followed LSD test.

RESULTS

Figure 1 show that the control group (K) shows an active monocyte cell that produces IL-1β, the KP1 group (S.mutans) appears to be higher compared with control but showed lower from coffee groups. KP2, KP3, KP4 exposed to steeping coffee beans showed higher levels of IL-1β (the higher the concentration, the higher the levels of IL-1β).

DISCUSSION

The control group showed that IL-1β levels means that monocyte cells were actively producing IL-1β. The KP1 group (S.mutans) appears to be higher than the control which means that when an infection occurs (S. mutans), it responds by producing IL-1β. KP2, KP3, KP4 exposed to steeping coffee beans showed higher levels of IL-1β (the higher the concentration, the higher the levels of IL-1β).

This is apparently caused by the chemical content in the steeping of the coffee beans.

The flavonoid content seemingly acts as an immunomodulator. In the studies, other natural ingredients which contain flavonoids can improve the immune system. A study of the function of in vivo cellular immunity in mice proves that flavonoid compounds can stimulate lymphocyte proliferation, increase T-cell count and increase IL-2 activity. Flavonoids potentially
work against lymphokines produced by T cells that will stimulate phagocyte cells including monocytes to perform phagocytic responses. Monocytes have receptors that can recognize S. mutans. Bacterial attachment through multiple binding sites due to lectin like interactions, ie proteins present on the surface of S. bacteria. Cell resistance to S. mutans works by synthesizing various pro-inflammatory cytokines and expressing leukocyte adhesion molecules. Pro-inflammatory mediators will activate leukocytes to support the body’s defense system in which one of the leukocyte cells play a pivotal role in the form of monocytes. Monocytes hold resistance against S. mutan subsequently producing endotoxin, making inflammatory cells including monocytes release cytokines namely IL-1β.

CONCLUSION
Robusta steeping Coffee Beans increased the level of IL-1β monocytes against Streptococcus mutans in vitro.

References
Association of Traumatic Brain Injury with Cognitive Impairment

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ABSTRACT

Background: Traumatic Brain Injury (TBI) is a major problem in the community. Advances in the management of traumatic brain injury can reduce mortality, but their sequelae in term of cognitive impairment can impact quality of life.

Objectives: To determine the association of traumatic brain injuries with cognitive impairment.

Methods: cross sectional study, conducted in dr. Kariadi General Hospital Semarang. Subjects were patients with mild to severe brain injury, selected using consecutive sampling technique. Assessment of cognitive impairment using MMSE and CDT performed in patients with a history of brain injury in the previous 3-12 months were then analyzed with a statistical program. The association of traumatic brain injury and its confounding factors with cognitive impairment considered to be significant when the value of p <0.05.

Results: There were 32 subjects with traumatic head injuries age 35.16 ±14.79 years including 16 (50.0%) subjects with mild traumatic brain injury, 13 (40.6%) subjects with moderate traumatic brain injury and 3 (9.4%) subjects with severe traumatic brain injury. MMSE revealed that 3 (9.4%) subjects were cognitively impaired, while 8 subjects had abnormal CDT score. In the group of age ≥50, age had a significant association with lower CDT scores (p = 0.047). Significant associations were found in moderate to severe brain injury with impaired orientation (p = 0.043) and with attention and calculation (p = 0.033)

Conclusion: There is significant association between the degree of traumatic brain injuries with cognitive impairment. The risk of orientation, attention and calculation disturbance is higher in moderate to severe brain injury patients compared to patients with mild brain injury.

Keywords: traumatic brain injury, cognitive impairment
INTRODUCTION

Globally, traumatic brain injury (TBI) is a main public health and social problem. It has serious impact not only in hospitalization issues but also in broader socio-economic dimensions. TBI is a giant killer for young adults group of age. The consequences of TBI are severe both in high and low-income countries. Most of the death happen within 48 hour after the injury.(1)

In Indonesia the prevalence of TBI among other trauma were increase from 14.5% in 2007 to 14.9% in 2013.(2) There were increasing number of death from 6 per-100 000 population in 2000 to almost 9 per-100000 population in 2009.(3)

The symptoms of such injuries include a variety of somatic, cognitive, and behavioral deficits. While these symptoms typically resolve in a matter of weeks, both children and adults may suffer from Post-Concussion Syndrome (PCS) for months or longer. Clinically, the acute signs and symptoms of a concussion are similar in children and adults and can include physical signs (e.g., loss of consciousness, amnesia), behavioral changes (e.g., irritability), cognitive impairment (e.g., slowed reaction times), sleep disturbances (e.g., drowsiness), somatic symptoms (e.g., headaches), cognitive symptoms (e.g., feeling “in a fog”), and/or emotional symptoms (e.g., emotional lability).(4)

The symptoms of a concussion may take some time to resolve, resulting in significant long-term burden. When the symptoms of concussion persist as a variety of cognitive, somatic, and behavioral changes, these lingering deficits comprise Post-Concussion Syndrome (PCS).(5),(6),(7),(8) Brain injury as well as education, toxic substances, infection of the central nervous system, epilepsy, cerebrovascular disease, brain tumors and depression can affect cognitive function. (9),(10)

Brain injuries can be divided based on several factors, including the mechanism of trauma, morphology and severity of injury (mild to severe).(11),(12),(13) Brain injuries, based on its morphology, are divided into focal injuries (contusions and lacerations) and diffuse (diffuse axonal injury).(13) Based on its mechanisms, brain injury can be divided into open and close brain injury.(11) Based on its severity, brain injuries are devided into minimal brain injury, mild brain injuries, moderate brain injuries and severe brain injuries.(12)(13)

Diagnosis and tests for cognitive function

Cognitive function tests should be performed in a good state of consciousness. Patients experiencing loss of consciousness can not perform cognitive function tests. The instrument can be used to diagnose cognitive impairment include the Mini Mental Status Examination (MMSE) and the Clock Drawing Test (CDT).(14)(15) MMSE is widely accepted as a screening tool for impaired cognitive function as it includes various cognitif domain, such as orientation of time and place, short-term memory and long term memory, registration, recall, constructive ability, language ability, and the ability to comprehend and obey command. This test is short, it can be done in about 10 minutes. It also can be done either by doctors or nurses with short-time training.(16) Total score for MMSE is in a range of 0 to 30; score > 24 indicates no cognitive impairment; score <18 indicates severe cognitive impairment. Improvement of cognitive function for those with score ≤ 24, are obtained by using score-adjustment coefficient based on patient’s age and level of education.(17)

CDT will provide better results if it was performed in conjunction with MMSE, as CDT has some cognitive domains which are not available on MMSE. CDT is used to assess visuo-constructive ability, orientation, concept of time, visuospatial, memory, auditory comprehension, as well as executive function.(15)(18)

OBJECTIVE

This study aimed to investigate the association of the severity of brain injury, GCS, electrolyte as well as blood glucose level with the occurrence of cognitive impairment in patients with brain injury.

METHOD

This research was an observational research using cross sectional design. The target population of this research is patients with brain injury with were treated in Dr. Kariadi Hospital, Semarang in the previous 3-12 months. The inclusion criterisa are all patients with traumatic brain injury who can read and write. Exclusion criteria were patients with a history of depression, previous brain injury, CNS infection, cerebrovascular disease, a brain tumor and epilepsy. Factors that affect cognitive function in this study is the level of consciousness during brain injury, blood sugar levels, electrolyte levels, age, education level and occupation. Cognitive function was measured using MMSE - CDT. The subjects of this research were 32 patients. This study then conducted after approval by the Ethics Commission of Diponegoro University Faculty of Medicine / Dr. Kariadi Hospital Semarang.
Statistical analysis

The results of the study are presented in the form of a table. Distribution of research data did not meet the assumptions of normality (Kolmogorov-Smirnov or Shapiro-Wilk; p > 0.05) so a non-parametric test was used. Univariate followed by bivariate test using Fisher’s exact test were performed for each factors of cognitive function. The influence of the various risks to MMSE domain were analyzed using univariate logistic regression (Table 6). All analyzes were performed using computer with statistical program. The results obtained are considered to be significant when p < 0.05.

RESULT

The subjects of this study consisted of 26 (81.3%) males and 6 (18.3%) females, with a mean age of 35.16 ± 14.79 years old. Education level is mostly high school (SLTA) as many as 19 patients (59.4%). The degree of brain injury classified by the level of consciousness on hospital admission showed mild brain injury as the highest group, were found in 16 patients (50.0%), followed by moderate brain injury, were found in 13 patients (40.6%) and severe brain injury were found in 3 patients (9.4%) and diffuse axonal injury (DAI) stage I were found in 13 patients (40.6%). (Table 1)

Laboratory results which mostly abnormal are the number of leukocytes, where the number of leukocytes increased in 23 patients (71.9%) with a mean number of 13797.50 ± 5264.20 cells / mL respectively, followed by disruption of chlorida level with a mean of 106.86 ± 5.45, the levels of natrium with a mean of 141.58 ± 4.88, blood sugar levels with a mean of 130.6 ± 31.07 and the levels of kalium with a mean of 3.85 ± 0.56 (Table 1).

Association with MMSE results

Mini Mental State Examination (MMSE) score showed a mean of 27.81 ± 2.67 and subjects with impaired MMSE results are 3 subjects (9.4%). The most impaired domains in this study is the domain of attention and calculation, occurred in 18 (56.3%) and the results of CDT showed 8 (25.0%) subjects were impaired. (Table 1).

Considering age factor, MMSE scores were impaired in 2 subjects (28.6%) with age ≥ 50 years and 1 subject (4.0%) aged ≤ 50 years (p = 0.113). Furthermore, MMSE scores were disturbed on the following: 3 male subjects (11.5%), 3 subjects with education> 9 years (13.6%), and on 3 subject with severe brain injury (18.8%) and 3 subjects with DAI grade II-IV (18.8%). Impaired MMSE score was also experienced in 2 subjects with abnormal levels of blood glucose level (25.0%) and 1 subject with normal blood glucose level (4.2%) p = 0.147. Impaired MMSE score was also occurred in 3 subjects with normal sodium levels (13.3%), 2 subjects with normal potassium levels and 1 subject with abnormal potassium levels (p = 0.476). (Table 2)

Association with CDT score

Score of CDT impaired in 8 male subjects (8), 4 subjects aged ≥ 50 years (p = 0.047) and 4 subjects aged ≤ 50 years, also in 6 subjects with moderate to severe brain injury. There is no significant association between GCS score at the time of the accident and CDT results (p = 0.220). (Table 2)

Analysis of multivariate

In the analysis of multivariate, factor that affect cognitive function based on MMSE scores and scores CDT in patients with brain injury, was age (p = 0.047). Variables analyzed using analysis of multivariate were age, gender, education, degree of head injury and the severity of brain injury, degree of DAI and the laboratory characteristics. (Table 7).

<table>
<thead>
<tr>
<th>Table 1. General Characteristics of Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variable</strong></td>
</tr>
<tr>
<td><strong>Demographic Factors</strong></td>
</tr>
<tr>
<td>Sex</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Age (year)</td>
</tr>
<tr>
<td></td>
</tr>
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<td></td>
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### Level of education

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</tr>
<tr>
<td>Junior high school</td>
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</tr>
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### Clinical Factors

#### Brain injury

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<tr>
<td>Moderate (9-12)</td>
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</tr>
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<td>Mild (13-15)</td>
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#### DAI

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<td>Grade III</td>
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</tr>
<tr>
<td>Grade I</td>
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</tr>
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#### Onset (hour)

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<tr>
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<td>1.5</td>
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#### Lenght of stay (days)

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<tr>
<td>9.19 ± 5.46</td>
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<td>7.0</td>
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### Laboratory Factors

#### Blood Glucose level

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<tbody>
<tr>
<td>&lt; 80 or &gt; 146 mg/dl</td>
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<td>25.0%</td>
</tr>
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<td>80-146 mg/dl</td>
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#### Natrium

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<td>&lt; 136 or &gt; 145 mg/dl</td>
<td>9</td>
<td>28.1%</td>
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<tr>
<td>136-145 mg/dl</td>
<td>23</td>
<td>71.9%</td>
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#### Kalium

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<th>Percentage</th>
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<tr>
<td>&lt; 3.5 or &gt; 5.1 mg/dl</td>
<td>6</td>
<td>18.8%</td>
</tr>
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<td>3.5-5.1 mg/dl</td>
<td>26</td>
<td>81.3%</td>
</tr>
</tbody>
</table>

#### Chlorida

<table>
<thead>
<tr>
<th>Chlorida level</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 98 or &gt; 107 mg/dl</td>
<td>19</td>
<td>59.4%</td>
</tr>
<tr>
<td>98-107 mg/dl</td>
<td>13</td>
<td>40.6%</td>
</tr>
</tbody>
</table>

#### Leucocyte count

<table>
<thead>
<tr>
<th>Leucocyte count</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 10.600 mg/dl</td>
<td>23</td>
<td>71.9%</td>
</tr>
<tr>
<td>3800-10600 mg/dl</td>
<td>9</td>
<td>28.1%</td>
</tr>
</tbody>
</table>

#### MMSE Score

<table>
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<tr>
<th>MMSE Score</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
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<tr>
<td>Dysfunction</td>
<td>3</td>
<td>9.4%</td>
</tr>
<tr>
<td>Normal</td>
<td>29</td>
<td>90.6%</td>
</tr>
</tbody>
</table>

#### Cognitive Domain

<table>
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</thead>
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<td>Dysfunction</td>
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<td>15.6%</td>
</tr>
<tr>
<td>Normal</td>
<td>27</td>
<td>84.4%</td>
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<tr>
<td>Dysfunction</td>
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<td>0.0%</td>
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<tr>
<td>Normal</td>
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<td>100%</td>
</tr>
<tr>
<td>Dysfunction</td>
<td>18</td>
<td>56.3%</td>
</tr>
<tr>
<td>Normal</td>
<td>14</td>
<td>43.8%</td>
</tr>
<tr>
<td>Dysfunction</td>
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<td>46.9%</td>
</tr>
<tr>
<td>Normal</td>
<td>17</td>
<td>53.1%</td>
</tr>
<tr>
<td>No</td>
<td>Variable</td>
<td>CDT Score</td>
</tr>
<tr>
<td>----</td>
<td>------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Impaired</td>
</tr>
<tr>
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<td></td>
<td>n = 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>n (%)</td>
</tr>
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<td>1</td>
<td>Age (years)</td>
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</tr>
<tr>
<td></td>
<td>- ≥ 50</td>
<td>4 (57.1%)</td>
</tr>
<tr>
<td></td>
<td>- &lt; 50</td>
<td>4 (16.0%)</td>
</tr>
<tr>
<td>2</td>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Male</td>
<td>8 (30.8%)</td>
</tr>
<tr>
<td></td>
<td>- Female</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>3</td>
<td>Length of study</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- &lt; 9 years</td>
<td>2 (20.0%)</td>
</tr>
<tr>
<td></td>
<td>- &gt; 9 years</td>
<td>6 (27.3%)</td>
</tr>
<tr>
<td>4</td>
<td>Brain Injury</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Moderate to Severe</td>
<td>6 (37.5%)</td>
</tr>
<tr>
<td></td>
<td>- Mild</td>
<td>2 (12.5%)</td>
</tr>
<tr>
<td>5</td>
<td>DAI</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Grade II-IV</td>
<td>6 (31.6%)</td>
</tr>
<tr>
<td></td>
<td>- Grade I</td>
<td>2 (15.4%)</td>
</tr>
<tr>
<td>6</td>
<td>Blood Glucose level</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Abnormal</td>
<td>3 (37.5%)</td>
</tr>
<tr>
<td></td>
<td>- Normal</td>
<td>5 (20.8%)</td>
</tr>
<tr>
<td>7</td>
<td>Natrium</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Abnormal</td>
<td>1 (11.1%)</td>
</tr>
<tr>
<td></td>
<td>- Normal</td>
<td>3 (13.0%)</td>
</tr>
<tr>
<td>8</td>
<td>Kalium</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Abnormal</td>
<td>3 (50.0%)</td>
</tr>
<tr>
<td></td>
<td>- Normal</td>
<td>5 (19.2%)</td>
</tr>
<tr>
<td>9</td>
<td>Chlorida</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Abnormal</td>
<td>4 (21.1%)</td>
</tr>
<tr>
<td></td>
<td>- Normal</td>
<td>4 (30.8%)</td>
</tr>
<tr>
<td>10</td>
<td>Leucocyte count</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Abnormal</td>
<td>8 (34.8%)</td>
</tr>
<tr>
<td></td>
<td>- Normal</td>
<td>0 (0.0%)</td>
</tr>
</tbody>
</table>

* Significant p < 0.05
<sup>+</sup> Fisher's Exact Test
Analysis of association of risk factors with cognitive domain.

Relationship between risk factors such as age, sex, length of study, GCS, the degree of DAI, blood glucose level, sodium, potassium, chloride and leucocyte count with cognitive domain, including orientation, attention and calculation, recall (recall) and language. Domain of registration was not analyzed because none of the subjects impaired in domain registration.

The data showed that GCS at hospital admission caused malfunctioning of orientation with \( p = 0.043 \) (Table 3) and attention-calculation, \( p = 0.033 \) (Table 4). Recall was only influenced by abnormal leucocyte count at hospital admission for about 5.48 times compared to normal leucocyte count, \( p = 0.018 \) (Table 5). Language is not affected by any the risk factors in this study.

### Table 3. Caracteristics of Risk Factors to Domain of Orientation.

<table>
<thead>
<tr>
<th>No</th>
<th>Variabel</th>
<th>Impaired</th>
<th>Normal</th>
<th>( p )</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- ( \geq 50 ) years</td>
<td>3 (42.9%)</td>
<td>4 (57.1%)</td>
<td>0.057( ^\xi )</td>
<td>5.36 (1.10-26.03)</td>
</tr>
<tr>
<td></td>
<td>- &lt; 50 years</td>
<td>2 (8.0%)</td>
<td>23 (92.0%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Male</td>
<td>4 (15.4%)</td>
<td>22 (84.6%)</td>
<td>1.000( ^\xi )</td>
<td>0.92 (0.12-6.84)</td>
</tr>
<tr>
<td></td>
<td>- Female</td>
<td>1 (16.7%)</td>
<td>5 (83.3%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Length of study</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- &lt; 9 years</td>
<td>0 (0.0%)</td>
<td>10 (100.0%)</td>
<td>0.155( ^\xi )</td>
<td>1.29 (1.03-1.62)</td>
</tr>
<tr>
<td></td>
<td>- &gt; 9 years</td>
<td>5 (22.7%)</td>
<td>17 (77.3%)</td>
<td></td>
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</tr>
<tr>
<td>4</td>
<td>Brain Injury</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Moderate to Severe</td>
<td>5 (31.3%)</td>
<td>11 (68.8%)</td>
<td>0.043( ^\xi )</td>
<td>0.69 (0.49-0.96)</td>
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<tr>
<td></td>
<td>- Mild</td>
<td>0 (0.0%)</td>
<td>16 (100.0%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>DAI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Grade II-IV</td>
<td>5 (26.3%)</td>
<td>14 (73.7%)</td>
<td>0.064( ^\xi )</td>
<td>0.74 (0.56-0.96)</td>
</tr>
<tr>
<td></td>
<td>- Grade I</td>
<td>0 (0.0%)</td>
<td>13 (100.0%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Blood Glucose level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Abnormal</td>
<td>3 (37.5%)</td>
<td>5 (62.0%)</td>
<td>0.085( ^\xi )</td>
<td>4.50 (0.90-22.29)</td>
</tr>
<tr>
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<td>- Normal</td>
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<td>22 (91.7%)</td>
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</tr>
<tr>
<td>7</td>
<td>Natrium</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Abnormal</td>
<td>0 (0.0%)</td>
<td>9 (100.0%)</td>
<td>0.288( ^\xi )</td>
<td>1.28 (1.03-1.58)</td>
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<td>5 (21.7%)</td>
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<tr>
<td>8</td>
<td>Kalium</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>- Abnormal</td>
<td>2 (33.3%)</td>
<td>4 (66.7%)</td>
<td>0.228( ^\xi )</td>
<td>2.89 (0.61-13.66)</td>
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<td>3 (11.5%)</td>
<td>23 (88.5%)</td>
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<tr>
<td>9</td>
<td>Chlorida</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Abnormal</td>
<td>4 (21.1%)</td>
<td>15 (78.9%)</td>
<td>0.625( ^\xi )</td>
<td>2.74 (0.34-21.79)</td>
</tr>
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<td>1 (7.7%)</td>
<td>12 (92.3%)</td>
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</tr>
<tr>
<td>10</td>
<td>Leucocyte count</td>
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<td></td>
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<tr>
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<td>- Abnormal</td>
<td>4 (17.4%)</td>
<td>19 (82.6%)</td>
<td>1.000( ^\xi )</td>
<td>1.56 (0.20-12.17)</td>
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<td>1 (11.1%)</td>
<td>8 (88.9%)</td>
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<td></td>
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</tbody>
</table>

* Significant \( p < 0.05 \)

\( ^\xi \) Fisher’s Exact Test
Table 4. Characteristics of Risk Factors to Attention and calculation

<table>
<thead>
<tr>
<th>No</th>
<th>Variable</th>
<th>Impaired n (%)</th>
<th>Normal n (%)</th>
<th>p</th>
<th>OR (95% CI)</th>
</tr>
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<td>Age (years)</td>
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<tr>
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<td>≥ 50</td>
<td>5 (71.4%)</td>
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<td>0.426</td>
<td>1.37 (0.75-2.50)</td>
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<td>13 (52.0%)</td>
<td>12 (48.0%)</td>
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</tr>
<tr>
<td>2</td>
<td>Sex</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Male</td>
<td>15 (57.7%)</td>
<td>11 (42.3%)</td>
<td>1.000</td>
<td>1.15 (0.49-2.74)</td>
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<td>Female</td>
<td>3 (50.0%)</td>
<td>3 (50.0%)</td>
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</tr>
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<td>Length of study</td>
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<td>15 (68.2%)</td>
<td>7 (31.8%)</td>
<td></td>
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</tr>
<tr>
<td>4</td>
<td>Brain Injury</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate to severe</td>
<td>12 (75.0%)</td>
<td>4 (25.0%)</td>
<td>0.033</td>
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<td>10 (62.5%)</td>
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<tr>
<td>5</td>
<td>DAI</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Grade II-IV</td>
<td>13 (68.4%)</td>
<td>6 (31.6%)</td>
<td>0.093</td>
<td>1.78 (0.84-3.77)</td>
</tr>
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<td>8 (61.5%)</td>
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</tr>
<tr>
<td>6</td>
<td>Blood Glucose level</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Abnormal</td>
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<td>3 (37.5%)</td>
<td>1.000</td>
<td>1.15 (0.60-2.21)</td>
</tr>
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<td>Natrium</td>
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<td></td>
</tr>
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<td>Abnormal</td>
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</tr>
<tr>
<td>8</td>
<td>Kalium</td>
<td></td>
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<tr>
<td></td>
<td>Abnormal</td>
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</tr>
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<td>14 (53.8%)</td>
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</tr>
<tr>
<td>9</td>
<td>Chlorida</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Abnormal</td>
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<td>8 (42.1%)</td>
<td>0.821</td>
<td>1.07 (0.57-2.02)</td>
</tr>
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<td>Normal</td>
<td>7 (53.8%)</td>
<td>6 (46.2%)</td>
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<td></td>
</tr>
<tr>
<td>10</td>
<td>Leucocyte count</td>
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<td></td>
</tr>
<tr>
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<td>Abnormal</td>
<td>15 (65.2%)</td>
<td>8 (34.8%)</td>
<td>0.132</td>
<td>1.96 (0.74-5.16)</td>
</tr>
<tr>
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<td>Normal</td>
<td>3 (33.3%)</td>
<td>6 (66.7%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Significant p < 0.05
£ Pearson Chi Square
€ Fisher’s Exact Test
Table 5. Characteristics of Risk Factors to Recall

<table>
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<th>No</th>
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<td>Normal n = 17</td>
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</tr>
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<td></td>
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<td>n (%)</td>
<td>n (%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>p</td>
</tr>
<tr>
<td>1</td>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 50</td>
<td>5 (71.4%)</td>
<td>2 (28.6%)</td>
<td>0.209€</td>
</tr>
<tr>
<td></td>
<td>&lt; 50</td>
<td>10 (40.0%)</td>
<td>15 (60.0%)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>12 (46.2%)</td>
<td>14 (53.8%)</td>
<td>1.000€</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3 (50.0%)</td>
<td>3 (50.0%)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Lenght of education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt; 9 years</td>
<td>2 (20.0%)</td>
<td>8 (80.0%)</td>
<td>0.060€</td>
</tr>
<tr>
<td></td>
<td>&gt; 9 years</td>
<td>13 (59.1%)</td>
<td>9 (40.9%)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Brain Injury</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate to severe</td>
<td>9 (56.3%)</td>
<td>7 (43.8%)</td>
<td>0.288€</td>
</tr>
<tr>
<td></td>
<td>Mild</td>
<td>6 (37.5%)</td>
<td>10 (62.5%)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>DAI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grade II-IV</td>
<td>10 (52.6%)</td>
<td>9 (47.4%)</td>
<td>0.430€</td>
</tr>
<tr>
<td></td>
<td>Grade I</td>
<td>5 (38.5%)</td>
<td>8 (61.5%)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Blood Glucose level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Abnormal</td>
<td>3 (37.5%)</td>
<td>5 (62.5%)</td>
<td>0.691€</td>
</tr>
<tr>
<td></td>
<td>Normal</td>
<td>12 (50.0%)</td>
<td>12 (50.0%)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Natrium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Abnormal</td>
<td>2 (22.2%)</td>
<td>7 (77.8%)</td>
<td>0.122€</td>
</tr>
<tr>
<td></td>
<td>Normal</td>
<td>13 (56.5%)</td>
<td>10 (43.5%)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Kalium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Abnormal</td>
<td>3 (50.0%)</td>
<td>3 (50.0%)</td>
<td>1.000€</td>
</tr>
<tr>
<td></td>
<td>Normal</td>
<td>12 (46.2%)</td>
<td>14 (53.8%)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Chlorida</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Abnormal</td>
<td>10 (52.6%)</td>
<td>9 (47.4%)</td>
<td>0.430€</td>
</tr>
<tr>
<td></td>
<td>Normal</td>
<td>5 (38.5%)</td>
<td>8 (61.5%)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Leucocyte count</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Abnormal</td>
<td>14 (60.9%)</td>
<td>9 (39.1%)</td>
<td>0.018*g</td>
</tr>
<tr>
<td></td>
<td>Normal</td>
<td>1 (11.1%)</td>
<td>8 (88.9%)</td>
<td></td>
</tr>
</tbody>
</table>

* Significant p < 0.05

€Pearson Chi Square

*gFisher’s Exact Test
Table 6 Logistic regression of factors that influence cognitive function based on MMSE score in patients with brain injury

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cognitive function based on MMSE score</th>
<th>Univariate</th>
<th>Multivariate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Impaired n = 3</td>
<td>Normal n = 29</td>
<td>p-value</td>
</tr>
<tr>
<td>Demographic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (≥ 50 years old)</td>
<td>2 (28.6%)</td>
<td>5 (71.4%)</td>
<td>0.113</td>
</tr>
<tr>
<td>Sex (Male)</td>
<td>3 (11.5%)</td>
<td>23 (88.5%)</td>
<td>1.000</td>
</tr>
<tr>
<td>Education (&lt; 9 tahun)</td>
<td>0 (0.0%)</td>
<td>10 (100.0%)</td>
<td>0.534</td>
</tr>
<tr>
<td>Clinical Factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brain Injury (moderate to severe)</td>
<td>3 (18.8%)</td>
<td>13 (81.3%)</td>
<td>0.226</td>
</tr>
<tr>
<td>DAI (Grade II-IV)</td>
<td>3 (1.8%)</td>
<td>16 (84.2%)</td>
<td>0.253</td>
</tr>
<tr>
<td>Laboratory Factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypo/ hyperglicemia</td>
<td>2 (25.0%)</td>
<td>6 (75.0%)</td>
<td>0.147</td>
</tr>
<tr>
<td>Hypo/hypernatremia</td>
<td>0 (0.0%)</td>
<td>9 (100.0%)</td>
<td>0.541</td>
</tr>
<tr>
<td>Hypo/ hyperkalemia</td>
<td>1 (16.7%)</td>
<td>5 (5.4%)</td>
<td>0.476</td>
</tr>
<tr>
<td>Hypo/ hyperchloremia</td>
<td>2 (10.5%)</td>
<td>17 (89.5%)</td>
<td>1.000</td>
</tr>
<tr>
<td>Leucocytosis</td>
<td>3 (13.0%)</td>
<td>20 (87.0%)</td>
<td>0.540</td>
</tr>
</tbody>
</table>

Table 7. Logistic regression of factors that influence cognitive function based on CDT score in patients with brain injury

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cognitive Function based on CDT score</th>
<th>Univariate</th>
<th>Multivariate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Impaired n = 8</td>
<td>Normal n = 24</td>
<td>p-value</td>
</tr>
<tr>
<td>Demographic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (≥ 50 years old)</td>
<td>4 (57.1%)</td>
<td>3 (42.9%)</td>
<td>0.047*</td>
</tr>
<tr>
<td>Sex (Male)</td>
<td>8 (30.8%)</td>
<td>18 (69.2%)</td>
<td>0.296</td>
</tr>
<tr>
<td>Education (&lt; 9 tahun)</td>
<td>2 (20.0%)</td>
<td>8 (80.0%)</td>
<td>1.000</td>
</tr>
<tr>
<td>Clinical Factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brain Injury (moderate to severe)</td>
<td>6 (37.5%)</td>
<td>10 (62.5%)</td>
<td>0.220</td>
</tr>
<tr>
<td>DAI (Grade II-IV)</td>
<td>6 (31.6%)</td>
<td>13 (68.4%)</td>
<td>0.420</td>
</tr>
<tr>
<td>Laboratory Factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypo/ hyperglicemia</td>
<td>3 (37.5%)</td>
<td>5 (62.5%)</td>
<td>0.378</td>
</tr>
<tr>
<td>Hypo/hypernatremia</td>
<td>1 (11.1%)</td>
<td>8 (88.9%)</td>
<td>0.386</td>
</tr>
<tr>
<td>Hypo/ hyperkalemia</td>
<td>3 (50.0%)</td>
<td>3 (50.0%)</td>
<td>0.148</td>
</tr>
<tr>
<td>Hypo/ hyperchloremia</td>
<td>4 (21.1%)</td>
<td>15 (78.9%)</td>
<td>0.684</td>
</tr>
<tr>
<td>Leucocytosis</td>
<td>8 (34.8%)</td>
<td>15 (65.2%)</td>
<td>0.070</td>
</tr>
</tbody>
</table>
DISCUSSION

In this study the number of male subjects 26 (81.3%) is more than female subjects 6 (18.3%). This is consistent with studies performed by Wee Jz et. al which included 275 male subjects (75.3%) of 780 all subjects.(19)

On blood glucose level examination at hospital admission the average level of blood glucose obtained was 130.06±31.07. This is in accordance with research by Kumar V et al, the mean glucose levels at admission in cases of mild TBI was 70.5±9.08 and 24 hrs after injury was 82.9±18.3. In cases of moderate TBI the mean glucose values were 79.93±9.18 and 93.72±10.44 respectively. Severe TBI showed glucose at admission 105.67±23.81 and higher 24 hrs later, 128.02±23.99. Higher mean glucose level at admission and 24 hrs after injury was associated with poor outcome in this patients with isolated TBI. (20)

Natrium level of 23 subjects in this study is in normal range (71.9%) while abnormal natrium level both hyponatremia and hiper natremi were found in 9 (28.1%) subjects. Average Kalium level was 3.85±0.56, which showed normal kalium level. This result is slightly different from the research conducted by Kumar N et al, Hypernatremia (27.30%) is the most common electrolyte abnormality followed by hyponatremia (18.73%), Hypokalemia (21.58%), Hyperkalemia (17.77%), hypocalaemia (11.4%), Hyperphosphatemia (9.8%) followed hypophosphatemia (4.8%) within the first 24 hours after resuscitation. (21) Hyponatremia associated with GCS value (22) and severe clinical symptoms.(23)

The mean leukocytes count in this study was 13797.50±5264.20, which was also found in the study by Gurlankar et al, the mean WBC count values were 23.74 x10⁹/l for (severe TBI), 16.41 x 10⁹/l for (moderate TBI) and 11.26 x10⁹/l for (mild TBI).(24)

Average MMSE scores in this study was 27.81±2.67, which means normal, or did not develop cognitive impairment. The same results are also shown in previous studies done by Zade et al, in this study 60% patient have good MMSE status and 40% of them have bad status.(25)

Another study showed average MMSE Score were 23.76±4.64 (Mild TBI); 20.25±5.93 (Moderate TBI); 19.15±7.42 (severe TBI) and 22.68±5.55 (overall).(26) The different methodology and and subjects with previous study as a cause of different results.

In the analysis of the association of all risk factors with cognitive status based on MMSE score found that there is no significant association in all risk factors with cognitive function. In the analysis of the characteristics of the risk factors with CDT scores showed that age> 50 years had a meaningful relationship with a score CDT, where at the age> 50 years there was 3.57 times risk for impairment in CDT scores compare to age <50 years. MMSE alone was known to have some weaknesses. The most important weakness of MMSE is inability to assess the cognitive abilities impaired in early Alzheimer’s disease or other dementias (eg limited item of verbal and memory as well as the lack of ability assessments solving or judgment), MMSE is also relatively insensitive to mild cognitive decline, especially in individuals with high education status.

In the analysis of association of risk factors with cognitive domain showed a significant association between moderate to severe brain injury and mild brain injuries and cognitive domain. This is consistent with the results of the review of the various studies conducted by Dikmen S et. al (27), where cognitive impairment was found in severe brain injury.

In this study, there is a significant relationship between GCS at hospital admission to the disruption of domain orientation, attention / calculation, and recall. Similar results were also obtained in research conducted by Miotto EC et. al(28) where orientation, attention / calculation and recall where the most cognitive disorder often disrupted.

In this study, impaired cognitive domains, respectively were attention / calculation, recall, language and orientation. This corresponds with the results of the previous study conducted by Zhang et al that impaired cognitive domains in TBI were orientation and recall.(29)

CONCLUSION

There is a significant association between the degree of traumatic brain injuries with cognitive impairment. The risk of orientation, attention and calculation disturbance is higher in moderate to severe traumatic brain injury patients compared to patients with mild traumatic brain injury.

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BIBLIOGRAPHY

2. Ministry H. Basic Health Survey 2013. Department of Health of Republic of


Grandparent’s Social Support to Autistic Grandchild, and Psychological Well Being in Elderly

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ABSTRACT
Children with ASD need social support from their surroundings, including from grandparents living with them. The social support given will also affects the grandparents' psychological wellbeing. The research was aimed to provide empirical evidence on the correlation between grandparental social support and psychological wellbeing of elderly who takes care of grandchildren with ASD. The research used quantitative approach with correlational method. The tools were Psychological Wellbeing scale (30 valid items, \( \alpha = 0.911 \)) and Grandparental Role (21 valid items, \( \alpha = 0.828 \)). The subjects of the research were 86 elderly from Semarang, Jepara, and Kendal obtained from quota-purpose sampling technique. Simple regression analysis was used to analyze the data. The test on the research hypothesis results in \( r_{xy} = 0.419 \) with \( p = 0.000 \) \((p<0.05)\), which indicates positive and significant correlation between grandparental social support and the psychological wellbeing of the elderly. A noticeable correlation was observed on the aspects of emotional support to the psychological wellbeing of the elderly and belongingness which is related to emotional support to the psychological wellbeing of the elderly. Instrumental support also shows increasing effects on the psychological wellbeing of the elderly if correlated with emotional supports. So, emotional support is the main contributor of social support that influences the psychological wellbeing of the elderly

Keywords: Social support; Psychological wellbeing; Elderly; Grandchildren; Autism spectrum disorder (ASD)

INTRODUCTION
Autism is not a small phenomenon in Indonesia. More than that, autism is now commonly found in Indonesia, especially in children. The statement is supported by a growing number of prevalence of autism patient in Indonesia which is recorded annually (Desiningrum, 2016). Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by repetitive and restrictive behavior which usually occurs before the age of 3. The followings are included in the criteria of ASD diagnostics, i.e. autistic disorder, pervasive developmental disorder not otherwise specified (PDD-NOS), Rett syndrome, childhood disintegrative disorder (CDD), and Asperger's disorder (Hallahan & Kauffman, in Desiningrum, 2016). The awareness of Autism Spectrum Disorder increases in public and medical environments. To maximize detection and minimize the negative effects, all professions in health and educational facilities who deal with children with ASD are required to expand their knowledge on how to detect and assess the level of ASD and on the understanding of accompanying symptoms to be able to apply therapy and proper caring. (Yates, & Le Couteur, 2016).

Recent statistics shows that 0,15% of school age population are accepting special education under the category of autism. The most reliable data indicated a prevalence of 60 from 10.000 are categorized as ASD and 8-30 from 10.000 are categorized in autism (Frith, 2003) In Indonesia, there has no specific figure related to autism prevalence. It is estimated that more than 400,000 children are autistic and the number continues to grow every year. In Indonesia, it is estimated that more than 112.000 children aged 5-19 years old are suffering from autism in (klinikautis.com, 2015).

Research on autism is not only conducted on children with autism, but also to the family since autism also has effects on parents and family. Taking care of children with autism is not an easy thing to do. A significant correlation is confirmed between child behavior problems with caregiver wellbeing and depression in caregiver (Obeid, & Daou, 2015; Ekas, Pruitt, & McKay, 2016). The characteristic of autism that is hyperactivity or hypoactivity might be a burden for caregivers (Desiningrum, 2016). Unclear etiology and pathogenesis of ASD, as well as lack of solid knowledge of the disorder mechanisms reduce the chances of autism pathogenic treatment. None of the scientists has
been able to explain the disorder on ASD patient’s nervous system, including the accompanying symptoms of hyperactive and hypoactive, so there’s a need of research that continues to be developed to deal with the problems and dynamics of autism (Yenkoyan, Grigoryan, Fereshteyan, & Yepremyan, 2017).

The difficulties in caring children with ASD might cause stress for the caregiver. A study measured the stress level of parents, social support, handling mechanism employed by the family, and resilience in facing challenges as caregiver. The result was then analyzed using descriptive statistics and the result shows that parents experiencing stress when taking care of children with autism. Stress factors identified are time restraint, secondary social support (grandparents, other family members, friends, and neighbors), religion and spirituality. Special attention from the government to the families having children with autism are needed (DasA, Dasa, Nathb, Duttaa, Boraa, Hazarika, 2017).

Autism spreads all over Indonesia, from cities to rural areas, in all levels of communities. Since most of Indonesians embrace collectivism, the existence of extended family is a common thing. In Europe, elderly health is improved by the responsibilities of grandparental care, that is the feeling of being valuable and important, especially observed in grandmothers (Gessa, Glaser, Tinker, 2016). A group consists of 201 grandparents from three cities in Malaysia: Ipoh, Tanjung Malim and Commonwealth Area in a research showing that grandfathers and grandmothers in Malaysia are actively involved in educating and nurturing their grandchildren regardless of gender, ethnicity and religion (Yusuf, 2014). Another research provides an overview of a two-year ethnographic studies in a rural hospital with HIV-positive children experiencing their health care in Malawi, reviewed from child care to “family” or “household” model through “Therapy Management Group”, with a more accurate, smooth, and inclusive technique to think about the care and treatment of these children, where intergeneration dynamics or grandparents existence is considered essential in grandchildren health care and healthy food supply when parents are working (Sikstrom, 2014).

In 2010, 3,1 grandparents aged more than 60 years old live with their grandchildren aged under 18 years old. In 2010, around 915.000 grandparents are responsible for taking care of one grandchild for their basic needs like food, clothes, shelter. In 2000, there was a 30 percent increase in every tenth year (U.S. Census Bureau, 2010). In Indonesia, the consensus has not been made. The data confirm that grandparental care exists in every part of the world, including Indonesia.

Not all grandparents are involved in nurturing grandchildren with autism (D’Astous, Wright, Wright & Diener, 2013). Yet, a grandparent has a 1 in 166 chance to be a grandparent for autistic children. Elderly taking care of grandchildren with disabilities might experience stress, anxiety, and worse stress coping and these grandparents need social supports from other family members or social environment (Ross, Kang & Cron, 2015). When their grandchildren have a disability, grandparents significantly adjust their expectation and interactions, which affect grandparents’ identity and roles. (Woodbridge, Buy, & Miller, 2011). Not to mention the condition of severe autism cause more stress to the caregiver, including grandparents, so that family wellbeing condition can be disrupted and handling autistic children will be more challenging (Glaser, McAlpine, & Wieling, 2016). A process of adaptation is important for the whole family in handling children and teenagers with ASD which is influenced by daily stressor (O’Brien, 2016). On the other side, a positive perception of grandparents for grandchildren, whose existence is considered meaningful and important, can improve the quality of life and health of the elderly (Zohar & Garby, 2016). Two longitudinal studies confirmed positive correlation between grandchild care and elderly health. Furthermore, it is stated that elderly having positive role in grandchild care will be more healthy and happy, preventing loneliness and depression (Di Gessa, Glaser, & Tinker, 2016; Tsai, 2016). Happy and healthy elderly, or successful aging, has been the main focus of recent research. Successful aging can be achieved with the fulfillment of psychological needs to feel satisfied (Poulin, M., & Silver R.C., 2007), as well as the fulfillment of psychological wellbeing. The psychological wellbeing of the elderly is defined as psychological condition of individual in their elderly period (Ryff, 2004), related to life satisfaction. Ryff (2002) stated that individual psychological wellbeing can be achieved if positive psychological functioning has been achieved.

Psychologically, individuals having positive attitude towards themselves and others are individuals who recognize and accepts the various aspects within themselves (self-acceptance), are able to maintain positive relations with others, autonomous, have
purposes in life, possess the ability to develop self-potential, in line with their self-capacity (personal growth) and actively take part in fulfilling personal and environmental needs (environmental mastery) (Ryff in Cavanaugh & Blanchard, 2006).

Grandparents usually give love and freedom to their grandchildren, more than what they give to their own children. A research stated that grandchildren act as the central of preservation to the culture so grandparents provide unconditional love for their grandchildren, loyalty to their grandchildren’s existence, applied disciplines and prayers which always accompany their children and grandchildren’s life (Vakalahi, 2011). Grandparents’ role becomes more complex when parents of autistic children might be depressed because of social isolation and financial burden, being single parent or divorced so that the elderly will be exposed to two burdens, that is to adapt to the conflicts and provide emotional and instrumental support (Hillman, 2007). Grandparents provide protection for their grandchildren growth and give basic care when parents are unable to provide. Grandparents establish positive social-emotional relationship with their grandchildren through their social support. (Sheridan, Haight, and Cleeland, 2011). Grandparents provide support for special needs children, including children with disabilities like autism (Snopkowski, & Sear, 2015)

Grandchildren need social support from their grandparents, especially for those with autism whose parents are working, so their attention and education can be obtained from their grandparents when their parents are not home. Sanderson (2004) identifies that social supports consist of five kinds of support, namely, emotional support, belongingness support, informational support, instrumental support and validational support. Through grandparents-grandchildren interaction, grandparents will be able to provide emotional support in form of attention to their autistic grandchildren. Grandparents usually have more patience in handling autistic grandchildren by providing guidance, accompanying them, giving assistance, and listening to their grandchildren’s problems which are conveyed through limited language. All of those are the characteristics of belongingness, informational and validational support. In particular, autistic grandchildren care assistance is an instrumental and emotional support that is needed by children with ASD. Grandparents are considered as the main provider for informal child care, grandparental perspective on feeding and physical activities (Eli, Howell, Fisher, & Nowicka, 2016), which are included in belongingness and emotional support.

Sarafino and Timothy (2011) defines received support as an action conducted by others to a person, while the supports referring to one’s perception on comfort, care, and availability given to him are defined as perceived support. Grandparents provide social supports to their autistic grandchildren and this can be considered as a form of received supports. When the grandchildren are experiencing disability, grandparents should significantly adjust their expectations and interactions with their grandchildren (Woodbridge, Buys, and Miller, 2011). Moreover, there has been no research on social support provided by the elderly in the care of autistic children in Indonesia, and its impact on their wellbeing. They will also experience better health with the task of taking care for their grandchildren which generates the feeling of being appreciated and important. (Gessa, Glaser, and Tinker, 2016).

OBJECTIVE

The research was aimed to observe the correlation between grandparent social supports to grandchildren with elderly well-being, in families having children with autism. The study was conducted to grandfather/grandmother living together with their autistic grandchildren, and both parents are working or single parent.

METHOD

The study used correlational design, which links between two variables (Azwar, 2010). Methods of data collection used psychological scale with Self-Administered Questionnaire. The variables in this study consist of Grandparents’ Social Support as a predictor variable, and Psychological Well-Being as a criterion variable. Specific criteria of research subjects are:

- Grandparents who live with autism grandchildren.
- Grandparents who are not in the treatment of chronic disease.

The sampling technique used is quota-purposive sampling (Azwar, 2008) because it is proper to the criteria of a specific subject. Subjects in this study were the grandparents of autistic children at: SLB Ungaran (10 elderly) and SLB Negeri Semarang (29 elderly) who were subjected to test the measuring instruments. Then YPAC Semarang (8 elderly) Autism Therapy Foundation in Kendal (12 elderly), Bintang Semarang Foundation (5 elderly), Autism School of Jepara (17 elderly) and Putra Mandiri Autism School Semarang (5 elderly), who are the subject
of research. So the total of testing subjects is 39 elderly and the subject of the study is as many as 47 elderly. All subjects were given informed consent, the sheet of willingness to be the subject of research.

The results of data collection were analyzed through data analysis method used to see the correlation between social support of grandparents and psychological well-being of elderly, that is using the product moment correlation from Karl Pearson, while to see contribution between the role aspects of grandparents to psychological well-being data analysis used the regression analysis technique assisted by SPSS 21.0 program for window.

Psychological well-being measuring tool contains 33 statements with 21 positive items and 12 negative items. Psychological well-being is the ability to function positively both psychologically, then the items are derived from the psychological well-being indicators (Ryff, 1989, in Keyes & Magyar, 2003).

The social support measuring tool is managed by the researcher based on four dimensions of social support from Sanderson (2004). In the measuring tool, there are 32 points of statement consisting of 19 positive statements and 13 negative statements.

RESULT

Here is a description of the demographic data of the subject according to the characteristics:

<table>
<thead>
<tr>
<th>Table 1. Demographic Data of Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Data</td>
</tr>
<tr>
<td>Age: 60-75/76-90</td>
</tr>
<tr>
<td>Sex: F/M</td>
</tr>
<tr>
<td>Age of autism grandchild: Toddler/6-12 yo</td>
</tr>
<tr>
<td>Spouse: Alive/dead</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2. Results of Item Analysis on the Role of Grandfather / Grandmother Measuring Tool Testing and Psychological Well-Being of Elderly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>Grandparental social support</td>
</tr>
<tr>
<td>Psychological Well-Being</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 3. The Result of Reliability Testing on The Role of Grandfather/Grandmother Measuring Tool and Psychological Well-Being of Elderly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>Grandparents' Social Support</td>
</tr>
<tr>
<td>Psychological Well-Being</td>
</tr>
</tbody>
</table>

The Correlation and Contribution of Grandparents’ Social Support toward the Psychological Well-Being of Elderly

Based on the calculation using SPSS 21.0 obtained the product moment correlation coefficient value of 0.419 and significance value equal to 0.000 (<0.05). It indicates that there is significant positive correlation between grandparent social support to grandchild and psychological welfare of elderly. The value of R-Square obtained by 0.309, from the results of simple regression analysis shows that grandparent social support contributes to psychological well-being of the elderly by 30.9%.
Table 4. The Recapitulation of Correlation and Contribution on the Roles of Grandparents and Each Aspect toward Psychological Well-Being of Elderly in Semarang

<table>
<thead>
<tr>
<th>No.</th>
<th>Variables</th>
<th>Correlation</th>
<th>Contribution</th>
<th>Correlation Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Social Support Toward Psychological Well-Being</td>
<td>0.419</td>
<td>30.9 %</td>
<td>STRONG ENOUGH</td>
</tr>
<tr>
<td>2.</td>
<td>Information Support Toward Psychological Well-Being</td>
<td>0.152</td>
<td>11.9 %</td>
<td>LOW</td>
</tr>
<tr>
<td>3.</td>
<td>Emotional Support Toward Psychological Well-Being</td>
<td>0.422</td>
<td>31.8 %</td>
<td>STRONG ENOUGH</td>
</tr>
<tr>
<td>4.</td>
<td>Belongingness Support Toward Psychological Well-Being</td>
<td>0.391</td>
<td>28.1 %</td>
<td>ENOUGH</td>
</tr>
<tr>
<td>5.</td>
<td>Instrumental Support Toward Psychological Well-Being</td>
<td>0.299</td>
<td>21.1 %</td>
<td>ENOUGH</td>
</tr>
<tr>
<td>6.</td>
<td>Information and Instrumental Support Toward Psychological Well-Being</td>
<td>0.197</td>
<td>19.9 %</td>
<td>LOW</td>
</tr>
<tr>
<td>7.</td>
<td>Emotional and Belongingness Support Toward Psychological Well-Being</td>
<td>0.499</td>
<td>34 %</td>
<td>STRONG ENOUGH</td>
</tr>
<tr>
<td>8.</td>
<td>Emotional and Instrumental Support Toward Psychological Well-Being</td>
<td>0.385</td>
<td>27.9%</td>
<td>ENOUGH</td>
</tr>
</tbody>
</table>

DISCUSSION

Grandparents who interact with family will give effect to the psychological condition of the family. Grandparents, who make regular contact with family, especially to grandchildren, can create and maintain a wider family support network to improve family resilience (Sims, & Rofail, 2013). In another study, it was found that grandparents spend more time with grandchildren than grandchildren's parents. Therefore, it was found further that grandparents play a major role in grandchildren's education (Smorti, Tschiesner, & Farneti, 2012). This means that grandparents who make contact with a certain frequency with their grandchildren, will provide a role and influence on the lives and development of grandchildren.

Grandparenting, of course, will give influence to the well-being of the grandfather / grandmother. Mentioned from the results of research, that, in the United States, the role of parenting has proven to be a significant source of stress for the elderly. Overall, this study shows that caregivers have higher stress levels than non-caregivers (Gillian, Sadruddin, Aalyia, Amy, Jaja and Elizabeth, 2012). In families with children with special needs such as autism, the burden of parenting is heavier. Caregivers are confronted with some facts of autistic children, that is the condition of children who have communication difficulties such as in expressing their wants and inability to understand stimuli from the environment, as well as repetitive, imitative and unusual behaviors, all of which become obstacles in the parenting process (Desiningrum, 2016).

The result of hypothesis test of research using product moment technique and simple regression analysis technique assisted by SPSS version 21.0 program is obtained result of $r_{xy}=0.419$, with $p=0.000$ ($p<0.05$). The correlation coefficient indicates a significant correlation between grandparental social support to grandchildren with psychological well-being of elderly, in families with children with autism spectrum disorders. The higher the social support of grandparents, the higher the psychological well-being of the elderly. In the other side, the lower the social support of grandparents the lower the psychological well-being of the elderly.

Psychological well-being is a description of how far is an individual has life goals, whether the individual is aware of his or her potential, the quality of his / her relationship with others, and how far is the individual's responsibility for his/her own life based on the result of evaluation or self-assessment which is an evaluation of the life experiences (Ryff, 2002). According to Ryff (in Papalia, Old & Feldman, 2008), psychological well-being becomes very important for the elderly because with good psychological well-
being they will become happier, have life satisfaction and no symptoms of depression. In one study, it was found that lifelong learning, and remaining an active elderly can improve psychological well-being (López, Parra, Liria, Pérez, Muñoz, Góngora, 2017). When the elderly is actively nurturing their grandchildren, this will foster their self-worth in the family, so that it can bring a positive assessment of their life or improve the psychological well-being. Another study explains that there is a contribution of the meaning of life to the relationship between physical activity and subjective vitality in 250 elderly people. That is, the elderly activity in raising grandchildren to form life meaningfulness, which became the determinant of happiness in the elderly (Ju, 2017).

Social support given by the grandparents to grandchildren is one manifestation of the active behavior of individuals who show their functions in life. So the more elderly plays an important role in the family, it can form a positive self-understanding that he is still needed, so as to improve the psychological well-being of individuals. The results of a study of 2930 grandparents from the Health Study and Elderly Life Status in Taiwan, show that the elderly who constantly care for the grandchildren or start treating grandchildren significantly feel happier and enjoy life more than ever before, than the elderly who do not take care the grandchildren (Tsai, 2016). From the results of the analysis of table 4, it was found that emotional support has a strong enough contribution in forming the psychological well-being of the elderly. This means that the elderly who give attention, compassion, praise and hugs is able to make grandchildren be happy, and further the happy grandchildren can shape the elderly self-evaluation to be positive, elderly also feels satisfied and happy. The physical and emotional proximity between grandparents and grandchildren, will foster comfort for grandchildren and form family resilience (Sims & Rofail, 2013; Smorti, et al, 2012).

On the other hand, belongingness support is classified as if seen from table 4, which means grandparents’ togetherness for grandchildren can bring a sense of security for grandchildren and also formed a sense of comfort for the elderly itself. And if it is associated with emotional support, then its contribution becomes higher. It can be concluded that togetherness along with the attention and affection of grandparents to their autistic grandchild can make the condition much better and form a close emotional bond between grandchildren and grandparents. In this case, togetherness can be in the form of accompanying grandchild to do autism therapy and playing together. Furthermore, the development of autistic grandchildren can improve and again impact on the elderly self-evaluation which becomes more positive, or in other words, it can improve the psychological well-being of the elderly. In a study mentioned that togetherness in the family can increase the satisfaction of life and welfare of all family members, including the elderly who care for his grandchild with affection (Dinisman, Andresen, Montserrat, Strózik, & Strózik, 2017).

Instrumental support, can be given by the elderly in the form of provision of food for autistic grandchildren, assistance in financing therapy, assistance in grandchildren' daily activities. This support contributes to moderate levels of psychological well-being of the elderly but when it is associated with emotional support, the contribution increases. That is, the emotional support of the elderly to autistic grandchildren is desperately needed by the grandchildren and can form a progressive development of autistic grandchildren, thereby impacting on the elderly self-evaluation is getting more positive. The emotional supports that accompany instrumental support are, for example, delivering grandchildren to therapy with full of affection and sincerity, preparing meals carefully and willingly, accompanying grandchildren to play with laughter and jokes. From a psychological perspective, helping others can be associated with healthy aging, which in turn contributes to longevity (Hilbrand, Coall, Meyer, Gerstorf, Hertwig, 2017).

Often elderly role is as a provider of funds and emotional support, as well as providers of grandparenting. This means that grandparents can help support the family economy, provide emotional support to children and assist in parenting of grandchildren, thus stimulate the elderly to realize its potential, take an active role in fulfilling the needs of self, family and the autistic grandchildren. Elderly life satisfaction is higher in elderly people who still have a good role in the family than in elderly people living in nursing homes (Ferrand, Martinent & Durmaz, 2014).

The limitation of this study is that there are variations in the level of autism in children in the family, because these differences can affect the level of stress in parenting that will affect the psychological well-being of the elderly. This is minimized by the restriction of elderly characteristic that must be in a healthy condition generally, that is not having any chronic disease and also strengthen the measuring tool, both in the scale of social
support of grandparents to the autistic grandchild and the psychological well-being of the elderly through validity and reliability test, also the assumption test to conduct regression analysis.

CONCLUSION AND DISCUSSION
The result of research hypothesis test indicates that there is a significant correlation between social supports of grandparents with psychological well-being of elderly. The higher social support of grandparents results in the higher psychological well-being of elderly. Meanwhile, the lower the social support of grandparents the lower the psychological well-being of the elderly. A strong correlation lies in the aspect of emotional support for the elderly psychological well-being, as well as support for belongingness associated with emotional support for the psychological well-being of the elderly. In addition, instrumental support also increases its influence on the elderly psychological well-being if associated with emotional support. It can be said that this emotional support becomes a major contributor of social support, which affects the psychological well-being of the elderly.

REFERENCES


35. Sikstrom, Laura. 2014. “Without the grandparents, life is difficult”: Social hierarchy and therapeutic trajectories for children living with HIV in rural Northern Malawi. Children and Youth Services Review. 45: 47-54. https://doi.org/10.1016/j.childyouth.2014.03.037


Determinant Factors of Exclusive Breastfeeding: A Literature Review

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ABSTRACT

Exclusive breastfeeding (EBF) means that the infant receives only breast milk for the first six months of life. The aim of this study was to discuss the determinant factors of exclusive breastfeeding. We extracted 30 articles in both qualitative and quantitative studies in the English language, based on PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method. There were 7 determinant factors of exclusive breastfeeding mentioned. The proportion of mothers who exclusively breastfeed their infants up to 6 months remaining low. Interventions that seek to increase exclusive breastfeeding should be timely with an increased focus on mothers with infants four to six months of age and in those who are most at risk of early discontinuation of exclusive breastfeeding.

Keywords: Determinant factor, Exclusive breastfeeding

INTRODUCTION

The World Health Organisation (WHO) recommend infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development and health. Breastfeeding has many health benefits for both the mother and infant. Breastfeeding is an unequalled way of providing ideal food for the healthy growth and development of infants; it is also an integral part of the reproductive process with important implications for the health of mothers. Breastfeeding is one of the most effective investments a country can make to ensure a smarter, healthier population. It is a powerful practice, and one that has huge implications for a country’s future prosperity (1). Globally, only 38% of infants aged 0 to 6 months are exclusively breastfed. Recent analyses indicate that sub optimal breastfeeding practices, including non-exclusive breastfeeding, contribute to 11.6% of mortality in children under 5 years of age. This was equivalent to about 804 000 child deaths in 2011. Global nutrition targets 2025: breastfeeding policy brief is Increasing the rate of exclusive breastfeeding in the first 6 months up to at least 50%. Optimal breastfeeding is so critical that it could save the lives of over 820 000 children under the age of 5 years each year (2).

METHODS

Search strategy: We searched articles in both quantitative and qualitative studies which published from 2006 to 2015 that was written in English language. The literature review was carried out by collecting the result of scientific publications in 2006–2015 from databases such as PubMed, Science Direct, CINAHL, Pro Quest Medical Library and google Scholar. Searching was done by using the keywords of “breastfeeding”, “exclusive breastfeeding” and “determinant factors”.

Study selection: Selected articles focused in determinant factors which were related to exclusive breastfeeding practices.

Data extraction: The articles were reviewed and extracted based on PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), finally it were classed as for triangulation to be discussed and summarized in order to know the quality of the articles. The process of selecting studies is shown in figure.
Figure 1. Flow diagram of studies included in this literature review

The data were extracted into a created table. The items in the table consisted of authors, country, year publication, subjects, design and determinant factors of EBF mentioned. (Table 1)
Table 1: Table of literature review

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Country</th>
<th>Year Published</th>
<th>Subjects</th>
<th>Design</th>
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<td>1520</td>
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<tr>
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</tbody>
</table>

*EBF: Exclusive Breastfeeding

*DRC: Democratic Republic of Congo

Source: Primary data
RESULT

Study Characteristics : A total of 228 articles identified from database searching, remain 167 Records after duplicates removed, and then 167 records were screened, 130 Records were excluded and 37 Full-text articles assessed for eligibility, 7 Full-text articles were excluded with reasons: 2 duplicated, 1 no result reported and 4 is not about exclusive breastfeeding and 30 records included in this study.

Determinant factors: There were 7 determinant factors of exclusive breastfeeding mentioned: 1) Nine studies mentioned that breastfeeding initiation and duration were associated with EBF's practice, 2) Eight studies mentioned the maternal knowledge and experience, 3) Socio demographic was mentioned by two studies, 4) Traditional and cultural beliefs were mentioned by two studies, 5) Thirteen studies mentioned Places and services delivered, 6) Three studies reported Working mother and 7) Two studies reported economic factor.

DISCUSSION

Initiative and duration of exclusive breastfeeding's practice : The rate of breastfeeding initiation and exclusive breastfeeding up to fourth months is very high. However EBF up to six month is still low (3). About 92,5 % of mothers initiated breastfeeding, only 30 % fully breastfeeding (4). The prevalence of EBF among mothers with infants aged between one and six months was 43,1%. The majority (54 %) of mothers who discontinued breastfeeding had breastfed their babies for less than three months (5). The prevalence of EBF when stratified by infant from one to six months ranged between 32,4 % and 63,3 % with the highest one month old infant and lowest among six month old infants (6). Exclusive breastfeeding practice decreased with increasing infant age (7). Senbanjo, (2014) reported 36 % of mothers exclusively breastfeed for six months (8). The proportion of EBF practice declined with each additional month of age (9). The median duration of EBF was 10,9 weeks. At six months 28 % of infants were exclusively breastfeeding (10). Mothers whose babies were younger than 3 months were more likely to exclusive breastfed and 42 % of mothers did not exclusive breastfed their babies (11).

Maternal knowledge and experience : Breastfeeding difficulties experienced such as painful nipple/breast, low milk supply, and latching difficulties were the most frequent major breastfeeding problems (12). Maternal education was positively associated with the duration of breastfeeding (13). Women with adequate knowledge of EBF and who had no problems related to breast, were more likely to exclusive breastfeed (14). Mothers of lower educational attainment was found decreased of likelihood EBF practice (7). Knowledge about the maternal benefit of breastfeeding and awareness of appropriate time frame for EBF were statistically associated with increasing the likelihood of choosing EBF (15). Mothers who did not receive counseling services was 0,42 times less likely to practice EBF (16). The factors associated with the discontinuation of EBF before six months were: not confident in the ability to breastfeed, no plan on the duration of EBF, breastfeeding problem during the first week, low level of breastfeeding knowledge and experienced less than five baby-friendly practices during the maternity stay (10). Higher maternal education and higher maternal knowledge were associated with likelihood of EBF (11).

Socio demographic : There were differences in EBF practice in city, suburban and rural areas in China (17). A lower proportion of mothers in the city (38,0%) were exclusively breastfeeding compared to the suburban (63,4%), and rural areas (61,0%). The existence of regional variation in breastfeeding initiation (18).

Traditional and cultural beliefs : Initiation of breastfeeding was delayed after birth because of the belief that mother's milk is 'not ready' until two or three days postpartum in West Bengal State in India (19). Concern that the mother could potentially harm her infant though breastfeeding were rooted in a number of cultural beliefs (20). The culture beliefs that water is needed for proper digestion of human milk (21).

Places and services delivered : Mother were generally aware of the advantage of EB, but at the same time reported problem that they were not able to solve alone on through social and health system support, most mothers would welcome the support of a peer counselor (22). Exclusive breastfeeding is not promoted in healthcare facilities because the health professionals do not encourage it and their practicing are inappropriate (23). Initial training duration for counselor was positively associated with the use of many breastfeeding support skills (24). Mothers those who delivered in health facility were more likely to practice EBF (25). Decreased of EBF related to Caesarian delivery (7) (26) (27). Although the hospital had a written breastfeeding policy, copies of policy were not clearly displayed in any of the unit in the pediatric department. Almost half the staff was not aware of the policy. The hospital had no
breastfeeding support group (8). There was a higher prevalence of early initiation breastfeeding among mothers who delivered in health facilities compared to mothers who delivered at home (28). Those mothers who gave birth at home were seven time more likely to practice prelacteal feeding as compared to mothers who delivered at health institutions (29). Receiving postnatal care were the determinant factors for EBF (30). Giving birth in a health institution were positively associated with EBF (31). Mothers who did not receive infant feeding counselling was less likely to practice EBF than those who received counselling services (16).

Working mother: Three studies mentioned. Being an unemployed mother were important associations of early cessation of EBF (3). The main reason to stop EBF between four to six months were mothers starting to work (32). Employed mothers were found to be 0,36 times less likely to practice EBF than housewife (16).

Economic factor: Two studies mentioned that wealth quintile: richer showed evidence of an association with EBF (27) and socioeconomic class were retained as important maternal predictors of EBF practices after adjustment for confounders (7).

CONCLUSION

The proportion of mothers who exclusively breastfeed their infants up to 6 months remaining low. Interventions that seek to increase exclusive breastfeeding should be timely with an increasing focus on mothers with infants four to six months of age and in those who are most at risk of early discontinuation of exclusive breastfeeding.

Declaration of interest: None
Grant Support and Financial Disclosure: None

REFERENCES
1. Scorecard GB. Tracking Progress for Breastfeeding Policies and Programmes Breastfeeding is One of The Most Effective Investments A Country Can Make. 2017;
15. Jara-palacios MÁ, Cornejo AC, Peláez


**ABSTRACT**

**Objective:** Individual with prediabetes had higher risk of hypertension. In Indonesia, the prevalence of prediabetic with hypertension was higher than prediabetic with no hypertension. The chemical compounds contained in papaya leaves were known to have effects on lowering blood pressure. The purpose of this study was to assess the effect of papaya leaves jelly on blood pressure.

**Methods:** This was an experimental study with pre-post control group design. Subjects were 27 prediabetic women aged 35-50 years old which were divided into two groups. Treatment group (n = 13) received 24.6 grams papaya leaves jelly containing 182.4 mg chlorophyll, while the control group (n = 14) received jelly with green dye 24.6 grams. The interventions were performed for 20 days.

**Results:** Systolic and diastolic blood pressure in the treatment group had significant reduction from 130.14 ± 25.25 to 124.29 ± 25.48 (p = 0.008) and 89.00 ± 13.49 to 84.43 ± 14.16 (p = 0.02) respectively. Meanwhile, there was no significant blood pressure reduction in the control group.

**Conclusion:** Consumption of papaya leaves jelly could reduce systolic and diastolic blood pressure in prediabetic women.

**Keywords:** papaya leaves, blood pressure, prediabetic

**INTRODUCTION**

Prediabetes was a condition which blood glucose levels exceed from normal levels but not higher than the criteria for people with diabetes mellitus. Prediabetes individuals have fasting blood glucose levels between 100 mg/dl to 125 mg/dl and or have fasting glucose between 140 mg/dl to 199 mg/dl.

Prediabetic sufferers have a hypertensive risk of up to 2-3 times. Based on Weili Xu research, prediabetes events were more common in women than in men. Moreover, prediabetic women had a higher risk for having cardiovascular disease than prediabetic men because adiponectin levels in prediabetic women were lower than in prediabetic men. Adiponectin was a hormone secreted by adipose tissue that had the following functions: 1) anti-diabetes by increasing insulin sensitivity; 2) anti-atherogenic by suppressing adhesion molecule expression; Enhancing the endothelial vasodilation effect, increasing the production of Nitric Oxide (NO).

The risk of hypertension increased in individuals with prediabetes due to hyperglycemic that triggers oxidative stress and decreases superoxide dismutase (SOD). High oxidative stress conditions could damage endothelial cells and inhibit the relaxation of blood vessels. The state of hyperglycemia in the body could also disrupting the activity of NO as vasorelactor by relaxing the smooth muscle cells in the blood vessels.

Prevention of the occurrence of diabetes and hypertension in patients with prediabetes should be done as early as possible. One way was to eat foods that contain antioxidant compounds that could balance the state of oxidative stress, in this case was SOD. SOD was antioxidant that produced in our body also exist in nature. SOD could be found in chlorophyll substances. In addition to being able to act as SOD, chlorophyll content such as magnesium also had a positive effect on hypertension and diabetes. Magnesium could lowering blood pressure by lowering calcium levels that could lead to vasodilation. Magnesium plays role in absorption of insulin-mediated glucose that could protect increasing risk of developing Type 2 Diabetes Mellitus (T2DM).

Chlorophyll was found in leaves such as papaya leaves. Chlorophyll in papaya leaves was the highest chlorophyll content among cassava leaves, pegagan, spinach, cincau, kangkung and kemangi. Papaya leaves were potential if used as functional food. However, papaya leaves have a weakness that was bitter taste. This bitter
taste was caused by saponin compounds. This compound could lower blood glucose levels and had activity as antihypertensive to lower blood pressure.

Papaya leaves could be processed into various foods, one of them was jelly. It had been proven by a preliminary study of papaya leaves jelly and had a good acceptance response. Food innovation was done to reduce bitterness and improve taste with addition other foodstuffs. The composition of this product was papaya leaves juice, jelly, stevia powder and skim milk. Each of the ingredients in this product had a positive effect for people with diabetes who have high blood pressure.

The agar-agar fibers act as anti-hyperglycemic because they increasing insulin sensitivity, and lowering blood pressure through increased endothelial function. Stevia had anti-hyperglycemia and antihypertensive effects lowering blood pressure by increasing vasodilation of blood vessels. Skim milk may trigger insulin secretion and slow the absorption of nutrients so that glucose levels will be controlled and hyperglycemia did not occur. In addition, skim milk could also help the body in regulating endothelial function associated with the elasticity of blood vessels.

Some studies have shown that chlorophyll could lower blood glucose and lipid profile. Otherwise, research on the effects of chlorophyll on blood pressure was very limited. However, the relationship between blood glucose and lipid profile to blood pressure was very close.

METHODS
This research was included in clinical nutrition scope conducted in Semarang city which covers residential area and office. Data collected from the screening process of research subjects was conducted from March to June 2016. The design study used a true experiment design with pre-test post-test control group design.

Total subjects were calculated using unpaired numerical analytic formulas with standard deviations 12.88 based on previous study. The results of the calculations were augmented 10% to anticipate the drop-out and found 10 people per group. The total subjects used in this study were 27 people, 14 people including the control group and 13 people including the treatment group. The control group was given a papaya leaves jelly while the control group was given a jelly with a green dye.

Subjects were obtained through two screening stages. The first stage through the criteria Body Mass Index (BMI) ≥ 23 kg/m², women aged 35-50 years, waist circumference > 80 cm, not consuming alcohol, not smoking, not taking anti-hyperglycemia and anti-hypertensive drugs, not being pregnant or breastfeeding. Second stage screening was having Fasting Blood Sugar (FBS)> 90 mg/dl, willing to comply with research procedures and signing informed consent (IC).

The dependent variable in this research was papaya leaves jelly. The independent variables used were systolic and diastolic blood pressure. Confounding variables used were intake of fiber, sodium, potassium, calcium, magnesium, and physical activity.

The data of food intake was obtained using recall form in 3 times (2 times on weekday and 1 day at weekend) while physical activity data using International Physical Activity (IPAQ) form that obtained in 3 times data retrieval. Blood pressure data were taken before and after the intervention. Blood pressure was measured using digital sphygmonanometer. Anthropometric data of body weight was measured using a digital weight scales with 0.1 kg precision and height measured using microtoise with 1 mm accuracy. Compliance data was obtained from filling out the checklist form filled by the researcher through direct observation while the subject consuming the product.

The safe dose to lower blood pressure were based on dose that used Panam Parikh study to lower blood glucose and lipid profile. The Parikh Precious study gave daily spirulina supplementation of 8 grams that containing 60,8 mg of chlorophyll for 60 days. Based on laboratory test, 8,1 gram papaya leaves jelly of contains 7,4% chlorophyll. The dose given to the respondents was 24,6 grams of papaya leaves jelly containing 182,4 mg of chlorophyll for 20 days.

Normality test using Saphiro-Wilk because the subject used less than 50 subjects. The relationship between two variables could be seen from the results of bivariate analysis. Differences in systolic blood pressure (SBP) before and after intervention were analyzed using paired t-test while diastolic blood pressure (DBP) differences before and after intervention were analyzed using Wilcoxon. The difference of SBP in the treatment group and the control group was analyzed using independent t-test while the difference of DBP in the treatment group and control group was analyzed using Mann Whitney. ANCOVA test was performed to see the effect of papaya leaves jelly after controlled by confounding variables.
RESULTS
Characteristics of the subject
Subjects that fulfill inclusion criteria were 27 people which obtained from screening at Sendangmulyo and Tandang (Tembalang Sub-district) and Semarang City Government office in Pandananaran Building. Total subjects who screened were 221 person, 27 subjects were selected, 13 subjects were in the treatment group and 14 subjects were in the control group.

The comparison of characteristics before intervention between the treatment group and the control group showed in table 1. Statistical analysis shows that the characteristics between the treatment group and the control group was no different (p> 0.05).

Data on Nutrient Intake and Physical Activity
Based on table 1, it could be concluded that there was no difference in average intake of fiber, potassium, calcium, magnesium, and physical activity in both groups (p> 0.05) but there was a significant difference in sodium intake where the percent of sodium sufficiency in the treatment group was higher than the control group.

Blood Pressure Difference Before and After Intervention
Table 2 shows that there was a difference between systolic and diastolic blood pressure before and after intervention in the treatment group (p <0.05). However, there was no difference in the control group for both systolic and diastolic blood pressure before and after intervention (p> 0.05).

Differences in Blood Pressure between Treatment Group and Control Group
Table 3 shows that there was no difference change in systolic or diastolic blood pressure or decrease in the treatment and control group (p> 0.05).

<table>
<thead>
<tr>
<th>Characteristic/ Variable</th>
<th>Treatment (n=13) mean±SD</th>
<th>Control (n=14) mean±SD</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>43.46±4.29</td>
<td>43.57±3.39</td>
<td>0.94a</td>
</tr>
<tr>
<td>FBS (g/dl)</td>
<td>101.62±10.04</td>
<td>97.93±9.31</td>
<td>0.33a</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>28.10±3.18</td>
<td>28.98±2.70</td>
<td>0.44a</td>
</tr>
<tr>
<td>Waist circumference (cm)</td>
<td>89.43±5.53</td>
<td>88.83±7.29</td>
<td>0.54b</td>
</tr>
<tr>
<td>SBP pre (mmHg)</td>
<td>131.15±25.98</td>
<td>124.21±19.80</td>
<td>0.31b</td>
</tr>
<tr>
<td>DBP post (mmHg)</td>
<td>90.54±12.70</td>
<td>86.86±16.02</td>
<td>0.18b</td>
</tr>
<tr>
<td>Fiber intake (%)</td>
<td>25.40±14.31</td>
<td>26.82±20.88</td>
<td>0.88b</td>
</tr>
<tr>
<td>Natrium intake (%)</td>
<td>24.35±20.27</td>
<td>14.07±17.34</td>
<td>0.05b</td>
</tr>
<tr>
<td>Kalium intake (%)</td>
<td>23.76±8.15</td>
<td>18.62±7.14</td>
<td>0.09a</td>
</tr>
<tr>
<td>Kalsium intake (%)</td>
<td>23.61±12.85</td>
<td>17.52±8.67</td>
<td>0.17b</td>
</tr>
<tr>
<td>Magnesium intake (%)</td>
<td>49.60±12.83</td>
<td>52.92±25.92</td>
<td>0.92b</td>
</tr>
<tr>
<td>Physical activity (MET-minute)</td>
<td>3822.40±2051.96</td>
<td>4193.0±5241.23</td>
<td>0.38b</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Treatment (n=13) Before (mean±SD)</th>
<th>After (mean±SD)</th>
<th>p-value</th>
<th>Control (n=14) Before (mean±SD)</th>
<th>After (mean±SD)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBP (mmHg)</td>
<td>131.15±25.98</td>
<td>124.92±26.41</td>
<td>0.01a</td>
<td>124.21±19.80</td>
<td>119.86±16.08</td>
<td>0.12a</td>
</tr>
<tr>
<td>DBP (mmHg)</td>
<td>90.54±12.70</td>
<td>85.54±14.09</td>
<td>0.01b</td>
<td>86.86±16.02</td>
<td>84.07±10.23</td>
<td>0.47b</td>
</tr>
</tbody>
</table>

a Independent t-test
b Mann-Whitney test
*significantly different

Table 2. Blood Pressure Blood Test Results Before and After Intervention
Table 3. Differential Test Results of Blood Pressure Changes Between Treatment Group and Control Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Treatment (Mean±SD)</th>
<th>Control (Mean±SD)</th>
<th>Sig p</th>
</tr>
</thead>
<tbody>
<tr>
<td>∆SBP (mmHg)</td>
<td>-6.23±7.21</td>
<td>-2.21±14.26</td>
<td>0.37a</td>
</tr>
<tr>
<td>∆TDP (mmHg)</td>
<td>-5.00±7.90</td>
<td>-4.93±14.85</td>
<td>0.63b</td>
</tr>
</tbody>
</table>

a Independent t test
b Mann-Whitney

MAKING OF PAPAYA LEAVES JELLY (3 serving, 9 grams per serve)

1. Tools and Materials
   a. Tools
      1) Pans
      2) Blender
      3) Strainer
      4) Basin
      5) Mold jelly
   b. Materials
      1) 50 gr papaya leaves
      2) 30 gr “ampo”
      3) 50 ml low fat milk
      4) 2 gr stevia sugar
      5) 0.5 gr jelly powder
      6) Water

2. Procedure
   Prepare the papaya leaves by washing and remove any dirt. Boil the papaya leaves jelly and “ampo” with water. Wash papaya leaves with running water until there is no “ampo” left in the leaves. Blend papaya leaves with skim milk then strain the juice. Cook the juice with jelly powder and stevia sugar in pan while stirring until boiling. Pour the jelly into the mold.

DISCUSSION
 Characteristics subjects by age, FBS, BMI, waist circumference, pre SBP and pre DBP between treatment group and control group had p > 0.05. This suggests that the characteristics of the subject between the group and the treatment were same. This test should be performed before the intervention so that the initial characteristics of the subject between the two groups were equal. Homogeneity of preliminary data was required for experimental research so not confounding the final data of the study.

There was no difference in nutritional intake and physical activity of the subjects between treatment and the control group during intervention except sodium intake. Sodium intake in the treatment group was higher than in the control group. Several subjects in the treatment group ate high-sodium foods such as salted fish, instant noodles, light snacks with flavorings and artificial preservatives. Nutrition education had been conducted on balanced nutrition in both groups as an effort to control intake. This was done so the subject of eating foods as needed.

Based on the dependent difference test using paired t test and wilcoxon, there was a significant decrease in systolic and diastolic blood pressure after intervention in the treatment group but there was no significant reduction in systolic and diastolic blood pressure in control group. Decreasing systolic and diastolic blood pressure in the treatment group caused by papaya leaves content in jelly. The state of hypertension was closely related to oxidative stress in the body. Oxidative stress that may occur due to hyperglycemia in this prediabetic woman could result in the function and decreasing Nitric Oxide (NO) amount. NO was a compound could maintain the elasticity of blood vessels. Decreasing NO will cause its function as a vasodilator was not optimal and will increase blood pressure. In addition, the state of oxidative stress also resulted in reduced antioxidant compounds that used as a neutralizer of prooxidant compounds.

Papaya leaves contain several antioxidant compounds that could balance the state of oxidative stress. There were several possible mechanisms for blood pressure reduction: 1) Chlorophyll in papaya leaves could give additional electrons to free radicals 2) chloroplasts also contain superoxide dismutase (SOD) compounds that could catalyze superoxide radicals (O2-) 3) Saponin in papaya leaves could combine superoxide radicals. Papaya leaves also have compounds that have a positive effect on blood pressure. Magnesium contained in papaya leaves had a function to regulate the pressure and reactivity of blood vessels by altering the response of vasoconstrictors and vasodilatators. Increased magnesium concentration could cause vasodilation, improve blood flow, decrease vascular resistance, and increase arterial function. In vascular smooth muscle cells, magnesium inhibits calcium into cells and acts as an antagonist of calcium that triggers...
vocusistriective activity.8 Studies conducted by Gurrero Romero showed decreasing systolic and diastolic blood pressure after taking magnesium supplementation.8 Saponin compounds, could also lower blood pressure by preventing RAAS (Renin Angiotensin Aldosterone System) by inhibiting the production of renin which was a component of RAAS.13

There was no difference in systolic and diastolic blood pressure changes between treatment and control group. This case happened because the jelly products that were administered in both groups equally contain fiber, skim milk and stevia sweeteners that also have the effect to lower blood pressure. The fibers contained in jelly could lower blood pressure by improving blood vessel endothelial function and increase mineral absorption that indirectly affects blood pressure such as magnesium and potassium.24 Skim milk contains calcium, magnesium and potassium minerals that have a positive effect on blood pressure. In addition to minerals, digested milk proteins will produce peptides that could inhibit angiotensin-1-converting enzymes that will regulate endothelial function.19 Stevia sweeteners used in jelly-making also have antihypertensive effects by triggering vasodilation and diuresis (including natriuresis) volume of plasma so that blood pressure drops.17

Decreasing SBP and DBP in treatment group showed a synergistic effect of the compound on papaya leaves with other foodstuff. Therese no difference changes between SBP and DBP in both groups because the dose of papaya leaves was less so the effect was less noticeable too. It was need to research about the addition of papaya leaves dose to see the effect of papaya leaves against the decrease in blood pressure. Research conducted by Nissa et al showed there were two variations of chlorophyll dose and higher doses had greater antioxidant activity as well.25 The limited research showing the effect of chlorophyll on blood pressure could be basic of subsequent research. In addition, it was also necessary to do similar research with longer duration of time. Research of Panam Parikh by using chlorine-rich spirulina performed for 60 days showed significant results on the decrease of blood glucose.21 Normal blood glucose could prevent oxidative stress to prevent the occurrence of hypertension.25

There was a significant decrease in systolic and diastolic blood pressure in the treatment group but not in control group. The test showed that there was no effect of confounding variables on the decrease of SBP and DBP in treatment group.

Test the content of nutrients and non-nutrients needs to be done to find out what and how much the content of papaya leaves jelly. Need further research with varying doses in order to know the effect of papaya leaves jelly to blood pressure. Furthermore, duration of giving papaya leaves jelly could also be enhanced to determine the effectiveness of papaya leaves jelly in lowering blood pressure.

REFERENCES
3. Xu, Detection Of Rediabetes And Undiagnosis Tye 2 Diabetes: A Large Oulation Based Study.
4. Satevo J, Kautainen H. Gender Differences In Adiponect And Low- Grade Inflamation Among Individuals With Normal Glucose Tolerance, Prediabetes, And Type 2 Diabetes. 2009
6. EFSA. Scientific Opinion on the substantiation of health claims related to superoxide dismutase (SOD) and protection of DNA, proteins and lipids protection of the skin from photo-oxidative (UV-induced) damage (ID 2305, 3161), reduction of muscle fatigue. 2010;8(1924):1–20.


24. Jarz K, Machnik G, Adamczyk J, Belowski D, Obuchowicz E, Urbanek T. Superoxide dismutase 1 and glutathione peroxidase 1 are involved in the protective effect of sulodexide on vascular endothelial cells exposed to oxygen – glucose deprivation. 201
The Satisfaction Level of Post-Surgery Patients Between Regional and General Anaesthesia at PKU Muhammadiyah Gamping Hospital Yogyakarta

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ABSTRACT

Introduction: Patient satisfaction is an important and commonly used indicator for measuring the quality in health care. A patient who will go through surgery requires general or regional anaesthesia. This research wants to find out satisfaction levels of post-surgery patient between regional and general anaesthesia at PKU Muhammadiyah Gamping Hospital.

Method: This research is an observational analytic design with cross-sectional approach. The samples in this study were post-surgery patients of PKU Muhammadiyah Gamping Hospital and were taken using consecutive sampling technique with 70 respondents. Satisfaction levels of patients were measured by using Iowa Satisfaction with Anaesthesia Scale (ISAS).

Results: Prevalence of patient who did not feel pain during surgery was higher at general anaesthesia (55.7%) compared to regional anaesthesia (27.1%) (p=0,01). Prevalence of nausea and vomiting was higher at general anaesthesia (28.6%) compared to regional anaesthesia (14.3%) (p=0,324). Prevalence of patient who felt relaxed was higher at general anaesthesia (58.6%) compared to regional anaesthesia (40%) (p=0,411). Prevalence of patient who felt pain was higher at general anaesthesia (24.3%) compare to regional anaesthesia (14.3%) (p=0,688). Prevalence of patient who satisfied with anaesthetic care was the same between regional and general anaesthesia (100%).

Conclusion: There is no correlation between satisfaction levels of patient with regional and general anaesthesia at PKU Muhammadiyah Gamping Hospital, but patients tend to use general anaesthesia rather then regional anaesthesia.

Keywords: Satisfaction Levels, Regional Anaesthesia, General Anaesthesia

INTRODUCTION

Patient satisfaction is an important and commonly used indicator for measuring the quality in health care (Prakash B, 2010). Patient satisfaction after anaesthesia is an important outcome in hospital care (Myles et al., 2000). Satisfaction can be achieved by optimizing result of patient and paying attention to patient and family's ability, complaint, physical environment, and also by prioritizing patient’s needs, thus producing balance between result and effort (Soejadi, 1996). It is influenced by the interaction between the patients with anesthetist, anesthetic management of perioperative and postoperative follow-up (Gebremedhn et al., 2015). Royse et al. (2010) define that only sensation of pain and nausea, which contribute to patient dissatisfaction.

Anaesthesia is derived from Greek an-, which means "without" and aisthēsi, meaning sensation. It refers to an injection or inhalation medication practice that may block the sensation of pain and other sensations, or it may create an unconscious state that eliminates all sensations, allowing medical and surgical procedures to be performed without causing unexpected, unpleasantness, or discomfort (ANZCA, 2016). Currently, anaesthesia can be done regional or general. In general anaesthesia, the patient becomes unconscious and does not feel the total pain sensation (Baradero et al, 2008), whereas regional anaesthesia makes the body's specific body numb, thus eliminating the pain sensation and allowing for surgery. Regional anaesthesia provide a numbing effect on the nerves that innervate several parts of the body, through the injection of local anesthetic in spinal/epidural plexus, or other nervus block. Patient with regional anaesthesia can remain conscious (ASRA, 2016).

General anaesthesia can be performed with total intravenous injection, and inhalation
(Pramono, 2015) and regional anaesthesia can be performed with spinal, epidural, and nerve block (Torpy, 2011). General anaesthesia and regional anaesthesia has disadvantages also. In general anaesthesia, some patients maybe requiring more complex treatment and preoperative patient preparation. General anaesthesia has associated with some complications such as nausea, vomiting, sore throat, headache, chills, and delayed return of normal mental function, can lead to an increase in acute and potentially lethal, hypercarbia, metabolic and hyperkalemic acidosis (Press, 2015). However, in the administration of regional anaesthesia, complications may occur although rarely occur, including post-injection headache, back pain, transient neurological symptoms (TNS), total spinal anaesthesia, spinal or epidural hematoma, epidural abscess, meningitis, arachnoiditis, cardiac arrest, and retention of urine (Agarwal and Kishore, 2009). Based on the patient's clinical situation, general anaesthesia is not always the best option, but local or regional anaesthesia may be more appropriate (Press, 2015). We will determine the level of patient satisfaction between operations using regional anaesthesia or general anaesthesia, at PKU Muhammadiyah Gamping Hospital Yogyakarta.

METHOD
This research was an observational comparative analytic, with cross sectional approach. The sample of this study were postoperative patients using either general anaesthesia or regional anaesthesia taken from the month of October 18 to December 18, 2016 at PKU Muhammadiyah Gamping Hospital Yogyakarta. The inclusion criteria of this study were postoperative patients with general anaesthesia, and regional anaesthesia, aged 18-60 years, while exclusion criteria were patients who have impaired interact and patients who did not return the questionnaires.

The research instrument used by researchers is the Iowa Satisfaction with Anaesthesia Scale (ISAS) to measure the satisfaction of patients who are in the supervision of anaesthesia (Dexter & Candiotti, 2011). Data analyzed with SPSS (Statistical Package for Social Science) and the results of the questionnaire will be analyzed through chi-square test. Chi-square test was used to test the relationship between two categorical variables unpaired. The variables referred to in this study are anaesthesia, both general and regional anaesthesia, and postoperative patient satisfaction level.

RESULTS
This research was conducted at the beginning of October until the end of November 2016 at PKU Muhammadiyah Gamping Hospital. Characteristic data of respondents in this study include sex and age. Based on the Table 1 below, it was knew that the respondents consisted of 30 men (42.9%) and 40 women (57.1%).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Man</th>
<th>Women</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y.o)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-25</td>
<td>8</td>
<td>10</td>
<td>18 (25.7%)</td>
</tr>
<tr>
<td>26-35</td>
<td>5</td>
<td>5</td>
<td>10 (14.3%)</td>
</tr>
<tr>
<td>36-55</td>
<td>6</td>
<td>17</td>
<td>23 (32.9%)</td>
</tr>
<tr>
<td>&gt; 55</td>
<td>11</td>
<td>8</td>
<td>19 (27.1%)</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>40</td>
<td>70 (100%)</td>
</tr>
</tbody>
</table>

Table 2. Satisfaction levels based on the statement “I feel pain during operation”

<table>
<thead>
<tr>
<th>Level of Satisfaction</th>
<th>Regional Anaesthesia</th>
<th>General Anaesthesia</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfied</td>
<td>19 (27.1%)</td>
<td>39 (55.7%)</td>
<td>58 (82.9%)</td>
</tr>
<tr>
<td>Not satisfied</td>
<td>9 (12.9%)</td>
<td>3 (4.3%)</td>
<td>12 (17.1%)</td>
</tr>
<tr>
<td>Total</td>
<td>28 (40%)</td>
<td>42 (60%)</td>
<td>70 (100%)</td>
</tr>
</tbody>
</table>

Based on the above table, the number of respondents was satisfied based on the statement "I feel pain during operation" more on giving general anaesthesia that were 39 people (55.7%), compared to the giving of regional anaesthesia that were 19 people (27.1%). Furthermore, the number of unsatisfied respondents were more than 9 respondents (12.9%), compared to respondents with general anaesthesia (3 people or 4.3%).
Table 3. Satisfaction levels based on the statement "I am vomiting or feeling nausea"

<table>
<thead>
<tr>
<th>Level of Satisfaction</th>
<th>Regional Anaesthesia</th>
<th>General Anaesthesia</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfied</td>
<td>18 (25.7%)</td>
<td>22 (31.4%)</td>
<td>40 (57.1%)</td>
</tr>
<tr>
<td>Not satisfied</td>
<td>10 (14.3%)</td>
<td>20 (28.6%)</td>
<td>30 (42.9%)</td>
</tr>
<tr>
<td>Total</td>
<td>28 (40%)</td>
<td>42 (60%)</td>
<td>70 (100%)</td>
</tr>
</tbody>
</table>

Based on the above table, the number of satisfied respondents based on the statement "I was vomiting or feeling nauseated" was more on the general anaesthesia that were 22 people (31.4%), compared to the regional anaesthesia that were 18 people (25.7%). Then there were more unsatisfied respondents in general anaesthesia, 20 people (28.6%), compared with 10 (14.3%) of regional anaesthesia.

Table 4. Satisfaction levels based on the statement "I feel calm"

<table>
<thead>
<tr>
<th>Level of Satisfaction</th>
<th>Regional Anaesthesia</th>
<th>General Anaesthesia</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfied</td>
<td>28 (40%)</td>
<td>41 (58.6%)</td>
<td>69 (98.6%)</td>
</tr>
<tr>
<td>Not satisfied</td>
<td>0 (0%)</td>
<td>1 (1.4%)</td>
<td>1 (1.4%)</td>
</tr>
<tr>
<td>Total</td>
<td>28 (40%)</td>
<td>42 (60%)</td>
<td>70 (100%)</td>
</tr>
</tbody>
</table>

Based on the above table, the number of respondents was satisfied based on the statement "I feel calm" more on giving general anaesthesia that were 41 people (58.6%), compared to the giving of regional anaesthesia that were 28 people (40%). Then the number of respondents was not satisfied more on respondents with general anaesthesia that were 1 person (1.4%), compared to respondents with regional anaesthesia that were 0 people (0%).

Table 5. Satisfaction levels based on the statement "I feel pain"

<table>
<thead>
<tr>
<th>Level of Satisfaction</th>
<th>Regional Anaesthesia</th>
<th>General Anaesthesia</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfied</td>
<td>10 (14.3%)</td>
<td>17 (24.3%)</td>
<td>27 (38.6%)</td>
</tr>
<tr>
<td>Not satisfied</td>
<td>18 (25.7%)</td>
<td>25 (35.7%)</td>
<td>43 (61.4%)</td>
</tr>
<tr>
<td>Total</td>
<td>28 (40%)</td>
<td>42 (60%)</td>
<td>70 (100%)</td>
</tr>
</tbody>
</table>

Based on the above table, the number of respondents were satisfied based on the statement "I feel pain" more in general anaesthesia which was 17 people (24.3%), compared to regional anaesthesia 10 people (14.3%). Then there were more unsatisfied respondents with general anaesthesia that was 25 people (35.7%), compared to respondent with regional anaesthesia that was 18 people (25.7%).

Table 6. Satisfaction levels by aspect "I am satisfied with the anaesthesia treatment I received"

<table>
<thead>
<tr>
<th>Level of Satisfaction</th>
<th>Regional Anaesthesia</th>
<th>General Anaesthesia</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfied</td>
<td>28 (40%)</td>
<td>42 (60%)</td>
<td>70 (100%)</td>
</tr>
<tr>
<td>Not satisfied</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Total</td>
<td>28 (40%)</td>
<td>42 (60%)</td>
<td>70 (100%)</td>
</tr>
</tbody>
</table>
Based on the above table, the number of respondents was satisfied based on “I am satisfied with the anaesthesia treatment I received” more on the general anaesthesia which were 42 people (60%), compared to the regional anaesthesia that were 28 people (40%). Then also found the number of respondents not satisfied as much between regional anaesthesia with general anaesthesia was 0 people (0%).

Data was then analyzed to see whether or not the relationship of respondent satisfaction level with regional anaesthesia and general anaesthesia use Chi-Square test. The result of Chi-square test said that there was a relationship between respondent satisfaction based on the presence or absence of pain when the operation takes place on the granting of regional anaesthesia and general anaesthesia (0.01), but no relationship of vomiting or feeling of nausea (0.324), presence or absence of calm feeling toward the granting of regional anaesthesia and general anaesthesia (0.411), feel pain (0.688), and in the aspect of “I am satisfied with the care I received anaesthesia”, all patients either using regional anaesthesia or the general anaesthesia, equally as satisfied entirely.

Based on the data processing described above, it was found that there is no relationship between postoperative patient satisfaction level with regional anaesthesia and general anaesthesia at PKU Muhammadiyah Gamping Hospital. There was no relationship between patient satisfaction levels of regional anaesthesia and general anaesthesia probably because patients have understood the risks or side effects of anaesthesia, so that when things like pain or nausea or vomiting occur they do not consider it something that were not satisfactory for the patient. However, patients prefer to use of general anaesthesia that allows to be unaware at all, so that patients do not need to watch the surgery. These results were consistent with research conducted by Moawad & Hefnawy (2015).

In the study we found out that general anaesthesia was preferred by patients because it was felt more comfortable. But the results obtained by researchers were different from the research Gebremedhn, et al. (2015). The differences that occur are likely due to Gebremedhn et al. (2015) used different aspects with researchers in assessing the level of satisfaction, such as the emergence of postoperative depression and postoperative sore throat. In addition, there is also a considerable difference between the number of regional anaesthesia patients and general anaesthesia patients in the study (Gebremedhn, et al., 2015).

Results of this research was suggesting that patients prefer general anaesthesia according to Nakahashi et al, (2004). This was related to postoperative back pain using spinal block regional anaesthesia, although the back pain is not a direct result of spinal block. The back pain may occur due to a less ergonomic position during surgery, overly tight bandages, surgical trauma, duration of operation, age, pregnancy, needle type, and stitch count (Rhee, et al., 2010).

CONCLUSION

There is no correlation between satisfaction levels of patient with regional and general anaesthesia at PKU Muhammadiyah Gamping Hospital, but patients tend to use general anaesthesia rather then regional anaesthesia. We suggest to do such research that compare patient satisfaction with regional anaesthesia with or without sedation.

REFERENCES:


A Systematic Review of Factors Influencing the Burden of Family Caregivers in Caring for Elderly with Dementia

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ABSTRACT

Background: The aging is the final cycle of human life, and one of the disturbances of aging which occurs in the elderly is dementia. Elderly with dementia will experience changes in the pattern of daily life activities, and therefore require total care from the family. There are some reasons of the family for caring for the elderly at home, among others, include the expression of devotion to the parents, respect, and affection towards the parents. The burden of elderly caregivers may lead to a stressful condition which can manifest in depression and frustration, and will finally affect the welfare of the elderly and the family.

Purpose: This study aimed to describe the factors influencing the burden of the family caregivers in caring for the elderly with dementia, and to identify the physical and psychologic factors associated with the caregiver burden.

Methods: A systematic review of three databases, including CINAHL, PubMed, and ScienceDirect was carried out by exploring relevant articles published in 2008 to 2017. The keywords of burden, elderly caregiver, and dementia were used. Seventy potentially relevant articles were selected out of 4,210. After a further review, 16 articles met the inclusion criteria and were used in this study.

Results: The results revealed that factors influencing the burden of family caregivers in caring for the elderly with dementia include family support, family socioeconomic ability, and family coping mechanisms. The burden will get higher when the caregivers play double roles, i.e., caring for the elderly and working to earn a living. The quality of life of the family caregivers can be well promoted if the influencing factors can be resolved.

Conclusion: Three factors influence the caregivers’ burden, including family support, socioeconomic factor, and family coping. Of the three factors, family support is the most influential factor in caring for the elderly with dementia.

Keywords: Burden, caregivers, elderly, dementia

INTRODUCTION

The aging is the ultimate cycle of human life, and one of the disturbances in aging that occurs in the elderly is dementia. Dementia is a chronic or progressive syndrome in which there is a cognitive decline and leads to disorders of memory, orientation, comprehension, language skills and impaired daily activities (WHO, 2015). Dementia experienced by the elderly will influence the burden of family caregivers. In practice, although caregivers feel overwhelmed with caring for older adults with dementia, they find that affection is the reason why they keep the health of the elderly (Vugt & Verhey, 2013). The number of older adults in Indonesia is estimated to be 234,181,400 inhabitants, and the proportion of the elderly population will increase by 11.34% by 2020. Risk factors for cognitive impairment include age, sex, race, age, genetics, heart rate, cholesterol, diabetes mellitus (Farid et al., 2013). The burden of elderly caregivers can lead to stressful conditions manifested in depression and frustration, and ultimately affect the welfare of parents and families. Zarit et al. (1986) defined caregivers’ burden as the degree to which an individual's emotional or physical health, social life or financial status develop the caring for his relatives.

The burden of the family caregiver is to help the elderly meet their needs of daily life. Since the caregivers continuously accompany the elderly during treatment, the caring given is then called as long-term care (Onishi, 2016). Caregiving for the elderly with dementia is highly stressful and has negative consequences for the caregivers such as the emergence of burden. Stress experienced by caregivers can be manifested physically and psychologically. Family support is importantly needed to minimize stress in the caregivers. Family
support in the form of affection to the elderly can be shown in the form of assistance for daily needs (Marian, I. Z., Marja, J., & Aartsen, 2015).

Dementia is a disorder that is manifested by cognitive impairment, chaotic behavior, impairment of sensory function, and inability to function optimally due to progressive disorders in the brain (Alzheimer Association, 2012). Physical burden of elderly caregivers can be in the form of compromised immune function, unstable emotions, social isolation, and depression and anxiety (Razani & Quilici, 2014; Aschbacher et al., 2006). Stress management interventions are appropriate for elderly caregivers to function optimally in caring for the elderly at home (Alzheimer Association, 2012). Caregiver burdens are associated with the work overload, sleep disturbance, and economic disability, and lack of leisure time to interact with society.

Caregivers should have knowledge and skill in caring for the elderly with dementia since they are key factors in providing educational assistance and information to the elderly. Family support is a key factor in the treatment of the elderly with dementia. Studies on factors influencing the burden of family caregivers in caring for the elderly with dementia have been massively conducted. However, there are limited studies which investigate specific primary caregivers of the elderly with dementia undergoing treatment at home. Therefore, this review is important to know the factors influencing family caregiver burdens in caring for the elderly with dementia.

OBJECTIVE
This study aimed to describe the factors influencing the burden of the family caregivers in caring for the elderly with dementia and to identify the physical and psychologic factors associated with the caregiver burden.

METHODS
Search strategy and article selection
This study describes a systematic review which was conducted by exploring relevant articles published in the databases of CINAHL, PubMed, ScienceDirect and Google Scholar. The review was limited to the articles published in 2008 to 2017. The studies were eligible for inclusion in this study when they reported on the burden of family caregivers in caring for the elderly with dementia. The keywords used in the search were burden, elderly, caregiver, and dementia.

The selection of articles in this study was performed in two steps. The first step was reviewing the articles based on the title and abstract, and the second step was selecting the full-text articles in accordance with the inclusion criteria. If there were several articles which reported similar results, only the full-text articles were used. The types of studies included in this review were correlation studies, longitudinal studies, qualitative studies, cross sectional studies, observational studies and case control studies. The participants in the studies were family caregivers who provided care to the elderly with dementia living in the family. The burdens of caregivers included the factors that influenced the delivery of care to the elderly and the elderly needs which should be met during the care.
Data abstraction
Information abstracted was based on the study designs, objectives, sampling method, source and type of data, characteristics of participants, and details of diagnosis of the caregiver burden.

Quality Assessment
A review that identifies dementia in the elderly has been extensively studied, but a review explaining caregiver burdens has not been widely studied. This review explores the factors that influence the burden of caregivers of the elderly with dementia with some differences in the caregivers and elderly characteristics.

RESULTS
This study explored 4,210 titles and abstracts for eligibility in the first step. After a further review, 225 articles were selected. Out of 225, 209 articles were excluded since they did not investigate the factors influencing the burden of caregivers (183), and 26 were reviews/editorials. Finally, 16 full-text articles were determined for this review. All articles were written in English.
<table>
<thead>
<tr>
<th>Title/ years</th>
<th>Author(s)</th>
<th>Study population and design</th>
<th>Instrument used in the study</th>
<th>Main Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caregiver burden associated with behavioral and psychological symptoms of dementia (BPSD) in Taiwanese elderly/ 2012</td>
<td>Huang, Lee, Liao, Wang, &amp; Lai, 2012</td>
<td>The study had a cross-sectional design and involved 88 patients with dementia.</td>
<td>Neuropsychiatric inventory</td>
<td>Improvement of treatments for delusions, agitation/aggression, anxiety, irritability/lability, and dysphoria/depression among dementia patients may reduce caregiver burden.</td>
</tr>
<tr>
<td>Caregiver Burden in Alzheimer-type Dementia and Psychosis: A Comparative Study from India/2017</td>
<td>Sinha, Desai, Prakash, Kushwaha, &amp; Tripathi, 2018</td>
<td>Comparing two continuous studies and 32 population</td>
<td>Zarit burden interview</td>
<td>Dementia carries a greater caregiver burden when compared with elderly patients with psychosis. Innovative interventions are needed to remove the burden from caregiving.</td>
</tr>
<tr>
<td>WHEDA study: Effectiveness of occupational therapy at home for older people with dementia and their caregivers-the design of a pragmatic randomized controlled trial evaluating a Dutch programme in seven German centres /2009</td>
<td>Voigt-radloff et al., n.d)</td>
<td>Single blind randomized controlled trial</td>
<td>Mini Mental State Examination (MMSE)</td>
<td>WHEDA interventions have positive implications for older adults with dementia.</td>
</tr>
<tr>
<td>The Association Between the Burden on Formal Caregivers and Behavioral and Psychological Symptoms of Dementia (BPSD) in Korean Elderly in Nursing Homes/2015</td>
<td>Song &amp; Oh, 2015</td>
<td>The study was to examine the association between BPSD and the burden on formal caregivers of nursing homes in South Korea and samples of 143 formal caregivers</td>
<td>The research instrument used Korean Version of Mini Mental State Examination (K-MMSE), Korean-Physical Activities of</td>
<td>Results showed that the total severity score of BPSD had a statistically significant positive correlation with the total distress score.</td>
</tr>
<tr>
<td>Study Title</td>
<td>Authors</td>
<td>Study Type</td>
<td>Methodology</td>
<td>Measures</td>
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<td>---------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>A Controlled Naturalistic Study on a Weekly Music Therapy and Activity Program on Disruptive and Depressive Behaviors in Dementia/ 2010</td>
<td>Han, Chen, &amp; Yusoff, 2011</td>
<td>Correlational study</td>
<td>MMSE AND Referral memory behavior problem</td>
<td>Music intervention could reduce the behaviors and burden of caregivers caring for the elderly with dementia.</td>
</tr>
<tr>
<td>The Effectiveness of Psychoeducational Interventions in Reducing the Care Burden of Family Members Caring for the Elderly in Turkey/ 2016</td>
<td>Boyacioglu</td>
<td>This study was conducted using pre and post-test control group and the older person aged 65 years or older in this service area of 84.</td>
<td>The older person aged 65 years or older in this service area. The General Self-Efficacy Scale – GSE, The Cognitive Emotion Regulation Questionnaire – CERQ</td>
<td>The psychoeducational intervention based on the McGill Nursing Model was efficient.</td>
</tr>
<tr>
<td>Telephone-delivered psychosocial intervention reduces burden in dementia caregivers/2008</td>
<td>Glueckauf et al., 2012</td>
<td>The study is randomized control trial</td>
<td>Psychosocial intervention for dementia caregivers (FITTD) dementia severity (Clinical Dementia Rating (CDR))</td>
<td>Caregivers receiving FITT-D exhibited significantly lower burden scores and less severe reactions to memory and behavior problems than caregivers in the standard care condition</td>
</tr>
<tr>
<td>Telephone-Based, Cognitive-Behavioral Therapy for African American Dementia</td>
<td>Gluekaufs</td>
<td>Randomized pilot study</td>
<td>Revised Memory and Behavior Problem</td>
<td>Cognitive behavior therapy can effectively reduce the burden of elderly caregiver with dementia</td>
</tr>
<tr>
<td>Study Title</td>
<td>Authors</td>
<td>Study Design</td>
<td>Measures</td>
<td>Findings</td>
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<tr>
<td>Caregivers With Depression: Initial Findings/ 2012</td>
<td>Sakurai et al., 2016</td>
<td>Cross sectional study and of 48 participants from our classes for caregivers</td>
<td>Zarit burden interview (ZBI)</td>
<td>Caregiver’s burden is strongly associated with the quality of life of patients.</td>
</tr>
<tr>
<td>Prevalence and predictor of burden in caregiver of people with dementia/ 2016</td>
<td>Ames, Psych, Balshaw, &amp; Ph, 2013s</td>
<td>Prospective cohort study and 732 primary caregivers</td>
<td>Zarit burden interview</td>
<td>People with dementia have high and persistent rates of burden. Identification of caregivers likely to have high levels of burden at 12 months may allow more accurate targeting of interventions.</td>
</tr>
<tr>
<td>Religious coping and caregiver well-being in Mexican-American families/ 2009</td>
<td>Herrera, Lee, Nanyonjo, Laufman, &amp; Torres-vigil, 2015</td>
<td>Qualitative longitudinal study</td>
<td>Religious Coping (Rames et al., 2013) COPE Scale</td>
<td>Spiritual beliefs of caregivers are pertinent to their ability to adapt to physical and mental health problems, even though some aspects of their beliefs may have an unintended negative impact. The subscale shows some individuals and varies depending on the person and role of the caregiver</td>
</tr>
<tr>
<td>Comparative analysis of informal caregiver burden in advance cancer, dementia and Acquired brain injury/ 2015</td>
<td>Harding, et al</td>
<td>Comparative study and the 131 participate caregiver elderly with dementia</td>
<td>Zarit burden interview(ZBI)</td>
<td>Psychosocial therapy is most effective and has a positive effect on follow-up for 1 year, so improvement of dementia can be seen</td>
</tr>
<tr>
<td>Psychosocial intervention for family caregivers of people with dementia reduces caregiver’s burden: development and effect after 6 and 12 months/ 2009</td>
<td>Andren</td>
<td>Longitudinal control design</td>
<td>The Carers’ Assessment of Satisfaction Index (CASI)</td>
<td>Considering the significance of DRA in the caregivers of an FMWD, health promotion strategies including dementia prevention and social support should be developed and provided to improve their attitudes and help them make behavior changes.</td>
</tr>
<tr>
<td>Experience of Dementia-related Anxiety in Middle-aged Female Caregivers for Family Members with Dementia: A Phenomenological Study/ 2016</td>
<td>Kim, et al</td>
<td>A descriptive phenomenological study and</td>
<td>-</td>
<td>The results showed psychosocial intervention can reduce the elderly caregiver burden in the family</td>
</tr>
<tr>
<td>Family caregivers of people with dementia/ 2009</td>
<td>Brodaty</td>
<td>Correlational study</td>
<td>-</td>
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</table>
**Summary of research**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factors influencing the burden of caregivers in caring for the elderly with dementia</td>
<td>Brodaty et al., 2009; Andren et al., 2009; Herera et al., 2009; Ashbacher et al., 2006; Kim et al., 2011; Jensen et al., 2017; Song et al., 2015; Lai et al., 2012; Bayaciouglu et al., 2016; Brodaty et al., 2009; Chan, 2011; Harding 2015; Brodaty et al., 2009; Glueckauf et al., 2012; Shim et al. 2015; Kim et al., 2011; Putri et al., 2013; Sakurai et al., 2016; Brodaty et al., 2009</td>
</tr>
<tr>
<td>Family coping</td>
<td></td>
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<tr>
<td>Socioeconomic ability</td>
<td>Palacio et al; Brodaty et al. 2009; Andren et al. 2012; Brodaty et al., 2009; Andren et al., 2012; Glueckauf et al., 2012; Shim et al. 2015; Kim et al., 2011; Putri et al., 2013; Sakurai et al., 2016; Brodaty et al., 2009</td>
</tr>
<tr>
<td>Family supporting</td>
<td></td>
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<tr>
<td>Physical factors of caregiver burden</td>
<td></td>
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<tr>
<td>The physical factors of the caregivers of the elderly with dementia are related to the activity daily living needs of the elderly. To meet the needs, caregivers must spend sufficient time to maintain good care. The caregivers should be able to set the time for all tasks that can be implemented properly.</td>
<td></td>
</tr>
<tr>
<td>Psychological factors of the caregiver burden</td>
<td></td>
</tr>
<tr>
<td>Depression, stressor, uncomfortable feeling, stress, predicting things that are not good, anxiety, depression, fatigue</td>
<td></td>
</tr>
</tbody>
</table>

**Factors influencing caregiver burden in caring for the elderly with dementia**

**Family support**

The majority of the elderly in Indonesia live more with their family. Love and affection become the reason why the elderly are not cared in a nursing home. Besides, the religious values also become the reason to care for the elderly with family. Health support in elderly care becomes an important factor and reduces the burden of elderly care with dementia (Schoenmakers, Buntinx, & Delepeleire, 2010). Elderly with dementia has a long-term care tendency. Health care has shifted to family-centered care, and families become care partners (Chan, 2011). Family support is important during the care. All family members must be able to understand the elderly since good family supports will reduce the caregiver burden of the elderly with dementia. The assistance provided by the families includes dressing, bathing, toilets, care, and around (sometimes referred to as personal care), and the help with ADL merges, including Instrumental Daily Life Activities (IADL), such as shopping, preparation food using transportation, and managing personal finance, as well as supervision to perform behavioral symptoms or to prevent the elderly from dangerous incidents.

Family support in caring for the elderly is demonstrated by helping the daily activities of the elderly. The wife is to be the primary caregiver in the care of the elderly. Wives with higher affection are neglected with other family members at home, other than that unemployed wives have enough time to care for the elderly with dementia (Rezende et al., 2017). Families who treat elderly with chronic illness have a high risk of burden which influences the caregiver quality of life.

**Socioeconomic ability of family**

Lack of financial resources is one of the main difficulties in caring for sick family members, and the consequence is that the families should reduce the budget for other expenses. This will cause more burden to the family members who make a living, and to mothers who are in charge of spending the money. Costs required include the cost of medicines, emergencies, transportation, daily necessities, and other unpredictable needs. The social characteristic is social being since the time required is very little; most daily time is given to the elderly with dementia (Jensen et al., 2017).

The balance in family finance arrangements is the solution to the caregiver’s economy. The need for great sacrifice in caring for the elderly with dementia will affect the quality of life of the caregivers and the elderly. This sacrifice includes the goods and the quality of life of other family members (Ames et al., 2013).

Caregivers need financial assistance in caring for the elderly with dementia. In some advanced countries, the care of the elderly with dementia is very good, such as by providing insurance for
the elderly care with dementia. This provision of insurance can reduce the burden of caregivers and families of elderly dementia patients (WHO, 2015).

DISCUSSION
Caring for the elderly with dementia requires more affection and care. The provision of total care can increase the quality of life of the elderly; this will have an impact on the family especially the primary caregivers. In many cases, primary caregivers can have dual roles, i.e. being the elderly caregiver and meeting the needs of other family members (Ames et al., 2013). Due to these dual roles, the process of caring for the elderly will run dynamically (Choi & Stone, 2012).

This systematic review revealed that the factors influencing the burden of caregivers caring for the elderly with dementia include family support, socioeconomic ability of family, and family coping. The family support includes family roles and functions. The roles and functions are operationally performed by assisting the elderly in daily needs, such as eating, shifting, dressing, toileting (Kim, Chang, Rose, & Kim, 2011). Another factor is related to the socio-economic capacity. The family needs a lot of costs to care for the elderly at home. As a result, the elderly family will have to use the budget of other expenses. The balance between the cost of elderly care and sufficient source of financial resources can decrease the burden of the elderly care givers.

Caregivers of the elderly with dementia are very susceptible to stressful and physical events. The elderly with dementia have many experiences which give an interference in cognitive function including the mindset. This makes the elderly caregivers vulnerable to physical and psychological stressors, and effective coping strategies become the main key in caring for the elderly with dementia (Gilhooly et al., 2016).

Furthermore, in caring for the elderly, the caregivers often experience physical fatigue. It is because the treatment takes a long time. Sometimes, the caregivers experience sleep interference in their care of the elderly, and this becomes one of the driving factors of stress. Constructive coping patterns are needed to decrease the burden of the caregivers.

CONCLUSION
Three factors influence the burden of caregivers in caring for the elderly, including the family support, family socioeconomic ability, and coping mechanism. Of these three factors, family support is the most influential factor in caring for the elderly with dementia.

REFERENCES
10. Jensen, M. P., Brunklaus, A., Dorris, L,


Low Glycemic Index Noodle Snack From Yellow Sweet Potato (Ipomoea Batatas) and Pumpkin (Cucurbita Moschata) Blend

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ABSTRACT

Food with low Glycemic Index (GI) and diet modification using high fiber and antioxidant contents are recommended to control blood sugar level. Sweet potato, pumpkin, and cinnamon have high fiber and antioxidant content; therefore, they are potential raw material for low GI food product. The study aimed to obtain the best formula of noodle snack utilizing sweet potato and pumpkin with or without cinnamon. The snack is expected to have good organoleptic acceptance, healthy nutrients (total antioxidant level, amylose, starch digestibility, and dietary fiber), and low GI value. A quasi experimental study was conducted to make noodle snack using six formula of sweet potato and pumpkin paste substitution, i.e., 30% yellow sweet potato, 30% pumpkin, and mixture of 15% yellow sweet potato and 15% pumpkin, with or without cinnamon powder (1.5% and 0%). Organoleptic data were analyzed using Duncan’s Multiple Range Test while the nutrient content (total antioxidant level, amylose, starch digestibility, and dietary fiber) were analyzed using Tukey’s Test. Noodle snack without cinnamon powder was the most preferable formulation by the panelists. The snack made of pumpkin and yellow sweet potato has high hypoglycemic activity (high amylose content 37.03%, low starch digestibility 9.62%, and high dietary fiber 1.88%). GI determination in ten healthy subjects revealed that it has a GI value of 30.18, which was categorized as low GI. However, it has the lowest levels of total antioxidants (IC50 33.76 ppm). Noodle snack from sweet potato and pumpkin blends has a good acceptance and low GI value, suggesting it to be a healthy snack that can assist in controlling blood sugar level.

Keywords: Low glycemic index, Snack, Yellow sweet potato, Pumpkin

INTRODUCTION

The glycemic index (GI) of food indicates how quickly a food product can raise the post prandial blood sugar level (Beber, 2004; Rizkalla et al, 2004; Astawan dan Widowati, 2011; Allen et al, 2012). Based on this GI value, foods can be categorized as low GI foods (<55), moderate GI foods (55–70), and high GI foods (>70) (Allen et al, 2012). The WHO has recommended food with low GI for patients with diabetes mellitus (DM) so as to control their blood sugar level.

Diet modification has been shown to be effective in controlling blood glucose level in patients with DM type 2 (Haghghian et al, 2011). Diets having high fiber content and high antioxidants are recommended for patients with DM type 2 (Astawan dan Widowati, 2011; Allen et al, 2012; Haghghian et al, 2011; Kang Yu et al, 2014; Han et al, 2014; Kaczmarczyk et al, 2012; Neergheen-Bhujun et al, 2014; Fei et al, 2014; Hossain et al, 2014). Dietary fiber slows down glucose absorption and gastric emptying, thus, controlling blood glucose level by decreasing glycemic response while antioxidants inhibit glucose auto-oxidation, which can cause hyperglycemia (Haghghian et al, 2011).

Yellow sweet potatoes (Ipomoea batatas) and pumpkin (Cucurbita moschata) contain high fiber and antioxidants (Astawan dan Widowati, 2011; Koala et al, 2013; Bhat dan Bhat, 2013). Yellow sweet potatoes have 34.36–51.37% fiber and 0.51–0.56 µmol TE/g antioxidants while pumpkins have 66.8% of fiber and 45.61±0.1 µmol TE/g antioxidants (Teow et al, 2007; Grace et al, 2014; Usha et al, 2010; De Carvalho et al, 2012; Pasha, 2013). Sweet potatoes have hypoglycemic activity due to its high amylose content (24.94–26.08%) and high content of resistant starch (2.80–3.80%) (Astawan dan Widowati, 2011; Bahado-Singh et al, 2011). Amylose is a complex carbohydrate polymer with a straight structure, which makes it difficult to
gelatinize and digest (Foster-Powell et al, 2011). Resistant starch has a negative effect on starch digestibility; the higher the resistant starch in a food item, the lower is its starch digestibility (Astawani dan Widowati, 2011).

Spices such as cinnamon powder have a beneficial effect on patients with DM type 2 (Haghghian et al, 2011). This is due to their antioxidant activity that controls blood glucose levels through activation of an insulin-receptor kinase enzyme, which can improve insulin sensitivity (Couturier et al, 2010). Instant noodles can be consumed as a snack. Therefore, the study aimed to obtain the best formula of noodle snack utilizing sweet potatoes and pumpkins with or without cinnamon powder. The proposed snack is expected to have good organoleptic acceptance, healthy nutrients (total antioxidant level, amylose, starch digestibility, and dietary fiber), and low GI value.

METHOD

Yellow sweet potatoes, pumpkins, cinnamon, high-protein flour (Cakra Kembar Bogasari), and salt were obtained from local market while carrageenan powder was obtained from the Panadia Laboratory Malang, East Java.

Noodle Snack

Sweet potatoes (Ip) and pumpkins (Cm) were steamed at 90±5 °C for 15 minutes after being cleaned and washed. They were peeled after being cooled at room temperature for 10 minutes and then mashed to produce a paste. The proportion of the ingredients of the noodle snack could be any of the following six formulas: 30% yellow sweet potatoes, 30% pumpkins, 15% yellow sweet potato, 15% pumpkins, with cinnamon powder (1.5%) or without cinnamon powder (Cc)(0%). Salt (1%) and carrageenan powder (0.75%) were added to noodles dough. Dough was kneaded for 15 minutes and then pressed and cut in the form of noodles. Noodles were fried in vegetable oil at 150±50 °C for 90 seconds.

Organoleptic Test and Nutrient Content Analysis

Twenty panelists conducted the organoleptic test using the 5-point hedonic scale (extremely dislike-extremely like) to evaluate the color, taste, texture, and flavor of the noodles snack with scale 1-5 (extremely dislike-extremely like). Antioxidant and nutrient contents were analyzed on noodles snack formulation.

The total antioxidant content was determined using the DPPH method (Awah et al, 2010), and the amylose content was determined using the Acid Hydrolysis Method (Srikaeo et al., 2014). Dietary fibers were estimated using the multienzyme gravimetric method (Asp et al, 1983), and starch digestibility was determined by an in vitro method (Muctadi et al, 1992).

Organoleptic data were analyzed using DMRT while the nutrient content (total antioxidant level, amylose, starch digestibility, and dietary fiber) data were analyzed using Tukey’s Test.

GI Value Determination

One of the noodle snack formulations was selected for GI value determination based on its acceptance by the panelists and its nutrient content. Blood glucose level was measured using glucometer (Accu-check™, equipped with Accu-check™ Biosensor Strip). GI value determination was conducted within 10 healthy subjects consisting of 5 women and 5 men using the Area Under the Curve Method (Broun et al, 2005). GI data were analyzed descriptively.

RESULT

The results revealed that noodle snack without cinnamon powder was the most preferable formulation by the panelists. Noodle snack without cinnamon powder has normal color, i.e., yellow color, like other commercial noodle products. This color is due to the beta carotene content in pumpkins and sweet potatoes (Koala et al, 2013; Olapade et al, 2014; Jacobo-Valenzuela, 2011). It is assumed that the Maillard reaction also contributed to the color acceptability of the noodle snack. Maillard reaction is a non-enzymatic reaction between reducing sugar and amino acids, peptides, or proteins. Melanoidin, which is an end product of Maillard reaction, is a nitrogen-containing brown pigment that gives a brownish color to a food product after thermal processing (Sun et al, 2010).

Cinnamon powder gave a unique taste and flavor to the noodle snack; however, it had low acceptance by the panelists because of its ‘aftertaste’ sensation. Noodle snacks made of yellow sweet potato substitutions (Ib and IbCc) had sweet potato taste and flavor, which were not desirable by the panelists. Noodle snack made of pumpkin paste substitution (Cm) had the most preferable taste and flavor by the panelists. It is assumed that the Maillard reaction also contributed to the taste and flavor acceptability of the noodle snack due to its heat treatment. Food processing at 90–100 °C enhanced the taste and flavor of Cantonese sausages (Sun et al, 2010).

Noodle snack with cinnamon powder (Cc(IbCc, CmIbCc) has less crispness compared to
noodle snack without cinnamon powder. It is assumed that cinnamon powder has high fiber content (54.3%) with 7% water adding on its dough may cause increase water absorption capacity by the fiber component on noodle snack (Mei Lu et al, 2011; Krishnan et al, 2012). Noodle snack made of yellow sweet potato paste substitution also has less crispness. It is might due to its high amylose content (21.62%-30.60%) which has a high capacity to absorb water, therefore amylose has more affect to product texture. Amylose-carrageenan interaction also contributes to noodle snack texture, produce less crispness (Kim et al, 2013).

Table 1. Mean Scores of Noodle Snack Acceptability

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Treatment Code</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cm</td>
<td>Ib</td>
<td>CmIb</td>
</tr>
<tr>
<td>Color</td>
<td>3.85±</td>
<td>3.80±</td>
</tr>
<tr>
<td>Taste</td>
<td>3.75±</td>
<td>2.90±</td>
</tr>
<tr>
<td>Flavour</td>
<td>3.75±</td>
<td>2.69±</td>
</tr>
<tr>
<td>Texture</td>
<td>3.95±</td>
<td>3.00±</td>
</tr>
</tbody>
</table>

Note: Different letter indicate significantly different in Duncan’s Multiple Range Test (DMRT) 95% CI
(Cm) : Curcubita moschata; (Ip) : Ipomoea batatas; (Cc) : Cinnamon

Noodle snack made of pumpkin paste substitution has the most preferable texture according to the panelists. Fried method to cook noodle snack made porous structure which resulting the crispness on the noodle snack. Antioxidant and nutrient contents of noodles snack without cinnamon in all formulations were analyzed due to its good acceptance by the panelists.

Nutrient Content of Noodle Snack

Each noodle snack has different significance for moisture, ash, protein, carbohydrate, antioxidant, amylose, and dietary fiber contents (p<0.05). This is because each ingredient has different significance on the component content.

Controlled duration of frying process of noodle snack (90°), which resulted in the amount of absorbed fat into noodles snack structure, was not significantly different among treatments such that the fat content in each treatment was also not significantly different. Carbohydrate content was affected by moisture, ash, protein, and fat content. The increase in these components decreased the carbohydrate content.

Table 2. Nutrient and Antioxidant Content of Noodle Snack

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Treatment Code</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ib</td>
<td>Cm</td>
</tr>
<tr>
<td>Moisture (%)</td>
<td>12.98±</td>
<td>11.92±</td>
</tr>
<tr>
<td>Ash (%)</td>
<td>1.32±</td>
<td>1.61±</td>
</tr>
<tr>
<td>Protein (%)</td>
<td>8.05±</td>
<td>10.69±</td>
</tr>
<tr>
<td>Fat (%)</td>
<td>2.05±</td>
<td>2.41±</td>
</tr>
<tr>
<td>Carbohydrate (%)</td>
<td>75.60±</td>
<td>73.37±</td>
</tr>
<tr>
<td>Antioxidant (ppm)</td>
<td>17.45±</td>
<td>25.28±</td>
</tr>
<tr>
<td>Amylose (%)</td>
<td>30.11±</td>
<td>33.75±</td>
</tr>
<tr>
<td>Starch Digestibility (%)</td>
<td>15.47±</td>
<td>12.65±</td>
</tr>
<tr>
<td>Dietary Fiber (%)</td>
<td>1.90±</td>
<td>0.72±</td>
</tr>
</tbody>
</table>

Note: Different letter indicate significantly different in Tukey Test 95% CI
(Cm) : Curcubita moschata; (Ip) : Ipomoea batatas; (Cc) : Cinnamon
IC$_{50}$ value shows the amount of sample concentrate required to inhibit 50% free radical DPPH. The higher the IC$_{50}$ value, the lower is its antioxidant activity (Muller et al, 2011). Noodle snack made of yellow sweet potato and pumpkin paste has the highest IC$_{50}$ (33.76 ppm) value, which indicates lowest antioxidant activity. It might because it needs some more time on kneading dough due to its high fiber content which can absorb more water. Water contributes to gluten and carbohydrate reactions, resulting in the chewy texture (Krishnan et al, 2012). The longer the kneading time, the higher is the antioxidant component loss in the food product (Li et al, 2015).

Noodles snack made up of sweet potato and pumpkin paste (IbCm) has the lowest starch digestibility (9.62%) due to its highest amylose content (37.03%). The highest the amylose content, the lowest is its starch digestibility.

**GI Value of Noodle Snack**

The GI value shows the effect of food on blood glucose level. It can be estimated by counting the contribution of GI values from some ingredients in a food product (Broun et al, 2005).

### Table 3. Estimated GI Values of Noodle Snack

<table>
<thead>
<tr>
<th>Formulation Code</th>
<th>Ingredients</th>
<th>CHO Content / 100 g</th>
<th>CHO Content (g)</th>
<th>Total CHO (%)</th>
<th>GI Value/100 g</th>
<th>GI Contribution</th>
<th>GI Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cm</td>
<td>Flour (68.25 g)</td>
<td>38</td>
<td>25.94</td>
<td>89.91</td>
<td>90</td>
<td>80.92</td>
<td>92.62</td>
</tr>
<tr>
<td></td>
<td>Pumpkin (30 g)</td>
<td>9.7</td>
<td>2.91</td>
<td>10.09</td>
<td>74±42</td>
<td>11.70</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flour (68.25 g)</td>
<td>38</td>
<td>25.94</td>
<td>83.66</td>
<td>90</td>
<td>75.29</td>
<td></td>
</tr>
<tr>
<td>Ib</td>
<td>Sweet potato (30 g)</td>
<td>16.89</td>
<td>5.067</td>
<td>16.34</td>
<td>39±15</td>
<td>9.97</td>
<td>85.26</td>
</tr>
<tr>
<td></td>
<td>Flour (68.25 g)</td>
<td>38</td>
<td>25.94</td>
<td>86.67</td>
<td>90</td>
<td>78.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pumpkin (15 g)</td>
<td>9.7</td>
<td>1.46</td>
<td>4.86</td>
<td>74±42</td>
<td>5.64</td>
<td>88.81</td>
</tr>
<tr>
<td>CmIb</td>
<td>Sweet potato (15 g)</td>
<td>16.89</td>
<td>2.53</td>
<td>8.47</td>
<td>39±15</td>
<td>5.17</td>
<td></td>
</tr>
</tbody>
</table>

Notes: (Cm) : Curcubita moschata; (Ip) : Ipomoea batatas; (Cc) : Cinnamon

According to the GI value estimation table, noodle snack have high GI value (>70) while noodle snack made of sweet potato paste substitution has the lowest GI value (85.26). However, to determine GI value, it is not accurate if only the GI value estimation table is used (Broun et al, 2005). GI value is not only affected by the amount of carbohydrate but also affected by food processing method, amylose, fiber, fat, protein content, and anti-nutrient components (Allen et al, 2012).

Glucose solution and noodle snack made of sweet potato and pumpkin paste blend were used as standard food and test food to determine the GI value. Noodle snack made of sweet potato and pumpkin paste blend has good acceptance by the panelists and has hypoglycemic activity based on its carbohydrate, amylose, dietary fiber content, and starch digestibility. All the tested food were measured as much as 25 g of carbohydrate (Broun et al, 2005). Therefore, noodle snack which was tested as much as 35 g equal to 25 g of carbohydrate. The tested food had to be consumed within 10 minutes according to a previous study, which showed that after consuming noodles made of gathotan flour, the blood glucose level reached its peak after 15 minutes (Purwandari et al, 2014).

Based on blood glucose level data showed in Figure 1, the GI value of noodle snack is 30.18, which was categorized as a low GI food (<50) (Foster-Powell et al, 2002). The GI value of noodle snack in this study is lower than the estimated GI value showed in Table 3. It is due to the frying process that can affect the GI value (Broun et al, 2005). Glycemic response is not only affected by the amount of carbohydrate but also by other factors such as nutrient content (high protein content, high amylose content, high fiber content, and low starch digestibility). High protein content of a food product can delay gastric emptying, thereby, delaying food digestion in small intestines.
Amylose is a starch component having hypoglycemic activity. It is hard to be digested as it affects starch digestibility (Foster-Powell et al, 2002). Low starch digestibility shows that only a small amount of starch can be digested by digestive enzymes at a specific time so that blood glucose level does not increase extremely after being digested and metabolized (Astawan dan Widowati, 2011). Dietary fiber also contributes to decreased GI value because it is hard to be digested and delays glycemic response (Astawan dan Widowati, 2011; Kang Yu et al, 2014).

Food processing using frying method also affects GI value. Vegetable oil, which is absorbed into food while being fried, delays gastric emptying and thus, decreases GI value (Astawan dan Widowati, 2011). Some components of Maillard reaction end-products have also been reported to have α-glucosidase inhibitory activity, which can delay carbohydrate absorption. This can further delay the increase in blood glucose level (Hwang et al, 2011). Noodle snack made of sweet potato and pumpkin paste without cinnamon powder has a good acceptance, high hypoglycemic activity (high amylose content 37.03%, low starch digestibility 9.62%, and high dietary fiber 1.88%), and low GI value (30.18). However, it has the lowest levels of total antioxidants ($IC_{50}$ 33.76 ppm).

CONCLUSION

Noodle snack made of yellow sweet potato and pumpkin blend has a good acceptance and low GI value, suggesting it to be a healthy snack that can assist in controlling blood sugar level.

REFERENCES
3. Astawan M dan Widowati SW 2011 Evaluation of nutrition and glycemic index of sweetpotatoes and its appropriate processing to hypoglycemic food Indonesian Journal of Agricultural Science 12(1) 40-46
6. Beber S 2014 Diabetes and nutrition: the
role of carbohydrates and the glycemic index

Diabetes Care News 18 11-13


10. De Carvalho LM, Gomes PB, Godoy RLDO, Pacheco S, do Monte PH, de Carvalho JLV 2012 Total carotenoid content, α-carotene and β-carotene of landrace pumpkins (cucurbita moschata duch); a preliminary study Food Research International 47 337–340


12. Fei BB, Ling L, Hua, Chen R, Ren SY 2014 Effects of soybean oligosaccharides on antioxidant enzyme activities and insulin resistance in pregnant women with gestational diabetes mellitus Food Chemistry 158 429-432


14. Grace MH, Yousef GG, Gustafsson SJ, Truong VN, Chen TC, Lila MA 2014 Phytochemical changes in phenolics, anthocyanins, ascorbic acid, and carotenoids associated with sweetpotato storage and impacts on bioactive properties Food Chemistry. 145 717-724


17. Hossain CM, Ghosh MK, Satapathy BS, Dey NS, Mukherjee B 2014 Apigenin causes biochemical modulation, glut-4 and cd38 alterations to improve diabetes and to protect damages of some vital organs in experimental diabetes American Journal of Pharmacology and Toxicology 9(1) 39-52

18. Hwang IG, Kim HY, Woo KS, Lee JS, Jeong HS 2011 Biological activities of maillard reaction products (mrps) in a sugar–amino acid model system Food Chemistry. 126 221-227


22. Kim HS, Patel B, BeMiller JN 2013 Effects of the amylose-amilopectin ratio on starch-hydrocolloid interactions. Carbohydrate Polymers 98 1438-48


26. Mei Lu, Bo Yuan, Maomao Zeng, Jie Chen 2011 Antioxidant capacity and major phenolic compounds of spices commonly consumed in china Food Research International. 44(2) 530-536

28. Muller L, Frochluch K, Bohm V 2011 Comparative antioxidant activities of carotenoids measured by ferric reducing antioxidant power (frap), abs2 bleaching assay (α teac), dpph assay and peroxy radical scavenging assay *Food Chemistry*. 129 139-148


30. Olapade AA dan Ogunade OA 2014 Production and evaluation of flours and crunchy snacks from sweetpotato (ipomea batatas) and maize flours *International Food Research Journal* 21(1) 203-208

31. Pasha I, Khan QAB, Butt M, Saeed M 2013 Rheological and functional properties of pumpkin wheat composite flour *Pakistan Journal of Food Sciences*. 23(2) 100-104


34. Srikaeo K dan Sangkhiaw J 2014 Effect of amylose and resistant starch on glycemic index of rice noodles *Food Science and Technology*. 59 1129-35

35. Sun W, Zhao M, Cui C, Zhao Q, Yang B 2010 Effect of maillard reaction products derived from the hydrolysate of mechanically deboned chicken residue on the antioxidant, textural and sensory properties of cantonese sausages *Meat Science*. 86 276-282


Grocery Store Tour to Promote a Healthy Food for Schoolchildren

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ABSTRACT

Introduction: Meet the needs of a good nutrition to children allows them to growing optimally. Children should had ability to choose a healthy food to formed a healthy diet behaviour in them. Supermarkets are often used as a proxy for healthy food access because of the variety and healthfulness of food available. Grocery store tour as an intervention for introducing the variety of food to children with pleasing.

Method: Quasy experiment without control group was performed for this study. Respondent are schoolchildren in 1st and 2nd grade of elementary school, with total was 138 respondents. Descriptive analysis used to seen the differences healthy food choose between before and after intervention. Paired t-test was used to analyse the effect of intervention.

Results: Obtained before intervention respondents least knows that the benefits of consumption of meat (24,63%) and the highest know benefits fruits and vegetables for health (98,55%). After intervention showed increased attitude of healthy food and drink choices, including fruit and vegetable as a provisions school food. There was an effect of grocery store tour to attitude of healthy food choices in children (p=0,000).

Conclusion: Children can be taught to behave a healthy food consumption with involving them to choose their own food. With grocery store tour activity open opportunity of learning to choose the healthy food by them own. For the future study can include the parents to this activity.

Keywords: Grocery Store Tour, Healthy Food, Schoolchildren

INTRODUCTION

The needs of nutritional foods are important to optimalize the growing of the school age children. In this phase is the fastest growing for the child1. There a lot of problems that caused by the nutritional consumptions of foods, effected to the quality of young child in the future. So, in the school age a child should had an attention for the nutritional food consumption. Large numbers of young child consume inadequate amounts of fruits and vegetables. Inadequate nutritional food consumption effected malnutrition it called stunting in the school age and for the over consumption it can be over nutrition and can be the obesity child2.

The attitude of the nutritional food consumption in Indonesia are low, in the age >10 years old had lot of MSG consumption (77,3%); sweets (53,1%); oily food (40,7%)3. In Depok, obesity rate in young child was high there are 10,8%4. From the first study by the researcher, there are 23,5% students are over nutrition; 23,8% over consumption of foods; 66,6% students always consumption of sweets and fastfood. and they did not have a good physical activity; 61,9% students always watching TV and playing a video game more than 2 hours per day.

Grocers are a key element in increasing fruit and vegetable consumption, including fruits and vegetables, are purchased through grocery stores5,6. Stores including supermarkets and supercenters continue to be the most efficient food communication method to influence shopper behaviour and food purchases7. Grocery store dietetics is also a growing field of employment for nutrition professionals8. A view studies shown that grocery store tour can improve the quality of nutritional food consumption, including consumption of fruits and vegetables, is generalized across the spectrum of socioeconomic and demographic subgroups9.

The aim of this study was improve the nutritional food choice by the child, they can chose the nutritional foods by themselves. This study was collaborate with the supermarket to give a real experience for the child about nutrition and dietics education program by the tour.
METHOD

Program description

The first segment was orientation of the store and the tour content, the outline was organized around key nutrition learning messages and included interactive components to reinforce each learning message. After the orientation, the participating grocery store provided a bagged for the child that featured foods that included in the tour. The third segment takes 50 minutes nutrition education tour. Each tour stop included a brief spoken introduction from facilitators, followed by an interactive educational component, after that they can chose their own foods. At the end of the tour was evaluation of the chosen foods from the participants.

Tours took place at a local fullservice supermarket with which the participating retail. The tour design was generalized to be usable at any conventional supermarket. Although no overt store-specific marketing took place during the tours, students were introduced to store brands in general as a strategy for lowering the cost of fruit and vegetable consumption. The store was conveniently accessible to students by public transportation.

Research design

Quasy experiment without control group was performed for this study. This study examine about attitude of the choosing nutritional foods before and after grocery store tour intervention.

Sample

Sampling method was used to selection from population. The population of this study are the school age children, and the sample was 1st and 2nd grade of the elementary school students. The total of the sample are 138 respondents.

Place and date of research

This study taken place at Curug 3 Elementary School in Depok, Jawa Barat, Indonesia. Conducted in May 2017, with six times intervention phase.

RESULT AND DISCUSSION

The response of the participants about healthy food are shown by the descriptive analysis in the table 1.

<table>
<thead>
<tr>
<th>Topics</th>
<th>Pre intervention</th>
<th>Post intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits of fruit and vegetable</td>
<td>136 (98,55%)</td>
<td>138 (100%)</td>
</tr>
<tr>
<td>Effect of MSG</td>
<td>37 (26,81%)</td>
<td>67 (48,55%)</td>
</tr>
<tr>
<td>Example of carbohydrate source</td>
<td>57 (41,31%)</td>
<td>91 (65,94%)</td>
</tr>
<tr>
<td>Expired date of the food</td>
<td>97 (70,28%)</td>
<td>108 (78,26)</td>
</tr>
<tr>
<td>Benefit of meat consumption</td>
<td>34 (24,3%)</td>
<td>74 (53,62%)</td>
</tr>
<tr>
<td>Example of protein source</td>
<td>116 (84,05%)</td>
<td>125 (90,58%)</td>
</tr>
<tr>
<td>Healthy body proportion</td>
<td>66 (47,82%)</td>
<td>89 (64,49%)</td>
</tr>
<tr>
<td>Benefits of breakfast</td>
<td>124 (89,85%)</td>
<td>132 (95,65%)</td>
</tr>
<tr>
<td>Benefits of milk consumption</td>
<td>128 (92,75%)</td>
<td>131 (94,92%)</td>
</tr>
<tr>
<td>Healthy snacking</td>
<td>108 (78,26)</td>
<td>105 (76,08%)</td>
</tr>
</tbody>
</table>

There are several positive outcomes from the program: first, students enrolled in a beginning nutrition class were able to benefit from nutrition education. Post intervention, survey shown that 100% of participants know about benefits of fruit and vegetable. For the lowest score was benefit of meat consumption (24,3%), after intervention the knowledge of the students were increased (53,62%).

Participants was hard to tell about effect of MSG, because everyday they always consume MSG for the taste of the food. The score shown that only 26,81% of the participants can tell the effect of MSG. in the nutrition class, respondents was given about effect of MSG, and in the tour was repeated about effect of MSG. after intervention the number of the participants known about effect of MSG was increased at the 65,94%.

Second, students can choose their own nutritious foods by themselves. The qualitative questions was given to the participants shown that they were happy because they can choose their own food, and they can choose the healthy food.

The participants thought about a thing that they learned today was "I will check the expired date before I buy it"; "I never known that there a lot of kind of vegetable, I thought that vegetable just spinach". Respondents were discribe their impression for the grocery store tour experience: "I hope this program can run regularly", "What a great experience, I can buy something that I like and I can learned about anything else".
After intervention showed increased attitude of healthy food and drink choices, including fruit and vegetable as a provisions school food. There was an effect of grocery store tour to attitude of healthy food choices in children (p=0.000).

CONCLUSION
Children can be taught to behave a healthy food consumption with involving them to choose their own food. With grocery store tour activity open opportunity of learning to choose the healthy food by them own. For the future study can include the parents to this activity.

REFERENCES


Correlation Between Eating Habits on Pregnant Women With Infant Birth Weight in Coastal Area

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ABSTRACT

Introduction: Maternal and child health issues are still a priority in Southeast Sulawesi because there are coastal areas in Southeast Sulawesi that have unique topography, geography and demographics. Coastal communities have very distinctive characteristics that are influenced by environmental factors, seasons and market conditions, thus having specific problems related to pregnant women and newborns. The purpose of study, to analysis correlation between eating habits of pregnant women with birth weight of baby in coastal area.

Method: The design of this study was the observational analytic method with cross sectional approach. The population was mother who has maternity in coastal area of Kendari City. This was done from July 2016 to September 2016. Samples were taken randomly with simple random sampling and data were collected using a questionnaire. Data of eating habits were collected by food frequency questionnaire (FFQ). Data were analyzed by Fisher Exact test with significant level < 0.05.

Results: There were 156 respondents in coastal area of Kendari City. Most of the respondents were healthy reproductive age, 20-35 years old (86.5%), as housewives (87.8 %), with medium and low education level (46.2%), sufficient income (53.2%) and low risk obstetric status (80.8%). Most often eating fish (76.6%) and frequent consumption of vegetables (82.7%). There was correlation between frequency of fish consumption (p=0.019) and vegetables consumption (p=0.016) on pregnant women with birth weight of baby.

Conclusion: There was a significant correlation between eating habits of fish and vegetables on pregnant women with infant birth weight.

Keywords: birth weight, coastal area, eating habits, pregnant women

INTRODUCTION

The low maternal nutritional intake during pregnancy can lead to various adverse effects for the mother and baby, such as low birth weight babies. Babies born weighing less than 2500 grams, classified as low birth weight babies (LBWB), will be more susceptible to the risk of childhood illness and have a higher risk of child mortality at an early age.¹ Infants born with low birth weight (BBLR) have a 35% higher chance of dying than birth weight above 2500 grams.² World Bank Reports (2006) say that babies with LBW are more susceptible to obesity and are at risk of suffering from Non Communicable Diseases (NCD) in adulthood.

Birth weight is affected by several factors: maternal age, gestational distance, parity, hemoglobin level, maternal nutritional status and maternal disease during pregnancy, genetic factors and fetal nutritional status.³ Fetal nutritional status is determined by maternal nutritional status during conception.⁴ Results Basic Health Research in 2013 states that the percentage of LBW in 2013 is 10.2% and tends to be higher in the family group that does not have a fixed income such as farmers, fishermen and labor.³ Sinatra in his research in Semarang, get the prevalence of iron deficiency anemia is higher in coastal areas compared to mountainous areas.⁵

The most common problem with coastal communities is the low level of community welfare due to the low level of education and health.⁶ The situation and condition of coastal areas, although located in urban areas, have specific problems related to the problems of pregnant women and newborns.⁵

The purpose of this study, to analyze eating habits in pregnant women with birth weight babies in coastal areas. The results of this study...
can be used as a study material to make the policy of handling infant birth weight that is influenced by the intake and nutrition of the mother during pregnancy, especially in the coastal area of Kendari City.

METHODS

This research used observational analytic method with cross sectional study approach. The study was conducted in subdistrict, where located in the coastal area of Kendari City, from August to October 2016. The population of this study were all maternal mothers located in the coastal district of Kendari City. Samples were taken randomly, as many as 156 respondents, using simple random sampling method. The inclusion criteria, antenatal care (ANC) for the first time at the gestational age of less than 20 weeks, single pregnancy, live birth, months, no complications of pregnancy and no history of chronic diseases.

The data were collected using questionnaires. The data of eating habits was obtained using questionnaire food frequency questioner (FFQ). Bivariate analysis was performed to see the relationship between independent and dependent variables, using Fisher Exact test with 95% confidence level (α = 0.05).

RESULT

Data in Table 1, showing characteristics by maternal age, most aged 20-35 years (86.5%). While the characteristics according to the work of the mother, as much as 87.8% as housewives, and 12.2% to employees. Level of education, low 46.2%, medium 46.2%, and higher education 7.6%. Family income, 53.2% enough, and 46.8% less. Characteristics of obstetric status of 80.8% low risk, and 19.2% high risk.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Respondents</th>
<th>Absolute (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mother’s Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 20 years</td>
<td>9</td>
<td>5.8</td>
<td></td>
</tr>
<tr>
<td>20-35 years</td>
<td>135</td>
<td>86.5</td>
<td></td>
</tr>
<tr>
<td>&gt;35 years</td>
<td>12</td>
<td>7.7</td>
<td></td>
</tr>
<tr>
<td><strong>Mother’s Occupation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewives</td>
<td>137</td>
<td>87.8</td>
<td></td>
</tr>
<tr>
<td>Employees</td>
<td>19</td>
<td>12.2</td>
<td></td>
</tr>
<tr>
<td><strong>Level of Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>72</td>
<td>46.2</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>72</td>
<td>46.2</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>12</td>
<td>7.6</td>
<td></td>
</tr>
<tr>
<td><strong>Family Income</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less</td>
<td>73</td>
<td>46.8</td>
<td></td>
</tr>
<tr>
<td>Enough</td>
<td>83</td>
<td>53.2</td>
<td></td>
</tr>
<tr>
<td><strong>Obstetric Status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Risk</td>
<td>126</td>
<td>80.8</td>
<td></td>
</tr>
<tr>
<td>High Risk</td>
<td>30</td>
<td>19.2</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>156</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 shows that most maternal mothers often consume fish (76.3%) deliver babies with LBW (1.3%). While pregnant women who rarely consume fish (23.7%) gave birth to babies with LBW (7.1%). Based on the analysis of the relationship between the frequency of fish consumption of pregnant women with birth weight infants obtained p value <0.05 (0.019). This suggests that there is a relationship between the frequency of fish consumption in pregnant women with birth weight babies in coastal areas.

<table>
<thead>
<tr>
<th>Fish Consumption</th>
<th>&lt; 2500</th>
<th>≥ 2500</th>
<th>Total</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Often</td>
<td>2</td>
<td>1.3%</td>
<td>117</td>
<td>75.0%</td>
<td>119</td>
</tr>
<tr>
<td>Rarely</td>
<td>11</td>
<td>7.1%</td>
<td>26</td>
<td>16.6%</td>
<td>37</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>8.3%</td>
<td>143</td>
<td>91.7%</td>
<td>156</td>
</tr>
</tbody>
</table>
Data in table 3, it appears that most maternal mothers often consume vegetables (82.7%) gave birth to infants with LBW (1.9%). While pregnant women who rarely consume vegetables (17.3%) gave birth to babies with LBW (6.4%). Based on the analysis of the relationship between the frequency of vegetable consumption of pregnant women with birth weight infants obtained p value <0.05 (0.016). This shows that there is a relationship between the frequency of consumption of pregnant women's vegetables with infant birth weight in coastal area.

<table>
<thead>
<tr>
<th>Vegetables Consume</th>
<th>BBW &lt; 2500</th>
<th>BBW ≥ 2500</th>
<th>Total</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Often</td>
<td>3</td>
<td>126</td>
<td>129</td>
<td>82.7%</td>
</tr>
<tr>
<td>Rarely</td>
<td>10</td>
<td>17</td>
<td>27</td>
<td>17.3%</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>143</td>
<td>156</td>
<td>100%</td>
</tr>
</tbody>
</table>

DISCUSSION
Pregnancy is a very important period in the life cycle. A healthy mother will give birth to a healthy baby. Pregnant women need nutrients for the growth and development of the fetus they contain, in addition to meet the needs of his own body. Intake of energy sources, proteins, fats and carbohydrates that are less able to affect the growth of the fetus in the womb and can affect the baby's birth weight. In this research it is found that the prevalence of LBW in coastal area of Kendari is quite low.

This can be attributed to the family income factor of most respondents. Family nutrition can be influenced by social, economic, income, education, and pregnant women's knowledge about food consumption containing essential macronutrient nutrients during pregnancy.8 The coastal zone is a meeting area between land and sea that has natural resources, especially food sources abundant marine life and can be used as a source of food to meet the nutritional needs of mothers during pregnancy.6,7 Fish is a major protein source in coastal areas. This is in accordance with the results of this study which shows that coastal communities consume lots of fish.

Statistically in this research indicate that there was correlation between frequency of fish consumption in pregnant mother with baby birth weight in coastal area. Inadequate protein intake during pregnancy may result in a baby born with LBW, prematurity or congenital anomalies. Birth weight is associated with the fulfillment of nutrients during pregnancy, one of which is the need for macro nutrients. Nutritional needs increase with increasing gestational age, fetal growth and development along with tissue changes and maternal body metabolism. Fetal growth and development accelerate in third trimester pregnancy so that adequate energy and protein intake is required. The nutritional adequacy during pregnancy affects the birth weight.9

In this research found that coastal communities also consume lots of vegetables and statistically there was a relationship between the frequency of vegetable consumption in pregnant women with infant birth weight. Some studies show that there was no relationship between infant birth weight with maternal nutritional food intake or with the concentration of some micro nutrients in blood. A good nutritional status in the mother before pregnancy illustrates the availability of nutrient reserves in the mother's body that are ready to support fetal growth early in pregnancy.10

CONCLUSION
There was a relationship frequency of consumption of fish and vegetables in pregnant women with infant birth weight.

SUGGESTION
Future research can use more independent variables and better design of other research to get an optimal result. Need to prove the influence of vegetable consumption to birth weight.

REFERENCES
Identification of Sudden Unexpected Death in Epilepsy (SUDEP) Based on Forensic Odontology Sciences

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ABSTRACT

Epilepsy patients are at risk of death by two to three fold increase compared with the general population. Epilepsy is more common in men than in women. In chronic and uncontrolled chronic epilepsy, the main cause of death during seizures is sudden unexpected death in epilepsy (SUDEP) with 7.5% to 17% of deaths in adult epilepsy with sudden death, between 15,500 and 151,000 patients per year. Lots of sign can be identified from SUDEP death cases particularly in the field of forensic odontology such as clinical findings on tip and tongue distal bites, dental fractures, and TMJ dislocations. To make the diagnosis of epilepsy, the examiner should have a clinical diagnosis in the patient's past or previous medical care record, complete autopsy including tongue preparation, as well as microscopic and toxicological examination. Saliva is investigated as an alternative biological fluid monitors the therapeutic drug of anti-epilepsy drugs and is more advantageous than blood or serum. There was a positive correlation between the decreased serum folate level and increased severity of gingival enlargement due to the consumption of antiepileptic drugs. The drugs most often studied using saliva are phenytoin, phenobarbital, and carbamazepine. Histologic examination of the presence of purkinje cells is characterized by plasma proteins in blood-brain-barrier damage. In the gene level, phenytoin consumption causes expression of CIP2C9*3 polymorphisms associated with gingival hyperplasia.

Keywords: SUDEP, epilepsy, sudden death, forensic odontology

INTRODUCTION

Epilepsy is a major global health problem which involve chronic condition of the nervous system that causes approximately 50 million people worldwide living in developing countries to have limited access to medical care.¹,² Epilepsy patients have mortality risk two to three times fold higher compared to the general population.²,³ This mortality rate increases and often occurs without warning sign so that the risk of injury is high.³ In chronic epilepsy that is difficult to be cured (refractory chronic) and uncontrolled, the main cause of death during seizures is sudden unexpected death in epilepsy (SUDEP) with 7.5% to 17% of deaths in adult epilepsy with sudden death, between 15,500 and 151,000 patients per year.¹,²,⁴ This disease can be caused by various combinations of mechanisms for each individual. Previous research has prioritized on the cause of respiration.⁵ Central hypoventilation is the primary mechanism of death characterized by increased extravasation of lung fluid resulting from changes in pulmonary vascular pressure during seizures. The partial pressure of oxygen (pO₂) so that the concentration falls less than 85% set in the electroencephalogram (EEG).⁶ In addition to hypoventilation, apnea is also one of the leading causes of death.⁷

Patients with epilepsy have an increased risk of tooth loss. Gingival hyperplasia due to anti-epilepsy drugs causes delayed eruption of permanent teeth and malocclusions in children with mixed-tooth periods.¹⁰ The most commonly used Anti-Epileptic Drug (AED) is phenytoin. Gingival hyperplasia is characterized by epithelial overgrowth and gingival binding tissue after approximately 1-3 months of phenytoin drugs. The tissue enlargement is seen from the interdental papules and the gingival margins of
the entire tooth. In addition, hyperactivity of the oral cavity due to epilepsy causes facial injuries, anterior teeth protrusion, dentofacial trauma i.e. wound and bite-marks on the tongue, especially lateral, mucosal buccal, maxillary facial fracture, avulsion, tooth fracture, and injury to the temporomandibular joint. Of the various signs described earlier, it is desirable that the dentist in the field of forensic odontology be aware of the identification of deaths caused by SUDEP disease.

Pathology and pathophysiology of SUDEP

The occurrence of epilepsy disease depends on race, age, and gender. Epilepsy is more common in men than in women. The development of epilepsy occurs in children is genetic, and if it occurs in adulthood is associated with cerebrovascular disease. The seizure classification according to The International League Against Epilepsy (ILAE) is divided into:

General

The entire cerebral cortex of the brain is affected simultaneously. There is usually no aura before the seizure and the patient is unconscious during the seizure. Common types are divided into 6 groups:

- General tonic-clonic (grand mal) have highest risk of SUDEP
- Atonic
- Absent (petit mal)
- Myoclonic
- Tonic
- Clonic

Partial

Only specific portions of the cerebral cortex are affected and can be diagnosed on the basis of electroencephalogram (EEG) and clinical symptoms. This type is classified into 3 groups:

- Simple partial
- Partial complex
- Secondary general seizure

The mechanism of death is unclear and there is no direct cause. Many varying trigger factors cause death in SUDEP, although triggered by seizures. SUDEP usually occurs in the morning. Of the several cases identified under the EEG video control showed the presence of respiratory dysfunction, protective reflex failure, and cardiac arrhythmia. Sclerosis Ammon's horn is a phenomenon associated with cerebral edema during epileptic seizures with compression of the blood vessels that supply blood to this region (Branching of the posterior artery of the brain) to the edge of the tentorium by herniating the hippocampal gyrus.

The seizure mechanism that eventually leads to death starts from a cortical structure that travels to the brainstem core and is involved in passion regulation (e.g. periaqueductal grey area), cardio regulator reflex (e.g. nuclear solitary system), and respiration nuclei in the ventromedial medulla and caudal raphe. The associated activation of seizures and postictal suppression of this region causes:

- Postictal coma is causing the loss of reflexes of the protective airway.
- Increasing sympathetic and cardiac related activation increases the risk of arrhythmias or parasympathetic activation and is associated with a risk of absence of jaundice.
- Reduces respiratory performance and hypoventilation.

A severe seizure associated with the disorder shown in red in the image, will cause death at the right time either alone or in combination.

Figure 1. Mechanism of epilepsy in disturbing the heart and lung functions.
The mechanism of cardiac dysfunction and secondary dysrhythmias and hypoxia contribute to the occurrence of seizures. Ictal bradycardia leads to sudden death as well as varying heart rate decreases causing autonomic dysregulation to be postulated as a potential mechanism. The main domains of the potential mechanism of sudden death in epilepsy are autonomous such as cardiac abnormalities when seizures. Mechanisms of cardiac arrhythmia triggered by autonomic discharge resulting in altered cardiac and respiratory activity of epilepsy patients. Autonomic sympathetic nervous system is essential for the physiology of the heart and blood vessels that are autonomously controlled by the cortical loci to a more specific cardiovascular change than the rate Lower brain. Cortical stimulation results in changes in heart rate, blood pressure, and cardiac extra systole. Due to the enormous control of its autonomic function, stimulation of the hypothalamus also results in cardiovascular changes such as cardiac arrhythmias. Stimulation of the sympathetic pathway to the heart or stimulation of epinephrine secretion causes the production of the extra systole produced by the hypothalamus stimulus.

The sympathetic nervous system lowers the threshold of the vulnerable even the electrically stable myocardium so that ventricular fibrillation becomes easier if the activity of the sympathetic nervous system is increased by neural or neuro humoral action. Increased sympathetic nervous activity may affect ventricular fibrillation by neuroepinephrine in myocardial neuroeffector. So it is concluded that epilepsy is most likely caused by a deadly cardiac arrhythmia and caused by irregular neural spasms.

There is a hypothesis of the relationship between Down syndrome in sudden death epilepsy is that the presence of uncontrolled seizures causes cardiovascular abnormalities that eventually lead to sudden death.

Figure 2. Hypothesis of Down syndrome with epilepsy.

EEG activity sequencing most frequent events is postictal suppression accompanied by respiratory failure and the absence of a heartbeat or arrhythmia as the end of the event. In addition to these major factors, there are also genetic predisposing factors of SUDEP (e.g. mutation-related QT length or impaired cerebellar brain stem control of arousal and respiration), autonomic changes in heart control, nocturnal seizures, seizures with real postictal suppression, and respiratory compromise.

**Gingival hyperplasia due to various Anti-Epileptic Drug (AED) in SUDEP**
Gingival enlargement relationship with phenytoin is divided into 3 types:

- Type 1: non-inflammatory hyperplasia. The substitution of phenytoin with other antiepileptic drugs is only a method for the
elimination of hyperplasia. Then after substitution, the enlargement disappears after a few months.

- Type 2: chronic inflammatory enlargement is not associated with phenytoin use. Enlargement is caused entirely by local irritants, and resembles gingival enlargement in patients not receiving phenytoin.
- Type 3: combination hyperplasia. This combination type hyperplasia is caused by phenytoin and localized irritant inflammation.\textsuperscript{14}

The secondary anti-epileptic drug effect that is common in phenytoin users is enlargement of the gingiva. Gingival hyperplasia is characterized by the unusual growth of epithelial and subepithelial connective tissue of the gingiva. These symptoms will decrease if the drug is not continued. Dental plaque and gingival inflammation are important risk factors in gingival enlargement. The pathogenesis of phenytoin-induced gingival hyperplasia is the interaction between phenytoin and gingival fibroblasts. Phenytoin reduces the absorption of cell folate, leading to localized folate deficiency, and inadequate protein synthesis of collagenase that plays a role in connective tissue.\textsuperscript{15} Catabolism confined to connective tissue causes gingival hyperplasia to develop. The sensitivity of fibroblasts to gingiva to phenytoin is influenced by different genes of each individual so that not all individuals experience gingival enlargement due to phenytoin. Several studies have also revealed that the pathogenesis of gingival enlargement due to phenytoin is influenced by certain cytokines i.e. interleukin-1, IL-6, IL-8; Platelet growth factor; and other fibroblast growth factors. Clinically gingival hyperplasia occurs in 50\% of patients.\textsuperscript{10}

Gingival hyperplasia is associated with phenytoin drugs described first by Kimball in 1939. Alternative drugs used as a substitute for phenytoin in reducing gingival hyperplasia are carbamazepine and valproic acid. Phenobarbital also may cause gingival hyperplasia. Levetiracetam has recently been recognized as an efficient drug and has little secondary effect.\textsuperscript{16}

Valproic acid suppresses the bone marrow directly causing damage to wound healing with increased postoperative bleeding and infection. Anti-epilepsy drugs that induce enzymes such as phenytoin, phenobarbital, and carbamazepine alter metabolism and cleansing vitamin D so that the risk of fracture increases and is associated with osteopenia and osteomalacia. Bone marrow suppression, decreased platelet count, with a frequency of 5\% to 40\%. Clinically, bleeding does not occur because thrombocytopenia is not severe.\textsuperscript{17}

Carbamazepine is associated with xerostomia and stomatitis whereas valproic acid causes a rash involving the cavity of the oral cavity although both have rare side effects. The use of phenytoin, carbamazepine, valproic acid, phenobarbital and gabapentin are the causes of gingival hyperplasia, delayed healing, excessive gingival bleeding, and osteoporosis to consider for children.\textsuperscript{10}

\textbf{Phenytoin as the main factor causing gingival hyperplasia}

1. \textit{Clinical and microscopic aspects}
   
   Gingival hyperplasia occurs 3 months after the use of phenytoin. Often occurs in children and adolescents, and there is no difference between sex and race. The incidence of gingival hyperplasia is predominantly present in the maxillary and mandibular buccal anterior gingivae. Enlargement starts from the interdental papilla which then increases even fused. Growth may be slow even to cover the crown of the teeth as a whole.\textsuperscript{18} In addition; gingival hyperplasia is also found in edentulous patients, deciduous teeth, and implants. Microscopically, gingival hyperplasia biopsy shows exaggerated tissue with increased amounts of collagen and fibroblasts. The epithelium surface produces a rete peg that extends down to the lamina propria. Various levels of inflammatory cells infiltrate significantly.\textsuperscript{19}

2. \textit{Pharmacological aspects}
   
   Patients with larger gingival lesions exhibited higher levels of serum phenytoin, so the phenytoin dose had an effect on the severity of gingival hyperplasia.\textsuperscript{3,10}

3. \textit{Pathogenesis of gingival hyperplasia}
   
   Phenytoin and cyclosporine A may inhibit the production of extracellular matrix (ECM) with gingival fibroblasts and in vitro proliferation. The accumulation of ECM proteins in collagen particles can cause an imbalance between ECM synthesis and degradation resulting in gingival hyperplasia. In vitro there is a decrease in collagen production after consumption of phenytoin. The reduction of collagen type 1 and 3 mRNA expression is related to fiber density in hyperplasia. These results are associated with decreased collagen degradation, not to enhance this synthesis. Collagen fibers are degraded by 2 stages:\textsuperscript{20}
   
   - Extracellular: occurs by collagenase secretion

   - Intracellular: occurs through proteolysis in the collagen desmin network.
Intracellular: collagen phagocytosis by fibroblasts

The three major classes of drugs that can induce gingival hyperplasia are the antiepileptic agents, immunosuppressant and calcium channel blockers that affect calcium metabolism.21

The drug induces a decrease in the entry of Ca2+ in cells that cause the reduction of folate uptake, thus the production of active collagenase is limited. The drug decreases collagen endocytosis through a lower expression induction in integrin α2β1 by fibroblasts. Phenytoin stimulates myofibroblasts, as well as other elements such as cytokines. Phenytoin-activated fibroblasts produce IL-6, IL-1, and IL-8.23 The mediator is capable of activation of T cell proliferation and neutrophil recruitment for the involved tissues, establishing direct interactions between the immune system and connective tissue. Interactions relate to fibrotic disease. Dental plaque is also an etiology of gingival hyperplasia through induced localized inflammatory responses. Growth factors such as CTGF, PDGF (platelet growth factor), FGF (fibroblasts growth factors), and TGF-β (growth factor change) are found at high levels of fibrotic tissue and indicate a role in the formation of gingival hyperplasia. Phenytoin also affects the production of IL-13 with the activation of Th2 cells as well as the induction of TGF-b, CTGF and other growth factors by macrophages, which synergistically causes fibroblast proliferation, collagen biosynthesis, TIMP activation (inhibition of metalloproteinase tissue), MMP inhibition (metalloproteinase matrix) and ECM synthesis, as well as the characteristic processes observed in fibrotic lesions.19

Figure 3. Pathogenesis of gingival hyperplasia induced by phenytoin.22

4. Role of inflammation and growth factors in gingival hyperplasia

The tissue becomes fibrotic and has a lower inflammatory rate. The process of tissue repair involves two stages: the regenerative phase and the fibrosis phase of the connective tissue replacing the normal parenchyma.19 This phase becomes dangerous if not controlled and causes excessive ECM sedimentation. The gingival tissue remains in a state of injury and repair involving repeated production cycle of repeated chemotactic factors, inflammatory cell recruitment and tissue repair.24 The tissue repair is regulated by cytokines and chemokines produced by inflammatory cells such as macrophages, lymphocytes, and fibroblasts.
Phenytoin, nifedipine, and cyclosporine regulate the expression of gingival tissue cytokines. In addition to cytokines and growth factors, nucleotide derivative growth factors (IL-6), IL-1, platelets, PDGF-b, FGF-2, TGF-b, and CTGF were also found in gingival hyperplasia.

5. Bacterial biofilms and progression of gingival hyperplasia

There are two bacteria that are significantly associated with gingival hyperplasia induced by phenytoin i.e. Treponema denticola (Td) and Porphyromonas gingivalis (Pg). Host response to antigens such as host cell Toll-like receptor (TLR) is a pathogen sensor associated with molecular patterns.

Cyclosporine boosts signals via TLR2 and TLR4, phenytoin lowers signals with lower expression of molecular adhesion such as CD54, TLR2 that stimulates peptidoglycan cell components and lipoproteins as well as TLR4 that stimulates membrane components of outer membrane components of lipopolysaccharide (LPS) causing a series of events including activation of nuclear factor (NF-kB) produced from cytokine production and adhesion expression of fibroblast molecules. Cell signal reduction changes the inflammatory response, supports bacterial invasion, and proliferation is therefore an important factor in the pathogenesis of gingival hyperplasia.

6. Relationship of genetic factors

Genetic predisposition will affect the variation of drug-plaque-and inflammatory factors including functional heterogeneity of gingival fibroblasts, collagenolytic activity, drug metabolism and collagen synthesis. Genotype C in patients showed lower expression of integrin and gingival hyperplasia had higher 807C allele frequencies. Cytochrome p450 (CYP2C9 and 2C19) on phenytoin metabolism is converted into the form of hydroxylation in the liver. Phenytoin consumption causes expression of CYP2C9*3 polymorphism and higher serum phenytoin concentrations.

SUCDEP identification

Death is most often caused by asphyxia during the bed with the face covered with a pillow so that it is found saliva and mucus to form a seal around the nose and mouth. In autopsies in epileptic patients there is no pathonomic / morphological lesion. Relevant external findings on post mortem are skin abrasion, evidence of incontinence before death, and petechial bleeding. Autopsies are usually found bite marks in the tongue’s end and distal side. Bite marks on the tongue is about 25% of cases that may indicate seizures. Bitten tongue is seen in 56% of children who have epileptic seizures. Tooth fractures are the most common injury to the hard tissue. Several cases of TMJ dislocations were also found.

To make the diagnosis of epilepsy, the examiner should have a clinical diagnosis in the patient's past or previous medical record care record, complete autopsy including tongue preparation, as well as microscopic and toxicological examination. Saliva is investigated as an alternative biological fluid monitors the therapeutic drug of anti-epilepsy drugs and is more advantageous than blood or serum. The drugs most often studied using saliva are phenytoin, phenobarbital, and carbamazepine. The advantage of using saliva is its concentration which reflects pharmacologically free non-protein bound is an active component in serum. Saliva is more easily collected than blood and patients prefer to take samples with saliva.

There are three main steps to diagnose epilepsy, there are:

- Medical history
- Neurological examination

Neurological examination is performed to identify areas of abnormal electrical activity of the brain. Brain examination is essential for the detection of the causes of post traumatic epilepsy. Histologic examination of the presence of Purkinje cells is characterized by plasma proteins in blood-brain-barrier (BBB) damage. Immunohistochemically, the presence of Purkinje cell fibrinogen in 50 cases of sudden death is positive. One of the two remaining high fibrinogen has unknown leukoencephalopathy and essential hypertension. Only two cases of low fibrinogen have a history of epilepsy. Purkinje cell immunopositivity is not specific to epilepsy but can occur in conditions of BBB damage as it largely absorbs fibrinogen from the cerebrospinal cerebrospinal fluid irrigation of the cerebellar surface. It takes other protein proteins as markers and additional methods to test the likelihood of epilepsy in the contribution of sudden death.

Serotonin deficiency and activation of adenosine receptors are found to be important contributors at the cellular level. Certain genes expressed in the brain and heart of KCNA1 and SCN1A are postulated as potential mechanisms of sudden death. Previous studies have demonstrated hypoventilation, apnea, hypoxia and hypercapnia when seizures occur. It is noted that the prone position to the occurrence of death.
raises the possibility of suppression of the brainstem center as a contributing factor. Serotonergic neurons play a major role in the arousal and respiratory system in the brain stem. The suppression of serotonergic activity will be an important support mechanism.13

The ion channel gene that regulates heart and respiratory function is widely expressed in the brain that causes epilepsy. KCNA1 potassium voltage channels are expressed in the brain and vagus nerves that show seizures, cardiac arrhythmias, vagal hyperexcitation, and premature death. KCNA1 is also affected by apilepsy of encephalopathy and cardiac dysrhythmias bringing de novo and KCNA1 new intragenic duplications. Generalized epilepsy genetic syndrome with febrile seizures (GEFS+) separating new variants in the SCN1A gene carries attention to the sodium duct subunits which are the main genes of Dravet syndrome. This syndrome shows autonomic dysfunction with depressed heart rate variability (HRV). Lack of SCN1 causes spontaneous seizures, autonomic instability, and activation of vagal seizures that move before SUDEP. Global Nav1.1 deficiency in GABAergic nerve inhibition reduces seizure phenotype and SUDEP incidence. Spontaneous epilepsy is also caused by lack of glutamate acid decarboxylase GAD65 isoform. The SCN8A channel genes are functionally active in children affected by encephalopathy epilepsy and SUDEP. KCNQ2 gene variants are also found in children with epilepsy.33

• Laboratory test

Complete investigation of toxicology screening for epilepsy drug overdose. After a negative principal autopsy, epilepsy is accepted as a result of death by a pathologist. There is positive correlation between the rate of folate serum reduction and increased severity of gingival enlargement due to the consumption of antiepileptic drugs. Antiepileptic drugs at the cellular level alter the Na+ and Ca ++ channels, modify GABA receptors and glutamate,11,32

Neuropathological findings in the presence of macroscopic brain abnormalities include potentially epileptogenic lesions such as MCD, perinatal infarction and low level tumors. Microscopic neuropathology was reported to be 89% in all cases. The most potentially epileptogenic and microscopically confirmed pathologies include MCD and vascular, tumor or mass lesions, and hippocampal sclerosis.34

Histopathologic examination with excision of gingival tissue is then stained with eosin and hematoxin. The result of observation was parakeratinization stratified squamous epithelium with variation of thickness in hyperplasia and secondary changes toward inflammation base. There is chronic inflammatory cell infiltration on connective tissue stroma.14

Many biomarkers are used to indicate cardiovascular death, one of which is low serum magnesium (Mg) levels that can initially suppress ventricular arrhythmia and QT dispersion in acute myocardial infarction patients. Mg deficiency resulting in progressive vasoconstriction of coronary blood vessels results in marked reductions in oxygen and nutrient delivery to cardiac myocytes. Mg abnormality causes morphological variation and functional abnormalities of the liver because it induces elevation of intracellular Ca2+ concentration, proinflammatory agent formation, oxygen radical, growth factor and membrane permeability changes as well as transport processes in heart cells. Mg is a potential modulator of seizure activity due to its ability to antagonize the stimulation of calcium entry through the N-methyl-D-aspartate receptor (NMDA). Reducing this level of serum in a person with refractory epilepsy may increase the frequency of seizures that are recently considered major risk factors for SUDEP.35

CONCLUSION

Epilepsy patients are at risk of death by two to three fold higher compared with the general population. Epilepsy is more common in men than in women. The development of epilepsy occurs in children is genetic, and if it occurs in adulthood is associated with cerebrovascular disease.

The seizure mechanism that eventually leads to death starts from a cortical structure that travels to the brainstem core and is involved in passion regulation (e.g. periaqueductal grey area), cardioregulator reflex (e.g. nuclear solitary system), and respiration nuclei in the ventromedial medulla and caudal raphe. As a result, there is a loss of airway reflexes, increased risk of arrhythmias or parasympathetic activation and associated risk of absence of heart beat, and reduced respiratory performance and hypoventilation.

Patients with larger gingival lesions exhibit higher levels of serum phenytoin, so the phenytoin dose affects the severity of gingival hyperplasia. Phenytoin reduces the absorption of cell folate, leading to localized deficiency of folate, then inadequate protein synthesis of collagenase which plays a role in connective tissue. Catabolism is restricted to connective tissue causing progressive gingival hyperplasia.
The sensitivity of fibroblasts to gingiva to phenytoin is influenced by different genes of each individual.

Genotype C in patients showed lower expression of integrin and gingival hyperplasia had higher 807C allele frequencies. Cytochrome p450 (CYP2C9 and 2C19) on phenytoin metabolism is converted into the form of hydroxylation in the liver. Phenytoin consumption causes expression of CYP2C9 * 3 polymorphism and higher serum phenytoin concentrations.

REFERENCES


Lean Healthcare Approach to Minimize Waste in Basic Emergency Obstetric and Newborn Care (BEMONC) in Brebes and Semarang City, Central Java

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ABSTRACT

Introduction: There are 5 cities that contribute as the highest maternal death region within Central Java in 2016, including Brebes District and Semarang City. Optimization of Basic Emergency Obstetric and Newborn Care (BEMONC) is an effort to lessen maternal death. Lean Healthcare is one of quality improvement theories in optimizing value-oriented services.

Method: Qualitative study with descriptive analytic approach was conducted at Jatibarang Primary Health Care (PHC), Brebes and Halmahera PHC, Semarang. There was 6 informants in each PHC including Doctor, Midwife, Nurse and also patient’s family. In depth interview and observation was done to assessing waste in service process.

Results: Based on Kepmenkes 856 in 2009, Value stream mapping description in both PHCs were ideal. Waste between normal delivery and referred process in Jatibarang PHC was 20%: 25%. While in Halmahera PHC was 42.9%: 50%. This concluded that the process of BEMONC services in Jatibarang PHC has already been lean while in Halmahera PHC has not been lean. Waste in Jatibarang PHC was unnecessary transportation, motion and waiting. Waste in Halmahera PHC was unnecessary transportation, waiting, underutilized abilities of people and defect. Root Cause Analysis (RCA) in Jatibarang PHC was found that layout, Standard Operating Procedure (SOP), Expanding Maternal and Neonatal Survival (EMAS) and communication system were affecting BEMONC process. RCA in Halmahera PHC was found to be similar as Jatibarang PHC but there were additional factor, including midwife competence.

Conclusion: Unnecessary transportation and waiting were found as predominant waste in both PHCs. The main causes was layout, EMAS, and communication systems.

Keyword: BEMONC flow, lean healthcare, minimizing waste

INTRODUCTION

In 2016, maternal mortality rate (MMR) of Central Java was 109.65 per 1.000 live births or equal to 602 cases, while in 2015 maternal death accounts for 619 cases.¹ Those maternal death cases were lower significantly than maternal cases in 2014, which accounted for 711 cases.¹ MMR of Central Java has a declining trend from 126.55 per 100.000 in 2014 to 111.16 per 100.000 in 2015.¹ Brebes has the highest maternal and neonatal death cases among all cities within Central Java in 2016, which comprised of 54 maternal cases and 444 neonatal cases, while Semarang has the third highest maternal and neonatal death cases in 2016, which comprised of 32 cases of maternal death and 201 cases of neonatal death.¹

Ministry of Health (MOH) has already made an effort to reduce maternal mortality rate, including establishment of Expanding Maternal and Neonatal Survival (EMAS) program in 2012. Efforts by EMAS in reducing maternal and neonatal mortality rate were as follows: 1) improving quality in both emergency care of obstetric and neonatal by establishing 150 Comprehensive Emergency Obstetric And Newborn Care (CEMONC) and 300 Basic Emergency Obstetric and Newborn Care (BEMONC) units and 2) strengthen the efficiency and effectivity of referral system between primary health care (PHC) and hospital.² Those efforts are supported by ISO accreditation, Halmahera PHC already been accredited since 2009 and Jatibarang PHC is on process to be accredited. Healthcare Accreditation supports healthcare improvement...
in clinical and non clinical aspect. Nowadays, Semarang city already has 6 PHC with BEMONC facility, while Brebes has 22 PHC with BEMONC facility.3 The total amount of PHC in Brebes is higher than Semarang, yet Brebes MMR is still higher than Semarang. Some of methodologies have already been proposed to manage healthcare inefficiency and improve quality in emergency care. One of methodology that can be used is lean.5 Lean is a continuous improvement to eliminate waste and improve value-added activity, thus a positive value could be achieved by the costumer.6 Lean continuously focused on transforming waste to become a value in costumer perspective. This is a precise and systematic approach to achieve quality improvement and waste reduction in health care.5 Waste is defined as a non value-added activity and consists of waste waiting, overprocessing, motion, defect, overproduction, unnecessary transportation, and non-utilized talent.6,7 Value itself is defined as an activity that could improve quality of care and patient condition.8

Previous study from Chan stated that lean implementation could reduced triage waiting time thus lean management could improve patient flow in emergency department.9 Studies that related with quality improvement in emergency care, notably BEMONC by minimizing waste with lean healthcare has not done in Indonesia. Hence, this study will identify waste with lean healthcare approach in 2 cities, which are Brebes and Semarang. The aim of study is to identify waste during care processes in order to improve BEMONC in PHC to be more effective and efficient and to increase patient satisfaction and quality of care.

METHOD

Descriptive qualitative method was used in this study. The study was conducted in 2 PHC with BEMONC facility including Jatibarang PHC in Brebes and Halmahera PHC in Semarang. Both PHCs already had a BEMONC facility.

Study Settings and Population
Observation and interview were conducted in Halmahera PHC with 7 respondents and 9 respondents in Jatibarang PHC. Respondents consisted of physicians, midwives, nurses, and 2 observed patients: 1 referral patient and 1 non-referral patient. Referral patient from Halmahera PHC had a severe preeclampsia, while referral patient from Jatibarang PHC had an obstructed labor. Non probability sampling was applied when choosing a non-referral respondent in postpartum ward for interview, while interview for referral respondent was done with patient’s family. Purposive sampling was used to interview PHC staffs that related with BEMONC process. Observed respondent was chosen by accidental sampling.

Study Protocol
In-depth interview for patients and PHC staffs was used to determine patient's value, staff's value, current value stream mapping (CVSM), waste elimination, and root causes analysis (RCA). The purpose of observation was to map out overall BEMONC flow in Jatibarang and Halmahera PHC and create a CVSM, waste findings, and RCA. Fish bone analysis method was applied as RCA method. Edified RCA was used as a basis design for quality improvement recommendation in BEMONC.

RESULT

Value Stream Mapping is a mapping method of patient flow based on duration in each process. The observation was simplified through Value Stream Mapping of BEMONC, from when patient entered emergency room until arrived in labor room and taken care of. The process was classified into 2 patient flows which are normal labor patient and patient with labor complication indicated for referral. Figure 1 below was a simplified CVSM of patient flow with normal labor while Figure 2 was a simplified CVSM of patient with labor complication (referred).

There was some differences of BEMONC flow in Halmahera and Jatibarang PHC on normal labor (Figure 1). In Jatibarang PHC, the patient was assessed to ensure patient’s true contraction in labor room, thus midwives prepared labor instrument. In our observation in Halmahera PHC however the patient was already in true labor condition thus instrument preparation and labor process were executed immediately. Shorter pathway is correlated with shorter duration of care and Halmahera PHC was 13 minutes faster than Jatibarang PHC.
Figure 1. CSVSM of Normal Labor in Halmahera PHC and Jati PHC. Notes: A, Halmahera PHC; B, Jatibarang PHC; BEMONC, Basic Emergency Obstetric and Newborn Care; PHC, Primary Health Care; ER, Emergency Room.

Figure 2. CSVSM of referred patient in Halmahera PHC and Jatibarang PHC. Notes: A, Halmahera PHC; B, Jatibarang PHC; BEMONC, Basic Emergency Obstetric and Newborn Care; PHC, Primary Health Care; ER, Emergency Room.
There were some differences of BEMONC flow on patient with labor complication (figure 2). Firstly, patient in Halmahera PHC was submitted to ER then patient was transferred into labor room. This situation is different in Jatibarang PHC, in which patient was directly transferred into labor room. Secondly, patient in Halmahera PHC undergone midwives assessment then result of the assessment was communicated to both physician and patient’s family before being referred. That process needs more time. This situation is different in Jatibarang PHC, in which patient was being assessed and decision to refer were made simultaneously. Midwives in Jatibarang PHC are eligible to decide referral cases independently, thus reduce process time. Total BEMONC process in Halmahera PHC is around 2 hours 45 minutes, while Jatibarang PHC is less than 60 minutes.

According to interview, those processes depended on patient’s condition, especially patient with labor complication. There will be a time difference for patients who require prior stabilization before being referred and those who do not.

Based on data above, both response time of referral in Halmahera PHC and Jatibarang PHC were in accordance with Health Ministry Decree 856 in 2009 on Emergency department (ED) standard, which stated that Emergency Care should be available in 24 hour each day and seven days each week. In addition, patient should be taken care at most 5 minutes after their arrival in ED.10 EMAS dashboard stated that response time of referral for maternal emergency, including postpartum hemorrhage, severe preeclampsia or eclampsia, fetal distress, obstructed labor is 10-30 minutes.11 Figure 1 and Figure 2 showed that the response time was 5-10 minutes. Normal labor patient flow in Jatibarang and referred patient flow in both PHC were ideal although there were some processes that took longer time, especially in administration process, referral hospital willingness, and ambulance readiness.

Value-added assessment (VAA) in CSVSM

CSVSM is a method to map out value added activity and non value activity so that overall process flow could be seen thoroughly.12 VAA was done to classify CVSM into several activity types, such as value-added activities, non value-added activities, and non value-added activities but necessary. The waste from non value-added and non value-added but necessary were calculated by VAA to illustrate system performance and to be compare with overall activities.6,13 VAA of BEMONC in Jatibarang and Halmahera PHC were done by observation in patient who arrived in ED until taken care by midwife. VAA of normal labor patient was simplified in table 1 and VAA of referral patient in table 2. VAA of BEMONC in Jatibarang PHC showed the ratio of value added (VA) with non value added (NVA) and non value added but necessary (NVA-BN) was 8:2 (20%). The ratio in Halmahera PHC was 7:3 (42.9). Therefore, BEMONC flow in Jatibarang PHC was in lean condition, while Halmahera PHC was not in lean condition. That statement was based on Gazpersz study which stated that a lean organization is an organization with maximum total waste not more than 30% from overall activities.6 VAA of BEMONC in Jatibarang PHC showed the ratio of value added (VA) with non value added (NVA) and non value added but necessary (NVA-BN) was 8:2 (20%). The ratio in Halmahera PHC was 7:3 (42.9). Therefore, BEMONC flow in Jatibarang PHC was in lean condition, while Halmahera PHC was not in lean condition. That statement was based on Gazpersz study which stated that a lean organization is an organization with maximum total waste not more than 30% from overall activities.6
Table 1. VAA (Value Added Assessment) of BEMONC Flow in Normal Labor Patient.

<table>
<thead>
<tr>
<th>No</th>
<th>BEMONC flow</th>
<th>Jatibarang PHC</th>
<th>Halmahera PHC</th>
<th>Type of Waste</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>VA</td>
<td>NVA</td>
<td>NVA - BN</td>
</tr>
<tr>
<td>1</td>
<td>Incoming patient to PHC</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Patient is directed to emergency room (ER) of BEMONC and handed over to midwives</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Patient transferred to labor room</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Obstetric assessment by midwives</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Checking true or false contraction</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Labor preparation</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Labor process</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Post partum care and early breastfeeding initiation</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Administration</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Patient was sent home</td>
<td>√</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total 8 1 1 7 0 3

Notes: BEMONC, Basic Emergency Obstetric and Newborn Care; PHC, Primary Health Care; ER, Emergency Room; VA, Value Added; NVA, Non Value Added; NVABN, Non Value Added But Necessary.
### Table 2. VAA (Value Added Assessment) of BEMONC patient with labor complication

<table>
<thead>
<tr>
<th>No</th>
<th>BEMONC flow</th>
<th>Jatibarang PHC</th>
<th>Halmahera PHC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>VA</td>
<td>NVA</td>
</tr>
<tr>
<td>1</td>
<td>Incoming patient to PHC</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Patient is directed to emergency room (ER) of BEMONC and handed over to midwives</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Patient transferred to labor room</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>4</td>
<td>Obstetric assessment by midwives</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>5</td>
<td>Decision to be referred</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>6</td>
<td>Midwife calls the referral hospital and inputs patient data in EMAS server</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>7</td>
<td>Administration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Ambulance driver was called by midwives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Patient was transferred into ambulans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Patient was transferred into referral hospital</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Total | 5 | 0 | 5 |    | Total | 6 | 0 | 2 |    |

Notes: BEMONC, Basic Emergency Obstetric and Newborn Care; PHC, Primary Health Care; ER, Emergency Room; VA, Value Added; NVA, Non Value Added; NVABN, Non Value Added But Necessary
Ratio of VA:NVA-BN in referral patient was 6:2 (25%) in Jatibarang PHC and 5:5 (50%) in Halmahera PHC. Therefore BEMONC flow in Jatibarang PHC was in lean condition, while Halmahera PHC was not in lean condition. The researcher had limitations such as time and research staff, thus the overall process time was unmeasured. In this study it was assumed that waste percentage in Halmahera PHC could be more than 30%.

Waste identification of BEMONC flow in Jatibarang PHC and Halmahera PHC

Waste identification was conducted while doing observation and corroborated by in-depth interview with patient and midwives. Waste findings from observation and interview were simplified in table 3, respectively. RCA of BEMONC in Halmahera PHC and Jatibarang PHC

The root cause of waste was identified by in-depth interview and analyzed by fish bone analysis. Through RCA in Halmahera PHC and Jatibarang PHC, it was found that waste unnecessary transportation was due to room layout factor.

RCA of waste underutilized abilities of people in Halmahera PHC was human resources factor, including broken communication line, substandard supervision by management, and discrepancy of midwives' competence. In contrast, waste underutilized abilities of people was not found in Jatibarang PHC.

RCA of waste motion in Jatibarang PHC was due to administration factor including unavailability SOP, patient flowchart, instrument arrangement and facility factors such as emergency cart for labor process. On the contrary, waste motion in Halmahera PHC was not found.
Table 3. Waste Findings and Root Causes Analysis (RCA) during Observation

<table>
<thead>
<tr>
<th>No</th>
<th>Type of Waste</th>
<th>Waste findings in Jatibarang PHC</th>
<th>RCA findings</th>
<th>Waste findings in Halmahera PHC</th>
<th>RCA findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unnecessary Transportation</td>
<td>Distance between sterilization and decontamination room with labor room was too far</td>
<td>Room layout factor</td>
<td>Distance between ED to labor room was too far</td>
<td>Room layout factor</td>
</tr>
<tr>
<td>2</td>
<td>Underutilized abilities of people</td>
<td>Midwives could not work independently</td>
<td>Human Resources Factor: 1. Inefficient communication 2. Substandard evaluation from management 3. Ineffective distribution of workload.</td>
<td>Untrained BEMONC midwives</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Motion</td>
<td>Redundant movement (going in and out from labor room to take labor instrument) during labor process occurred</td>
<td>SOP factor: 1. SOP of workflow Facility Factor: Placement of tools and equipments factor</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Waiting</td>
<td>Delay due to waiting for EMAS server to respond and acceptance from referral hospital.</td>
<td>Administration Factor: 1. Collaboration between PHC and CEMONC hospital. 2. Ambulance driver work honorarium status and substandard driver supervision in work environment</td>
<td>Delay due to waiting for confirmation from EMAS server and referral hospital. Delay due to waiting for ambulance driver arrival</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Defect</td>
<td>Patient files frequently gone missing</td>
<td>Facility Factor: 1. Disarrangement in patient medical record room 2. Instrument labeling was minimal</td>
<td>Filling error of patient form during administration process Mistakes when performing obstetric procedures.</td>
<td>Administration Factor: There was no best practice example for filling patient form and substandard communication line between midwife to patient/patient’s family Human Resources Factor: Substandard midwives’ competency and broken communication line among BEMONC staffs.</td>
</tr>
</tbody>
</table>

Notes: BEMONC, Basic Emergency Obstetric and Newborn Care; PHC, Primary Health Care; ER, Emergency Room; SOP, Standard Operating Procedure; EMAS, Expanding Maternal and Neonatal Survival
RCA of waste waiting in both PHCs were mainly due to administration and facility factor, such as delay in EMAS server and referral hospital response. Administration factor happened because of vague collaboration among vendors on sustainability of EMAS system and referral hospital, which has not been monitored and evaluated routinely. Other factor, such as human resources, including unavailability of full-time ambulance driver and substandard driver supervision from management, was found in Halmahera PHC.

RCA of waste defect in Jatibarang PHC was facility factor, including disorganization of instrument and document placement, and minimal instrument labeling procedures in Jatibarang PHC. While waste defect in Halmahera PHC was human resources factors, such as discrepancy of midwifew competence, faulty communication line between midwives and patients. SOP factor also contributed to the waste emergence, such as no proper guideline for filling patient form.

DISCUSSION

Both of PHCs were the best PHC in their respective city. Despite, there was difference on characteristic between 2 PHCs, in which Halmahera PHC was already been accredited but Jatibarang PHC was on process to be accredited. Ensuring health care quality could be done by doing accreditation.3,4

VAA (Value Added Assesment) of BEMONC flow from table 1 and 2 stated that Halmahera PHC was not in lean condition, while Jatibarang PHC was already been lean. In addition, based on mapping on flow of referred patient showed prolonged time thannormal labor. Even though, response time aspect in both PHCs showed standard condition, thus some process still contained waste and should be handle immediately.

Based on eight type of waste from Womack, this study found 5 wastes, including waste unnecessary transportation, underutilized abilities of people, motion, waiting and defect.6 Observation on BEMONC flow in Jatibarang PHC found 4 wastes, including waste unnecessary transportation, motion, waiting and defect. While, Halmahera PHC found 4 wastes, including waste unnecessary transportation, underutilized abilities of people, waiting and defect.

Waste findings were further analyzed by fishbone diagram, which was investigated with indepth interview. Waste unnecessary transportation in both PHCs were related with layout factor. Distance between ER with labor room was too far, while Jatibarang PHC found that the distance between sterilization and decontamination room with labor room was too far. Moreover, Jatibarang PHC has a confusion on difference standard concept between EMAS and PHC accreditation. EMAS standard states that 2 ER gates (BEMONC gate and non BEMONC gate) are mandatory, while PHC accreditation states that 1 ER gate (both BEMONC and non BEMONC) is mandatory. If Jatibarang PHC followed PHC standard, then the distance between labor room and ER was too far. Thus inefficiency will occurred in patient transportation. Minimizing transportation process could be a solution for waste unnecessary transportation. Zebra et al stated that solution for production process could be done by eliminate unnecessary process, customer transportation, and staffs motion.14

Waste underutilized abilities of people in Halmahera PHC found that human resources factor, including discrepancy of midwives’ competence and workload, faulty communication between physician and midwives, and substandard supervision from management. In Halmahera PHC, there was no midwife who had BEMONC competence because those midwives has already been mutated to other PHC. Saleh stated that competence and leadership have a significant role in work satisfaction, thus have an implication to quality of care to patients.15 PHC leader should routinely evaluate staff performance, and midwives coordinator also should classify midwives task for each shift as red , yellow, and green team, despite there were three shift (ie, morning, noon, and night shift ) each day. Leadership role was mandatory for care and human resources management. Those statement was relevant with Bercaw et al study, which stated that leader is an activator of change, including organization culture or organization improvement, thus the key of success on lean implementation in health care. Waste unnecessary ability of people were not found in Jatibarang PHC.16

Waste motion was found only in Jatibarang PHC during labor process. SOP factor happened because there were no flow and instrument arrangement standard. BEMONC standard was not estabilised and were still on the process of making. SOP is mandatory as staff guidelines during procedures.17 Facility factor happened because emergency trolley was in ER and labor room however emergency trolley content in labor room was not complete as complete as the one in the ER. Thus, midwives needed to go from labor room to ER when emergency cases occured in labor room. WHO stated that adequate healthcare facility could improve care quality and evaluation are necessary for better quality.18 Waste motion could be reduced by implement 5S method. This statement was made based on Shogo et al, which stated that there were improvements in Senegal healthcare quality, including efficiency, patient safety, and staffs behavior while 5 S method was implemented for 1 year.19

Waste defect and waiting were found in both PHCs. The major causative factor was the same in both PHCs. Firstly, those findings including
only had 1 CEMONC

ing found during pre-
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fil-
EMONC in Jatibarang
eed to re-
-2016. Pro-
PHC:

Proposed Improvement of BEMONC in Jatibarang

 system.22

on how to fill the form appropriately on computer
activity happened because there was no  guidelines
made midwives n
 mastered for emergency care aspect.21
leadership and management, was important to be
clinical and non-
Bleetman suggested hospital staff competence, both
difficulties prolonged the referral p
intravenous line and urine catheterization. Those
midwife found difficulties when inserting
form. During pre-
referral stabilization process  and  filling  referral
and there were no label to differentiate patient
inpatient files were kept in midwives break room
because there was no medical record storage. Those
inpatient files were kept in midwives break room
and there were no label to differentiate patient
medical record. Others findings found during pre-
referral stabilization process and filling referral
form. During pre-referral stabilization process,
midwife found difficulties when inserting
intravenous line and urine catheterization. Those
difficulties prolonged the referral process.
Bleetman suggested hospital staff competence, both
on clinical and non-clinical aspect such as
leadership and management, was important to be
mastered for emergency care aspect.21

In addition, mistake in filling the referral form
made midwives need to re-fill a new form. That
activity happened because there was no guidelines
on how to fill the form appropriately on computer
system.22

**PROPOSED IMPROVEMENT**

Suggestions for proposed improvement in
BEMONC are as follows:

Proposed Improvement of BEMONC in Jatibarang
PHC:
1. Rearrangement of labor room in consultation
with Brebes Health Department to ensure
conformity of ER standard.
2. Arrangement on patient flow and clinical SOP
for emergency procedure, especially in maternal
and neonatal care.
3. Proper emergency trolley placement and
inventory management to prevent drug and
instrument displacement.
4. Clarity on collaboration with other related
vendors.
5. Routine monitoring and evaluation with
CEMONC hospital.
6. Re-arrangement midwives break room and
medical record storage, labeling on every
documents.

Proposed Improvement of BEMONC in Halmahera
PHC:
1. Layout re-arrangement by switching general
inpatient room with post partum room as both
rooms have the same space.
2. Improves midwives competence by doing a
routine emergency training.
3. Clarity on collaboration with other related
vendors.
4. Routine monitoring and evaluation with
CEMONC hospital.
5. Establishm on guidelines of filling referral
form.
6. Improvement on supervision from management.
7. Improves communication among BEMONC
staffs.
8. Clarity of ambulance’s driver contract.
9. Establishments on division of team workload
based on red, yellow and green teams

**CONCLUSION**

The major waste in both PHCs were waste
unnecessary transportan, waiting and defect.
RCA analysis found similar causative factors,
including layout factor, clarity on collaboration
among vendors, facility factor and human resources
factor which related to improvement on midwives' competence.

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**REFERENCES**

Dinas Kesehatan Provinsi Jawa Tengah Tahun
2016.
http://www.dinkesjatengprov.go.id/v2015/dokum
en/profil2016/mobile/index.html?p=31/1 Juli
2017

2. SIJARIEMAS. Panduan Teknis SIJARIEMAS.
[monograph online] [Internet].http://emasindonesia.org/read/resourc
es/tools_guidelines/49/Panduan-Teknis-
SijariEMAS. 2014 [cited 2017 Mar 30]

3. Alkhenizan, Abdullah and Charles Shaw.
Impact of Accreditation on the Quality of
Helathcare Services: a Systematic Review of the
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC
3156520/

4. Heuvel, Jaap van den, et.al. Heuvel, Jaap


The Effect of Self Management Towards Psychosocial Adjustment Chronic Kidney Disease Patients With Hemodialysis

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ABSTRACT

Patients with chronic kidney disease experience health problem due to impaired the renal function and should undergo regular hemodialysis therapy. They need psychosocial adaptation with respect to their illness. The research objective is to investigate the effect of self-management therapy towards psychosocial adjustment in patients with chronic kidney disease undergoing hemodialysis.

The method used is quasi experiment. The design used was pre-test and post-test with control group design. This study used purposive sampling with 32 patients with chronic kidney disease. The treatment provided is self-management therapy in patients with chronic kidney disease during 8 times therapy at the hospital. The data collection used is questionnaire Pasychosocial Adjustment to Illness Scale (PAIS).

Result of research showed that the ability of psychosocial adjustment patients on pre-test had mean value (x̄) PAIS: 103,12 to increase in post test with mean value (x̄) PAIS: 141,81. Based on Wilcoxon test results obtained p value = 0,000, so that there is significan influence of self-management to the ability of psychosocial adjustment. Furthermore, a different test of Mann Whitney obtained p value = 0.043, then there is difference between intervention and control group. The ability of psychosocial adjustment of patients increases after participating self management. The engagement between patient, family and nurse during self management therapy can improve the patient's psychosocial adjustment as respond the changes in health status.

Keywords: Psychosocial Adjustment, Self Management, Hemodialysis

INTRODUCTION

Chronic kidney disease is a failure to maintain the metabolism of renal function and fluid - electrolyte balance due to the progressive destruction of renal structures.¹ ² Kidney Disease Improving Global Outcomes (KDIGO) defines chronic kidney disease as kidney damage more than three months with renal insufficiency. The kidneys damage are structurally or functionally with or without a decrease in glomerular filtration rate less than 60 ml / min / 1.73 m².³ The decline in renal function can damage to the nephrons which runs a chronic and progressive. These conditions are the end point of irreversible kidneys disorder. These conditions cause the body to fail in maintaining metabolism and fluid-electrolyte balance. Therefore, it causes retention of urea and other nitrogen garbage in the blood.⁴ ⁵ ⁶

Chronic kidney disease is closely related to the degenerative process. Degenerative diseases are associated with increased incidence of chronic kidney disease include diabetes mellitus, hypertension, coronary heart disease, and other metabolic diseases. Those diseases can cause a decrease in function ginjal.⁷ In addition, degenerative diseases, behavior change, unhealthy lifestyle, culture, and social status may contribute to the chronic kidney disease. The economy status also has an impact on the increase in the incidence of chronic kidney disease.⁸

World Health Organization explained that from 2009 to 2011, around 36 million people of the world died due to chronic kidney disease. Indonesia is a country with high rates of renal failure. Based on Indonesian Kidneys Diatrans Foundation stated that in 2006, it is estimated that the number of patients with chronic kidneys
disease in Indonesia is among 150,000 people. Of the total number of patients 21% are aged 15-34 years, 49% are aged 35-55 years, and 30% are over the age of 56.8. Therefore, Indonesia’s Nephrology Association in 2015 estimated as many as 70,000 people have kidney failure.9

The hemodialysis process is very helpful for people with chronic kidney disease; especially the terminal stage because the condition of the nephron is only 15% functioning.8 Hemodialysis process is done as an effort to assist the patient. But, this process also cannot help patients restore kidney function that is damaged. It improves the well-being of life of patients with chronic kidney failure.8 Although renal function can be replaced by a hemodialysis machine, the process is still causing health problems for people with chronic kidney disease. Dependence on the hemodialysis machine also raises the problem of physical, psychological, and social perceived as a burden for the patients.9

The patients who undergo hemodialysis must adapt to its current state.10 Individual adjustment rates can be categorized into well-adjusted and mal-adjusted adjustments.11 Individuals with well-adjusted are able to settle conflicts, avoid stress, and solve difficulties associated with the environment. On the other hand, those who are unsuccessful or fail in adjustment if they are unable to resolve the conflicts. They could not find the right ways to solve their environmental problems. It can create the frustrating reactions. This frustrating reaction will result on uneffectiveness of individual adjustments. Mal-adjustment occurs because the depressed conditions experienced by the individual result in his acting irrationally and effectively. Thus, encouraging the individual to undertake unrealistic attempts to solve the problems it faces.11,12,13

Self-management is one of nursing interventions that can be done by nurses to improve the health status of patients with chronic conditions by collaborating between patients and their families.12 Self-management is a learning procedure for patients to distinguish the behavioral targets and record the occurrence of the target behavior. Self-management means pushing yourself forward, organizing all the elements of personal ability, controlling the ability to achieve good things, and developing various aspects of the patient's personal life for the better.14

METHODS
The design of the research is Quasi Experimental with Control Group Design.13 It is used to reveal the cause and effect relationship by involving two groups: intervention and control. The population was patients with chronic kidney disease who took hemodialysis at Banyumas General Hospital. There were 214 patients in the period of January-March 2017. Furthermore, sampling technique used is purposive sampling that is sampling based on predetermined inclusion criteria. A total of 32 patients with chronic kidney disease became the respondents of this study. The intervention group was 16 respondents who were provided self-management therapy during 8 weeks. Among 16 patients as the control group was given education based on undergoing hemodialysis procedure. Measurements were made using the Psychosocial Adjustment Illness Scale (PAIS) questionnaire both before and after self-management therapy.

The collected data is analyzed and displayed in the form of frequency distribution. Based on the normality Shaprio-Wilk test obtained p = 0.000, so that the conclusion of the distribution of data is not normal because the value of p < 0.05. Thus, the Psychosocial Adjustment Illness Scale category uses the median as a central of measurement. Furthermore, Wilcoxon test and Mann-Whitney test were conducted to determine the effect of self-management on the psychosocial adjustment of patients with chronic kidney disease.

RESULT
The participation of respondents is an excellent one, there is no patient drop out during the process of self-management therapy. Similarly the return rate of both pre-test and post-test is 100% with all items of questions about psychosocial adjustment filled out by respondents according to their psycho-social condition.

1) Characteristics of patients with chronic kidney disease in the hemodialysis unit, Banyumas General Hospital.
Table 1. Distribution of respondents based on age, education, gender, marital status, employment and income.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Intervention</th>
<th>Control</th>
<th>Percentage (%)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 – 20 years</td>
<td></td>
<td>4</td>
<td>1</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>21 – 25 years</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>26 – 30 years</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6.2</td>
</tr>
<tr>
<td>31 – 35 years</td>
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<td></td>
<td>8</td>
<td>12</td>
<td>50</td>
<td>75</td>
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<tr>
<td>University</td>
<td></td>
<td>2</td>
<td>4</td>
<td>12.5</td>
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<td><strong>Gender</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td>11</td>
<td>11</td>
<td>68.8</td>
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<tr>
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<td>5</td>
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<td>31.2</td>
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<tr>
<td><strong>Marital status</strong></td>
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<td></td>
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<td>15</td>
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<td>1</td>
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<td></td>
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<td><strong>Income</strong></td>
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<tr>
<td>&lt; 1 million/month</td>
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<td>6</td>
<td>5</td>
<td>37.5</td>
<td>5</td>
</tr>
<tr>
<td>1-2 million/month</td>
<td></td>
<td>4</td>
<td>3</td>
<td>25</td>
<td>18.8</td>
</tr>
<tr>
<td>&gt;2 million/month</td>
<td></td>
<td>6</td>
<td>8</td>
<td>37.5</td>
<td>50</td>
</tr>
<tr>
<td><strong>Amount</strong></td>
<td></td>
<td>16</td>
<td>16</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Based on table 1, it can be explained that the age of patients with chronic renal disease as respondents in this study most > 41 years both the intervention and control group. In the intervention group as many as 8 respondents (50%) and the control group as many as 12 respondents (75%) have age more than 41 years.

The level of education in the intervention group between elementary and junior high school has the same number of each 6 people (37.5%). Meanwhile, Junior High School and the University also have the same number of each 2 people (12.5). In the control group, the education level is dominated by 8 people (50 %) elementary school, 3 people (18.8 %) junior high school, followed by 1 person (6.2 %) senior high school, and 4 people (25%) graduated from the university.

Characteristics of respondents by gender both intervention and control groups have the same number, each group has 11 men (68.8%) and 5 women (31.2%). Likewise, for the category of marital status, most of the respondents were married. In the intervention group among 12 people were married (75%) and control group has 15 people (93.8%).

Furthermore, the intervention group had the same amount of work and did not work, each had 8 people (50%). While the control group, most of them work that is 10 people (62.5%) and do not work as many as 6 people (37.5%).

The respondents income in the intervention group between less than 1 million and more than 2 million / month have the same number, each category has 6 people (37.5%). Meanwhile in the control group, most them have income
more than 2 million / month as many as 8 people (50%).

2) Psychosocial Adjustment before and after self-management therapy in the intervention and control group.

Table 2. Numeric score PAIS pre and post test.

<table>
<thead>
<tr>
<th>No resp</th>
<th>Pre-intervention</th>
<th>Post-intervention</th>
<th>Pre-control</th>
<th>Post-control</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>109</td>
<td>140</td>
<td>95</td>
<td>110</td>
</tr>
<tr>
<td>2</td>
<td>112</td>
<td>143</td>
<td>98</td>
<td>105</td>
</tr>
<tr>
<td>3</td>
<td>99</td>
<td>144</td>
<td>88</td>
<td>92</td>
</tr>
<tr>
<td>4</td>
<td>102</td>
<td>146</td>
<td>95</td>
<td>99</td>
</tr>
<tr>
<td>5</td>
<td>90</td>
<td>141</td>
<td>88</td>
<td>91</td>
</tr>
<tr>
<td>6</td>
<td>120</td>
<td>154</td>
<td>100</td>
<td>110</td>
</tr>
<tr>
<td>7</td>
<td>118</td>
<td>148</td>
<td>86</td>
<td>90</td>
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<td>8</td>
<td>140</td>
<td>165</td>
<td>87</td>
<td>92</td>
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<tr>
<td>9</td>
<td>110</td>
<td>147</td>
<td>95</td>
<td>92</td>
</tr>
<tr>
<td>10</td>
<td>100</td>
<td>149</td>
<td>88</td>
<td>91</td>
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<tr>
<td>11</td>
<td>98</td>
<td>143</td>
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<td>105</td>
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<td>15</td>
<td>90</td>
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<td>116</td>
</tr>
<tr>
<td>16</td>
<td>90</td>
<td>125</td>
<td>140</td>
<td>136</td>
</tr>
</tbody>
</table>

x̄: 103, 12 x̄: 141, 81 x̄: 96, 19 x̄: 100, 88

Based on table 2, it can be explained that the pre-test score PAIS in the intervention group has an average value (x̄): 103,12 with a minimum 89 and a maximum 140. Thus, post self-management therapy, score PAIS obtained average value (x̄): 141,81 with a minimum 119 and a maximum 165. On the other hand, In the control group obtained score PAIS an average value (x̄): 96,19 with a minimum 86 and a maximum 140 in pre-test. Furthermore, the post-test score PAIS is obtained on average (x̄): 100.88 with a minimum 90 and a maximum 136.


Table 4.5. The difference psychosocial adjustment distribution pre and post self-management therapy.

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Self-management toward psychosocial adjustment patient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intervention</td>
</tr>
<tr>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Pre-test</td>
<td>103,12</td>
</tr>
<tr>
<td>Post-test</td>
<td>141,81</td>
</tr>
<tr>
<td>P-value</td>
<td>**0,000</td>
</tr>
</tbody>
</table>

It can be explained based on tabel 4.5 that Mann Whitney test the following results are obtained the pre-test of the intervention and control group with the sig value. = 1,000 and post-test value of intervention and control group with sig value. = 0.043. So it can be concluded that there is a significant influence between self-management therapy to increase the ability of psychosocial adjustment in patients with chronic kidney disease.

DISCUSSION

The results of this study indicate that patients who experience chronic kidney disease
is dominated by the age more than 41 years. Similar results obtained in a study conducted by Tjekyan (2012) states the incidence of chronic kidney disease will increase with age. The study included 300 patients with chronic kidney disease in which 231 respondents (77%) aged over 40 years experienced chronic kidney problems with the following details of 23% at age 40-49 years, 27.3% at 50 to 59 years of age And 25.1% at age ≥ 60 years.16

Chronic kidney disease can actually occur at any ages. However, chronic kidney disease can occur frequently with the age of a person and there are several factors that influence it. In Indonesia, chronic kidney disease is connected by the frequent infection process due to diseases in tropical climates. This condition is different from developed countries, for example in the United States, 47% chronic kidney disease occurs in patients more than 60 years. Chronic kidney disease is caused by behavioral and lifestyle factors, particularly food intake.17 Other causes are metabolic disorders such as diabetes mellitus, hypertension, glomerulonephritis and other diseases associated with obstruction.

Furthermore, in this study male more experienced chronic kidney disease than women with a ratio of 11 men (68.8%) and women 5 (31.2%) in the intervention group. Results of the study by Latifah (2016) mentioned 80 patients with chronic kidney disease treated and undergoing hemodialysis therapy in Moewardi General Hospital, more men than women in both the intervention and control group.18 In the intervention group the number of men was 26 (65%) and 14 women (35%), while in the control group there were 24 men (60%) and 16 women (40%).

The education level of respondents in this study was dominated by primary and junior high school. Education is one of the factors that affect the knowledge, attitudes and actions possessed by individuals toward their health.19 Good knowledge can be as a stimulus of change in attitude and underlying the individual to take action in adjustment to the pain experienced. Psychosocial adjustment is a manifestation of individual to changes in health status. A study conducted by Sitiaga (2015) identified 31 patients with chronic renal failure with educational background characteristics divided into two categories: primary and secondary education. There are 23 respondents (74.19%) with the basic education category and 8 respondents (25.81%) with the category of further education. The results indicate that 18 respondents (58.07%) have good knowledge about chronic kidney disease and therapy and 13 respondents who have poor knowledge.

The marital status of chronic kidney patients can be one of the supporting aspects of self-management therapy. The magnitude of support provided by spouses will contribute to their ability to adapt psychologically. They will feel strong to face the disease and undergo hemodialysis therapy. Support from spouses can be such as motivation, reward or positive reinforcement, attention and looking for solutions to the problems it faces. A study by Rukmaliza (2013) stated there is no relationship between marital respondents (79.4%) with the quality of life of patients with chronic renal failure.21 Thus, the role of nurses who work in the hemodialysis unit is very urgent to support patients with chronic renal failure during hemodialysis therapy.

The employment status of respondents both working or not working in the intervention group has the same number of each 8 respondents (50%). While in the control group, respondents with working status more than those who did not work with the number of 10 respondents (62.5%) and 6 respondents (37.5%) respectively. A study conducted by Purwati & Wahyuni (2016) identified 103 respondents with chronic renal failure who were given hemodialysis therapy at Gatoel General Hospital Mojokerto. They were 29 patients (28.2%) with working status and 74 people (71.8%) with non-working status who suffered from chronic renal failure.22 The factors that affect the quality of life of patients with chronic renal failure are gender, education level and marital status.

The results of this study support previous research conducted by Hartini (2016) who studied 134 patients with chronic kidney failure in Moewardi General Hospital said patients who have sufficient economic will able to provide all the necessary facilities during undergoing hemodialysis therapy in the hospital. They can meet the needs of daily life. This is certainly different from patients with low incomes, where they will meet the difficulties in fulfilling their life needs including the use of health care facilities. In the study also revealed 58 respondents (43.3%) with low income less than 1,425,000 per month suffered from chronic kidney failure is greater than in those with moderate and high income.

Furthermore, the results of this study also states that there is increased ability of psychosocial adjustment of patients with chronic kidney disease after following self-management therapy program. Similarly, the results of the study Loriq and Holan (2003) indicated that
patients with hemodialysis therapy attempted to adjust to the illness condition in which the highest level of adjustment in the moderate category was 47%, 33% high and 20% low adjustment rate. There are three categories that should be done in self-management therapy according to Green (2012) that therapy should focus on the patient's pain needs, involving resources owned by the patient and helping the patient to get used to living with chronic illness conditions. Self-management therapy is one model of therapy in psychiatric nursing. It is called cognitive behavior therapy (CBT). Self-management therapy is attempted to make patients with the main problems of chronic kidney disease can do the planning, concentration of attention and evaluation of the activities that must be done in connection with changes in actual health status experienced.

Self-management therapy today is very important to be done in patients with chronic kidney disease who undergo hemodialysis in the hospital. This is in line with the changing pattern of treatment or therapy that must be undertaken by the patient. Thus, it may lead the patient to make changes to his own behavior with a therapeutic technique performed by hemodialysis nurses through education and SEFT therapy.

Some of the factors that can be identified have an effect on self-management such as socioeconomic and cultural status, clinical factors such as comorbidities and complexity treatments. Also, system factors such as the quality of relationships and communication with health providers may influence the results of therapy. Thus, these factors greatly affect the ability of patients and their motivation to make psychosocial adjustment. The previous experience in undergoing treatment in relation to his illness also contributed to the success of self-management therapy.

**CONCLUSION AND RECOMMENDATION**

Patients with chronic kidney disease were dominated by the age more than 41 years both the intervention and control group, with male more than women. Their educational background graduated from elementary school and senior high school. Most them have married status and work with the most income more than 2 million / month. There is the influence of self-management therapy on the improvement of psychosocial adjustment patients with chronic kidney disease. In addition, there is a difference in the ability of psychosocial adjustment between intervention and control groups after given self-management therapy.

Patients with chronic kidney disease should have a good and healthy lifestyle. They should take medications prescribed by the medical. Moreover, nurses who work in the hemodialysis unit should be able to provide intensive educational services about chronic kidney disease, treatment and care and SEFT therapy services for patients by teaching tapping techniques at certain points to reduce stress, anxiety and depression. Further application nursing research should be undertaken by identifying improved quality of life in chronic renal patients during hemodialysis therapy by focusing on decreased levels of anxiety and depression.

**THANK-YOU NOTE**

Acknowledgments are submitted to the Master Program of Nursing UNDIP, Banyumas General Hospital, patients undergoing hemodialysis therapy so that, this research can be resolved.

**REFERENCES**


17. Levey, A.S. Chronic Kidney Disease Progression. 2007. Tufts Open Course Ware,Tufts University School of Medicine, Boston United state.
Effect Of Modified “Dolanan Bocah” Dance to Attention Function In Obese Children Aged 7–10 Years Old

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ABSTRACT

Background: People with obesity is the lowest quartile of cognitive and intelligence. Attention is one of the cognitive domains. The objective of this study was to determine the effect of modified Dolanan Bocah dance to attention function at obese children aged 7-10 years old.

Material and Method: This study was a randomized pre and post test controlled group design. Thirty subjects of obesity students aged 7-10 years old were participated in this study. The obesity category according to the CDC curve 2000 (IMT ≥ percentile 95), age -10 years, and able to understand instructions. The subjects were randomly assigned into two groups: experimental and control group. The experimental group was given a 10 minute modified Dolanan Bocah dance program, with frequency 3 times a week while the control group performed usual daily activities. Attention function was Percentile Digit Span (PDS) before treatment and at the end of the 6th weeks of treatment.

Results: There was a significant difference in experimental group but not in control group. There was significant improvement in PDS score in experimental group (p = 0.000) compared to control group.

Discussion and conclusion: Modified Dolanan Bocah dance can improve attention function on children with obesity.

Keywords: attention, dance, obese children

INTRODUCTION

According to the results of Basic Health Research (Riskesdas) conducted by the Ministry of Health of the Republic of Indonesia in 2013, the prevalence of "Overweight" in children aged 5-12 years as much as 18.8% which consists of 10.8% overweight and 8.8% obesity. The results of this research also proves that the increase in national prevalence of excess body weight, because in 2007 only 1.4%, while in the year 2013 jumped to 7.3%. The prevalence of obesity has reached alarming levels in worldwide, where obesity people with disability will ultimately pose a serious threat to the national health system. Obesity has a profound effect on disability and quality of life.1,3

Cognition involves the entire mental process that enables us to recognize, learn, remember and respond in sensory information changing from the environment. Attention is one of the important and complex cognitive functions, depending on the interaction of the brain's nervous system. It plays an important role in child development especially in the learning process. According to Attention Network Theory, the human attention system can be divided into three functional and anatomical independent networks, such as alert or alertness network, orienting or selection network, and executive or conflict networks.4,5 Where other cognitive functions will be disrupted in case of attention disorder.6

In various literatures, said that physical exercise in addition to overweight / obesitas problems can also improve cognitive function.7,8 Dance can be used as an alternative physical exercise in children. Overweight / obesity not only cause problems to health but also affect cognitive function, so it is necessary appropriate management, especially in children and adolescents age school. That's why the authors are encourage to do research on Effect Of Modified “Dolanan Bocah” Dance to Attention Function In Obese Children Aged 7–10 years Old. This research measured by the percentile equvalen digit span (PDS) in adolescent obesity.
RESULTS

The subjects of the study were 7 to 10-year old students of Bendungan elementary school, fulfilled the inclusion and exclusion criteria and finished the program of 18 times dancing the modified Dolanan Bocah dance. The subjects of the study were 30 children who were randomly grouped into two, 15 children in the experimental group and 15 in the control group. There was no drop-out. Before the treatment, the subjects received socialization, the subjects' approval was obtained after they received explanation, pre-treatment-data was taken and the experimental group received one-week modified Dolanan Bocah dance practice program before actual treatment with the frequency of 3 times a week to familiarize them with the dance patterns. The treatment was given 18 times, 3 times a week on Monday, Wednesday and Friday. The study was carried out from February 2017 until March 2017. The post-study was taken on the last day of the treatment

Characteristics of Research Subjects

Characteristics of research subjects in table 1 showed no significant difference in mean age (p = 0.847) and gender (p = 0.715) treatment group and control group. The mean Body Mass Index (BMI) showed no significant difference between the two groups (p = 0.852). Physical activity activity profile of the treatment group did not differ significantly with control group either at week 2 (p = 0.282), week four (p = 0.646), and week six (p = 0.485).

Percentile Digit Span

In the treatment group and control group was assessed the score of digit span as measured by Percentil Equivaleln Digit Span (PDS). There was no significant difference in PDS score at baseline in the treatment group and control group (p = 0.984). There was a significant difference in PDS score after treatment in the treatment group and control group (p = 0.000). There was a significant difference in PDS score before and after treatment in the treatment group (p = 0.000). There was no significant difference in the control group at the start and end of the study. (P = 0.119).

DISCUSSION

Differences in PDS score before treatment and 6th week end in treatment group were higher than control group. Based on statistical
test, there was significant difference of PDS score before and after treatment in treatment group (p = 0.000).

Previous studies have shown an association between overweight and poor general cognitive performance. There are several mechanisms that explain the negative effects of overweight / obesity on attention function:

**Triglycerides**

Elevated triglycerides are found to interfere with transport of leptin via the blood-brain barrier. Leptin is associated with cognition and memory processes and acts in the brain region involved with memory and rewards, such as the hippocampus, the cortex, and the cerebellum.

**Insulin regulatory disorders**

Insulin helps the regulatory function of the brain and the cognitive process. Insulin-sensitive glucose transporters appear in the medial temporal region that support memory formation. Several studies have shown that memory improvement is induced by elevated plasma insulin levels in Attention Deficits patients.

**Brain structure**

Obesity is also known to disrupt the brain structure. Research by Kurth et al. (2013) in 115 healthy adults, increased BMI and waist circumference associated with gray matter volume in the hypothalamus, prefrontal cortex, temporoanterior cortex, inferior parietal cortex, and cerebellum, which play a role in cognitive function performance.

Physical exercise can be poured in the form of dance. In addition, overweight / obesity problems can also affect brain physiology by increasing capillary brain growth, blood flow, oxygenation, neurotrophins production, growth of nerve cells in the hippocampus (learning and memory centers), neurotransmitter levels, neural connections development, density Nerve tissue, and brain tissue volume, so that it can also improve cognitive function.

Young children will create movement spontaneously when presented with movement ideas or problems that can be solved with a movement response. Movement provides the cognitive loop between the idea, problem, or intent and the outcome or solution. This teaches an infant, child and, ultimately, adult to function in and understand the world. The relationship of movement to intellectual development and education is an embryonic field of study that has only recently begun to be explored.

Children also experience dance as it relates to movement as a symbolic action with potential communicative meaning, promoting cognitive symbol making capabilities in the brain. In this way, dance prepares children’s nervous systems for using symbols and is an early prototype for their abstract thought processes. Dance integrates Kinesthetic and Spatial Intelligences with other domains of intelligence.

**CONCLUSION**

There is a significant difference in the mean of PDS scores before and after the implementation of the program of modified Dolanan Bocah dance in the experimental group. There is a significant difference in the mean of PDS scores before and after the treatment between experimental and control group. There is a significant difference and in the change of the mean of PDS score between experimental and control group.

**ACKNOWLEDGMENT**

The authors thank to Bendungan elementary school, for the participation, my corresponding author Rahmi Isma MD for the suggestion, and also staffs and residents of Physical Medicine and Rehabilitation, Of Diponegoro University, Dr. Kariadi Hospital Semarang, Indonesia.

**Table 1. Characteristics of Research Subjects**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Treatment Group (n=15)</th>
<th>Control Group (n=15)</th>
<th>Value p</th>
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<tbody>
<tr>
<td>Age(year)</td>
<td>8.67 ± 1,113</td>
<td>8.73 ± 1,163</td>
<td>0.847v</td>
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<tr>
<td>Gender</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Boys</td>
<td>7 (46.7%)</td>
<td>8 (53.3%)</td>
<td>0.715ª</td>
</tr>
<tr>
<td>Girls</td>
<td>8 (53.3%)</td>
<td>7 (46.7%)</td>
<td></td>
</tr>
<tr>
<td>BMI(kg/m²)</td>
<td>26.56 ± 2,757</td>
<td>26.87 ± 5,387</td>
<td>0.852v</td>
</tr>
<tr>
<td>Activity in 24 hous (KKal):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2º week</td>
<td>1477.4 ± 160.01</td>
<td>1541.2 ± 158.76</td>
<td>0.282ª</td>
</tr>
<tr>
<td>4º week</td>
<td>1554.6 ± 151.65</td>
<td>1524.4 ± 190.89</td>
<td>0.646ª</td>
</tr>
<tr>
<td>6º week</td>
<td>1517.1 ± 146.3</td>
<td>1562.4 ± 200.81</td>
<td>0.485ª</td>
</tr>
</tbody>
</table>

Note: v Unpaired T test;
<table>
<thead>
<tr>
<th>PDS</th>
<th>Group</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Treatment</td>
<td>Control</td>
</tr>
<tr>
<td>1. Pre Treatment</td>
<td>46.13±18.07</td>
<td>45.23±17.08</td>
</tr>
<tr>
<td>2. Post Treatment</td>
<td>73.93±16.21</td>
<td>47.13±18.63</td>
</tr>
<tr>
<td>P</td>
<td>0.000*</td>
<td>0.199*</td>
</tr>
</tbody>
</table>

Note: * Significance p < 0.05; a unpaired T test; b paired T test;

REFERENCE
Comparison of the Acute Effect of Light and Moderate Intensity Aerobic Exercise on Cortisol in Obese Adolescents

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ABSTRACT

Introduction: Obesity is a global health problem that contributes to 2.6 million deaths worldwide each year. Obese adolescent have 80% chance to become obese when grow adult. Aerobic exercise is exercise that is recommended for the obese but aerobic exercise that is done excessive has also adverse effect, which increases levels of cortisol. Vigorous aerobic exercise at least 60% VO2max intensity triggers the release of cortisol. Obese individuals may experience hypersensitivity HPA axis that enables increased levels of cortisol in the exercise below the threshold.

Objective: To prove the difference of cortisol serum level in obese adolescents after light and moderate intensity aerobic exercise.

Method: It was an experimental study with pre-post test group design. 30 obese subjects were divided randomly into two groups, the first group received light intensity aerobic exercise (15 participants) and the second group received moderate intensity aerobic exercise (15 participants). Participants underwent single bout aerobic exercise consist of 5 minute warming up, 20 minutes of core exercises (running) and a 5 minute cooling down.

Results: There were no significant differences in serum cortisol levels before treatment in both groups (p=0.267), as well as cortisol levels after treatment (p=0.305). There was no significant difference in serum cortisol levels change after treatment in both groups (p=0.967).

Conclusion: Light and moderate intensity aerobic exercise did not cause significant differences in serum cortisol levels in obese adolescents.

Keywords: Obesity, adolescent, cortisol, aerobic exercise

INTRODUCTION

Obesity is a global health problem that contributes to 2.6 million deaths per year around the world. Obesity is a risk factor for cardiovascular disease, leading to an increase in morbidity and mortality. The obesity epidemic has increased over the past five years. There is an increasing prevalence of obesity in the last decade, in Indonesia based on data from basic health research, there is an increase in prevalence of central obesity in the population aged 15 years or more from 18.8% (2007) to 26.6% (2013).

There are various attempts to overcome obesity problems, one of them is aerobic exercise. Aerobic exercise is very useful in improving cardiovascular fitness, reduce the risk of cardiovascular disease and help weight loss programs in obesity. Regardless of the benefits of aerobic exercise, excessive vigorous aerobic exercise also have an adverse effect in increasing the levels of cortisol. Increased levels of excessive cortisol in the body can lead to glucose and fat metabolism disorders, insulin resistance, decreased immune system and decreased bone density.

Duclos and Tabarin in their study also stated that exercises with a minimum intensity of 60% VO2max or those categorized as vigorous intensity exercise according to the American College of Sports Medicine (ACSM) may lead to an increase cortisol levels, but not in light and moderate intensity aerobic exercise. This may be different in people with obesity. Obese people with predominant central obesity have hypersensitivity of HPA axis. The HPA axis hypersensitivity causes exercise of the same intensity will increase more cortisol levels than
lean individuals.\textsuperscript{16,17}

METHODS
This was a randomized, controlled, pre-post experimental study. The subjects of this study were obese adolescents who attended the SMA Negeri 14 Semarang which fulfilled the inclusion and exclusion criteria, with the following inclusion criteria were age 15-18 years, Body Mass Index (BMI) $> 25$kg / m², healthy for research based on physical activity readiness questionnaire (PAR-Q) , Got permission from parents to be included in the study. Exclusion criteria were Hb $<10$ g / dl, unwilling to follow the study and / or mood and feeling questionnaire score (MFQ) $> 11$, taking steroid medications less than 8 hours before the study, smokers, consumed alcoholic beverages and coffee, Addison and or cushing syndrome, routinely performed aerobic exercise with a frequency at least 3x / week, underwent hormonal gonadotrophin therapy. The number of participants in the study were 30 subjects divided into two groups, those who received light intensity aerobic exercise (group 1 = 15 people) and the group who received moderate intensity aerobic exercise (group 2 = 15 people). Aerobic exercise was performed only once for 30 minutes consisting of 5 minutes of warming, 20 minutes of core exercise (running) and 5 minutes of cooling down. Intensity of exercise based on maximal heart rate calculation (HRmax). Maximum heart rate is calculated by the HRmax formula $= 206.9 - (0.67 \times$ age). The group 1 received the exercise with intensity of 50-63% HRmax, while the group 2 received the exercise with intensity 64-76% HRmax. Exercise prescription based on the American College of Sports Medicine (ACSM). Participants used pulsemeter (omron) for heart rate monitoring during exercise. The researchers monitored the participants heart rates at minutes 5, 10, 15 and 20 while underwent core exercises (running) to ensure participants heart rates were in the targeted aerobic exercise zone (mild and moderate intensity). Participants were considered dropped out if not exercising in accordance with the training protocol and / or fatigue that cause could not performed exercise until completion. None of the participants dropped out in this study.

Blood sampling for cortisol examination was performed twice, before treatment and immediately after treatment. Pre-post blood collection was not performed on the same day, Examination of cortisol (ELISA DRG cortisol reagent (EIA 1887)) was carried out at the central laboratory of the Nasional Diponegoro Hospital in September 2015.

Results analysis using SPSS for windows 17.0. This study has received approval from the Ethics Committee of the Faculty of Medicine Diponegoro University / Dr. Kariadi Hospital Semarang (Ethical Clearance Number 445 / EC / FK-RSDK / 2015).

RESULTS
Characteristics of the subjects can be seen in table 1. There was no significant difference (p $> 0.05$) in all variables (sex, age, BMI, 6MWT and baseline cortisol).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group 1</th>
<th>Group 2</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>8 (53.3%)</td>
<td>8 (53.3%)</td>
<td>1.00*</td>
</tr>
<tr>
<td>Female</td>
<td>7 (46.67%)</td>
<td>7 (46.67%)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>15.67±0.61</td>
<td>15.67±0.72</td>
<td>0.93*</td>
</tr>
<tr>
<td>BMI</td>
<td>30.49±3.32</td>
<td>29.96±4.35</td>
<td>0.18$^$</td>
</tr>
<tr>
<td>6MWT</td>
<td>5.36±0.53</td>
<td>5.30±0.58</td>
<td>0.59*</td>
</tr>
<tr>
<td>Cortisol</td>
<td>107.49±51.86</td>
<td>84.97±32.1</td>
<td>0.27*</td>
</tr>
</tbody>
</table>

* uji mann whitney
$^\$ independent t test

There was no significant difference in cortisol levels before and after treatment in both groups based on statistical tests (table 2).
Table 2. Cortisol levels in group 1 and group 2

<table>
<thead>
<tr>
<th>Cortisol</th>
<th>Group 1 (n=15)</th>
<th>Group 2 (n=15)</th>
<th>p a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>107.49±51.86</td>
<td>84.97±32.1</td>
<td>0.27*</td>
</tr>
<tr>
<td>Post</td>
<td>86.77±38.45</td>
<td>82.02±69.24</td>
<td>0.30*</td>
</tr>
<tr>
<td>*Delta (post-pre)</td>
<td>-17.69±48.06</td>
<td>-20.67±66.46</td>
<td>0.97*</td>
</tr>
</tbody>
</table>

*p<0.05, *p<0.01

DISCUSSION

Levels of Cortisol Group 1 and Group 2

Based on Table 2, there was a significant decrease in serum cortisol levels after light intensity aerobic exercise (p = 0.17) as well as in the group performing moderate intensity exercise (p = 0.12). The slightly higher levels of cortisol before treatment in both groups may be due to blood sampling by needle-sharing for participants was a daunting condition, which can trigger an acute stress response that results in elevated levels of cortisol in both blood and saliva. The results of this study were consistent with the results of previous studies which suggest that no significant difference in cortisol levels immediately after light and moderate intensity aerobic exercise. Jacks et al., In his study of the effects of aerobic exercise with three different intensity levels also suggest, that light and moderate intensity aerobic exercise did not cause significant differences in cortisol levels before and after exercise, only exercise with severe intensity and long duration could lead to increased cortisol levels. This is because HPA axis will only respond to cortisol release at exercise with intensity at least 60% VO2max (vigorous intensity exercise), or if the exercise is done in a long duration of about 90 minutes even though below the 60% VO2 max threshold. In obese individuals with predominant central obesity, aerobic exercise below the 60% VO2max threshold may lead to increased cortisol release due to HPA axis hypersensitivity causing excessive stimulation of HPA axis, but different results are obtained in this study, which in both groups there is no significant difference of cortisol level after exercise. The factors that may contributed to this result may be due to selection of obese participants, in this study obese participants were selected based on WHO criteria for Asian populations with cut point for obesity is BMI ≥25 kg/m2, whereas in previous studies the selection of obese participants were based on WHO criteria in general with a cut of point for obesity is an individual with BMI ≥ 30 kg/m2. This led to differences in the characteristics of the study subjects, where in this study, the participants were mostly grade 1 obese based on the WHO criteria for Asian populations, whereas in the previous the study participants were grade 2 obese based on WHO for Asian populations.

Obesity is defined as a condition characterized by excessive accumulation of fat in the body, while the 11βHSD1 enzyme responsible for converting inactivated cortisol (cortisone) to cortisol, has the highest levels in adipose tissue, hepatic tissue and brain tissue. The more obese a person with higher visceral fat accumulation may also have higher local cortisol levels in adipose tissue as a consequence of HPA axis hypersensitivity. The difference in the degree of obesity with previous research is what may
cause the difference in outcomes. Another possible reason is the subject of this study despite individuals with obesity but they have a fairly good fitness level based on fitness test results with 6MWT, where the fitness level also affects the release of cortisol during exercise.\textsuperscript{13,25} A study conducted by Webb et al comparing the cortisol response to exercise and psychic challenges in individuals with high levels of fitness and individuals with low fitness levels indicate that in individuals with low fitness levels showed significantly higher cortisol levels than individuals with high levels of fitness. This is due to well trained individuals and who have a good level of fitness can develop adaptation mechanisms such as decreased sensitivity to cortisol to protect muscles against excessive secretion of cortisol, through these adaptation mechanisms, HPA axis can overcome recurrent stimuli that allow on the one hand the ability of the organism to respond to repetitive stimulation adequately and, on the other, to protect glucocorticoid-sensitive tissues from high cortisol levels.\textsuperscript{13} At the cellular level, Duclos et al., have reported that in vitro plasticity, monocyte sensitivity to glucocorticoids in well trained subjects, adjusted for changes in systemic cortisol concentrations.\textsuperscript{13}

Another factor causing the difference results in this study was the limitation of cortisol reagent causing exercise only done one time so that finally only got result from one exercise not from mean value from several times result of acute effect of exercise. In this study, blood sampling for cortisol examination was not performed in one day because patients refused to be taken blood twice a day, but nevertheless we tried to reduce the limitations by equating the participants condition in the second blood sampling with first blood sampling, such as patients do not drink coffee, do not drink alcoholic beverages and do not take medication 8 hours before the test and do not stay out late the night before. The aforementioned factors are possible factors that may cause the difference of this research result with previous research.

**CONCLUSION**

The results of this study suggest that moderate and mild intensity aerobic exercise in obese participants showed no significant difference in cortisol levels as well as individuals with normal weight.

**ACKNOWLEDGEMENTS**

We would also like to show our gratitudes to teachers and principal of SMA Negeri 14 Semarang for assistance during the research, as well as the laboratory officer Nasional Diponegoro hospital and our colleagues the student of physical medicine and rehabilitation departement, faculty of medicine, Diponegoro university semarang.

**REFERENCES**


The Perception Of Nurse Clinical Reasoning In Caring With Heart Failure Patients: A Qualitative Study

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ABSTRACT
Background: Nursing is a profession closely associated with clinical reasoning process. The clinical reasoning is the most significant part of the nurse practical compensation. A hearth failure-suffering patient becomes a nurse problem requiring sharp reasoning, but because of a lack of knowledge, implementation of evidence based-practice in service and insufficient skill in care, it becomes significant attention of nurse service.

Objective: this research aims to make out nurse clinical reasoning perception to care of a heart failure patient.

Method: qualitative method with interpretative hermeneutic method was conducted to 6 nurses in a hospital located in Semarang. Nurse perception was gained by Focus Group Discussion (FGD) followed by the unstructured interview and the data was analyzed by implementing qualitative analysis method.

Result: there are three topics in this research. They are self-awareness, patient-nurse value and belief and the improvement of nursing science between theory and practice.

Conclusion: in this study, nurse has lack in determining nursing diagnosis, outcome and best intervention and also lack of evidence based-practice become the feature of the nurse perception in caring a heart-failure patient. There is a need for nursing strategy development to enhance nurses' competency in clinical reasoning.

Keywords: Clinical reasoning perception, a heart failure.

INTRODUCTION
Clinical reasoning is the essential feature of the nurse practice focusing on assimilation and analysis to a health care practise (Banning, 2008). A profesional nurse is to possess clinical reasoning as a base of competent nursing practice. (Lapkin et al., 2010, Harjai & Tiwari, 2009). The clinical reasoning occurs as a nurse thinks about patient clinical data , then they make the conclusion to take the decision about a treatment plan involving cognitive process, judgment and clinical decision making (May et al., 2008, Kaldjian et al., 2005). Pesut and Herman define clinical reasoning as a reflective, creative and critical process learned during the practice of shaping the frame, approaching, and valuing uniformity between patient condition and the result(outcome) desired (Pesut & Herman, 1999). Clinical reasoning relieves the nurse to assess, assimilate, and analyze patients' data. This makes nurses professional (Simmons, 2010). Change of health service system and complexity of health problem need more intellectual and interpersonal drilling and clinical experience, clinical reasoning, to aid patients effectively (Menezes et al., 2015).

Caring patients with certain condition requires intensive attention. Therefore, doing clinical reasoning and taking clinical effective decision are considered to be important but nurses often get difficulty in taking proper action (Freshwater-Turner et al., 2007). They have lack in determining nursing diagnosis, outcome and suitable intervention because of the dynamic complex situation (Pesut, 2007).

An example of nursing case requiring high clinical reasoning is caring patient with heart failure. According to Grange (2005) some factors hampering nurses in caring the patient are lack of evidence based-practice implementation, lack of skill, lack of time, difficulty in taking nursing diagnosis, patient's bad condition, and lack of
nurse coordination. Heart failure becomes main problem in some thriving countries as Indonesia. Patients with heart failure are getting more and more every year even though the technology development is getting more and more sophisticated (Hunt et al., 2009). Data of World Health Organization (WHO) in 2012 shows that 17.5 billion patients died. In Indonesia, it presented 0.5% or about 883,447 patients died, 1.5% or about 2,650,340 patients died with diagnosis or symptom. It is assumed to raise every year (health ministry (Kemenkes), 2013). Patients with congestive heart failure reached 50% which was found in first 6 months and it was estimated 25% or 30% of the patients died the following 12 months. (Hunt et al., 2009)

The increasing number of patients with congestive heart disease is imbalance with the quantity of skillful nurses. A research on clinical reasoning shows that nurses are not of enough skills in patient management principles suffering heart failure such research problem and intervention. (Albert et al., 2002, Jurgens et al., 2015, Knopp, 2009). Nurses should possess knowledge and skill to value, analyze and understand management of heart failure-suffering patient to hand optimal service (Hart et al., 2011)

OBJECTIVE
This research aims to reveal the nurse clinical reasoning perception to care of a heart failure-patient.

METHODS
Qualitative research with interpretative hermeneutic method was carried out in the hospital in Semarang to six nurses. The respondents were selected based on the work experience they have in heart care unit from 0 to 8 years. This approach was chosen due to being appropriate for clinical reasoning study concentrating on experience and the nurse perception to clinical reasoning about the heart failure-patient treatment. Nurse perception can be obtained by Focus Group Discussion (FGD) followed by unstructured interview and respondents were invited to discuss according to their perspective. The interview was conducted for 90 minutes in where the respondents work. Data analyzed were coding process and categorization of verbatim transcript.

RESULT
The Qualitative analysis of caring experience with the heart failure patient.
The Qualitative analysis of the treatment experience of the patient with the heart failure shows that a nurse are immensely interested in caring the patients, but some indications reveal the weakness the nurses have. They are

1. self-awareness
Some respondents show they realize that the nursing process they have applied is tremendously substantial in giving the treatment of the patient with heart failure, however, what they all have done is following the rules the hospital has made. Neither do they try to figure out the cases from treatment diagnosis book nor is what they have conducted based on a nurse clinical reasoning. It is associated with the implementation of NANDA, NIC, and NOC terminology. NANDA, NIC, and NOC terminology push nurses to implement clinical reasoning, but they prefer to do nursing rules made in the room.

“I follow the room rules because NANDA NIC NOC are not appropriate for the steps we need to do. It can be very harmful to patients. In addition to why I rarely apply NANDA, NIC, and NOC, I feel more comfortable with room rules. (R.2)

“I open NANDA NIC NOC every day because I work while studying at collage. In my opinion, NANDA NIC NOC are sometimes appropriate and sometimes not for the action I need. (R.3)

“The first time I worked, my seniors thought critically. I and my friends were guided to think critically, but now, we do not. (R.5)

I get more knowledge and can care my the patients well. (R.3)

2. Patient-nurse value and believe
Nurses prioritize nursing values when caring for patients and take a decision in caring the patients with heart failure. Values and believe becomes the base of giving nursing basic. Nurses also emphasize how important the health education about enhancing patient knowledge is.

When problem arises, we must be able to provide a good service and keep patients' credibility. (R.6)

…..I prefer CHF patients' education. It means we have to explain about treatment done in the house, because the CHF patients often come in and come out a hospital. ”(R.3).

“ It is challenging enough to work for heart division owing to a variety of patients with different characters. That we are supposed to do
is having enough patience, being good at giving explanation, and being ready to encounter the cycle.” (R.4).

4. Understanding nursing changes between theory and practice

Clinical reasoning makes nurses own more comprehensive point of view to patients. To raise clinical reasoning, require high seriousness and passion. In this research, our informant admitted that she /he got difficulty in applying the theories in real condition. Some obstruction could be lack of evidence based-practice (EBP) and up to dated-information about heart treatment.

“We have not discussed about caring heart failure journal recently, only when we have nursing students here (R.6)

We just have open discussion about heart treatment once a month and we find it very difficult to translate some journals because they are in English. ”(R.5)

Actually, We are interested in discussing a lot of thing about caring patient with heart failure due to the information about that gets more and more developed. (R.3)

DISCUSSION

Some Research say that knowledge, values and belief of nurses effect on their clinical reasoning implementation. This research urges the nurses to be more aware of heart-failure patients. Health education is one of interventions to give better service (Cowie et al., 2014). Respecting values and belief must be main character to take care our patients. (Sawatzky & Pesut, 2005, Emblen & Pesut, 2001). Nurse’s belief can determine nurse’s behavior to do clinical reasoning well and values can support their idea, and their believe effects on taking decision.

By this research, it is found that nurse belief must be reflected on their behavior based on Fishbein’s integrative model of behavior prediction in which someone’s behavior can be instilled through behavior beliefs, normative believes,and self-efficacy believes(Fishbein Ajzen, 2011). The implementation of the three principles can stimulate strong intention which encourage nurses to drill their interpretation skill, analyze, evaluate, and explain something related to clinical option.

Nowadays complex health service system challenges nurses to give an evidence based service and commit to learn all their time.

Owning self-awareness is recommended to be a way to increase clinical competency (Williams et al., 2009). Self-awareness is a process involving the process of thinking which consists of thought, feeling, trust, values and feedback. (Eckroth-Bucher, 2010). Self awareness is the gist of the inner power to manage a life and career. If a person suffers from self-awareness illness, they will face the same problems repeatedly (Rasheed, 2015). it is found that nurses who get difficulty in improving the ability to apply nursing diagnosis as nursing terminology in tending the heart-failure patients becomes the main discussion of self-awareness. Nurses realize that this is very important, On the other hand; they feel hard to change and comfortable in this condition.

This result suppor Thoroddsen & Ehnfors (2007). Despite the fact that the standard has been improved, a number of the nurses don’t have enough understanding in practice. Some of the researchers have mentioned that nurses confront problems formulating and documenting nursing diagnosis properly. Besides that, nurses still face obstacles in selecting and deciding nursing diagnosis, outcome and the right intervention thanks to the dynamic and complex situation (Florin et al., 2005, Pesut, 2007).

Several research says that nurses must understand more about the nursing assessment, the use of nursing diagnosis, signs, symptoms, etiology, the proper nursing implementation (Rivera & Parris, 2002, Ehrenberg & Ehnfors, 1999) . This research contrasts with Müller-Staub (2009). Nurses are not competent enough to arrange nursing diagnosis, and are lack of thinking critically. The research in Canada tells that nurses encounter difficulty making diagnosis and about 44% of the nursing diagnoses are not based on the etiology factor. The quality of the nursing practice can be reached by the consistency among nursing diagnoses, nursing interventions, The terminology of nursing becomes tremendously important because it is a standardization in practice and nursing science in understanding, assessing, analyzing, relating nursing practice data, finding the newest nursing, being involved in research to develop the quality and affectivity of service conducted during nursing practice. (Tastan et al., 2014).

The standardization of nursing terminology can raise nursing understanding, and generalize the data needed to reveal the result of the nursing service given. The implementation of nursing terminology standardization can also improve the quality of nursing documents,
intervention and the result of nursing. Besides that, it is able to describe the problem of a patient systematically and comprehensively to take a clinical decision (Keenan et al., 2008, Müller- Staub et al., 2007).

Nurses decide clinical decision making by considering nursing diagnosis and the exact nursing intervention to obtain the needed result. During the intervention of nursing, nurses always evaluate associated with patients’ condition. The evaluation applies clinical reasoning based on data analysis, diagnosis and intervention. The standardization of nurse’s terminology give a series of the analysis categories that the nurse conduct. (Park et al., 2010). The research result is appropriate to Kautz et al. (2006), the use of the standardization of nursing terminology such as NANDA, NIC, and NOC reflects the knowledge of nursing and combines the ability of thinking critically and creatively.

The finding is that knowing the changes of nursing science between the theory and practice reveals the real opinion that says nurses possess a problem in implementing it. Some respondents show the obstacles experienced by nurses are the lack of the implementation of evidence based-practice (EBP) and realization of today's heart-failure patient management. According to what Grange says (2005) that nurses don't have enough skills to apply evidence based-practice (EBP) to patients with a cardiovascular trouble. Evidence practice becomes a directive of nurses to conduct clinical reasoning, this is supported by the empiric research which is used to take the effective clinical decision. Evidence practice help nurses to consider something in the clinical situation to patient conditions which can change any time.

Based on the finding of Melnyk et al. (2014), it is said that the problem of nurses to conduct and apply evidence practice are time limitation, organization culture, and nurse philosophy. “Those are what we always do here”, the lack of knowledge or EBP education, the lack of access of reviewing newest journals, lack of support from the leader, the overloading work, resistance from nurses and nurse collage, and the lack of knowledge to analyze the research result critically. This finding is supported by (Swenson-Britt & Berndt, 2013). It tells that various backgrounds, education, and a clinical attitude can influence motivation and skill to integrate the research result in practice. According to Wilson et al. 2015, some obstacles about knowledge in implementing evidence are nurses’ role, experience before conducting the research, the lack of understanding research process, obstacles in identifying evidence practice, the perception of nurses who don not want to change and graduation year. In other words, nurses confront serious problems in understanding the evidence practice.

Several requirements of clinical reasoning are that nurses are able to evolve the way of thinking, filter a nursing problem and focus on patient planning. The process of the nurse clinical reasoning begins with the assessment, formulating nurse diagnosis, implementation and evaluation (Harjai & Tiwari, 2009). Clinical reasoning belonging to nurses can help improve nurses’ ability to make the right clinical decision, minimalize the clinical error, understanding the signs the patient gives and take the proper action( Gracia-Lewis, 2013) clinical reasoning requires practical skill to identify the relation between knowledge and practical skills to be applied in the treatment to patients which is developed through experience. Experience and practical knowledge are very significant to enhance the clinical reasoning of nurse.

Generally, the result of this research shows that nurse’ clinical reasoning skill is not well applied to patients and the nurses have not owned effective strategy about clinical reasoning. The result of this research does not generalize skill of nurses in clinical reasoning. Although the interview records are proper with the purpose of this research, nurses must work on their clinical reasoning as good as possible to give their best performance for their patients. Nurses also must have value and belief principles in caring patients.

CONCLUSION

Clinical reasoning is the heart of nursing clinical competence. This research aims to know nurse perception towards patients with heart failure. The result of this research contributes new point of view about nursing. Some important aspects are self-awareness, values and believes in the patients and nurses, and understanding the nursing changes between theory and practice. In the research, it is found that nurses are not well-experienced enough in handling clinical reasoning towards patients with heart failure and lack of the implementation of evidence based-practice. Involving some informants with different experience is considered as the weakness of this research.

To increase the credibility of the findings of this research, it is necessary to explore the reasoning of nursing working in other contexts. It needs some experts of cardiovascular clinical nursing to share their experience in nursing patients with heart failure to support this
research and it is necessary to do another further work or research to know how nurses advance use their clinical reasoning skill with best strategy.

REFERENCES
5. Advances in Nursing Science, 33, 297-309.


Early Warning Score As A Triage System Increases Response Time Of Patient Management In Emergency Departments

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ABSTRACT

Objective: This study aimed to analyze the effect of EWS as a triage system to response time of patient management in Emergency Departments.

Method: This quasi experimental study used post test only with control group design to 210 respondents. Respondents were recruited using incidental sampling techniques from two different hospitals. Response times were measured using stopwatch from patient’s triage to initial assessments by physicians or nurses. The data were analyzed using independent sample t-test.

Result: The result showed that response time of EWS was 3.2 ± 0.71 minutes compared to response times of classic triage system which were 3.6 ± 1.00 minutes. There was different mean score in the response time of patient management between the treatment (EWS) and control group (classic triage system) with p value of 0.001.

Conclusion: The study concluded that EWS increased response time of patient management in Emergency Departments compared to classic triage system. Therefore, it is recommended to Emergency Departments in Indonesia to use EWS as the triage system for the best patient care.

Keywords: Early Warning Score, Response time, Triage system, Emergency Departments.

INTRODUCTION

Emergency department is a department in hospitals providing first care integrated health service to the patients with life and disability threats.¹ The number of patients visiting Emergency Departments (EDs) is unpredictable and around 50% of those patients are not urgent and emergent. This situation results in ED overcrowding.² ED overcrowding would potentially create delay in urgent and emergent patient care. The condition needs a systemic solution in patient management which is called triage.³ Triage is a very important aspect in the Emergency Department to manage the drastic increase of patient visits.⁴

Triage is a patient selection system adalaha to determine emergency levels and priority for patient management.⁵ College of Emergency Nursing Australasia (CENA) defines that triage is short clinical assessment to decide the urgency of clinical problems in patient and the order of patients who will receive the emergency care.⁶ There are some triage systems that have been used worldwide but there are only 3 triage systems that have mostly been applied to many countries namely the Australian Triage Scale (ATS), The Canadian Triage and Acuity Scale (CTAS), dan Emergency Severity Index (ESI).²,⁷-⁹

The application of the third triage system still has some obstacles while applied at hospital in Indonesia. The rapid development of triage system in some countries has not seen in Indonesia yet.⁴ The triage process in Indonesia has no clear standard and indicator so that the effective and efficient triage process based on the condition of Emergency Department in Indonesia needs to be developed.¹⁰ Early Warning Score (EWS) is an instrument for doctor and nurse to combine their regular observation, make total physiological score, identify and detect the patients with critical condition. The approach is based on the assumption that there is physiological deterioration to the emergency patients that can be detected by the simple observation.

Early Warning Score is a measurable scoring technique including observation and measurement of blood pressure, pulse, breath rate, saturation, oxygen, temperature, and level of consciousness.¹¹ EWS can be performed by health workers to recognize the characteristics of emergency quickly so that the patients get the
appropriate and fast treatment. The appropriate and fast management can prevent death and disability to the patients. \cite{12} Some previous studies have been conducted and related to Early Warning Score as early detection system and identification of critical patients. \cite{13,14} Early Warning Score is then developed as triage system. \cite{15,16}

The main purpose of the study is to prove that EWS as triage method has effect on response time of patient management in Emergency Department.

**METHOD**

The study was a quasy experimental study with Posttest Only, Non-Equivalent Control Group Design where the design was only conducted posttest after given the treatment. Sample used in the study was patient who visited to the Emergency Department and had some criteria like having \( \geq 17 \) and \( \leq 65 \) in age, not being maternal emergency patients, not being mental disorder patients. Based on previous study with the power of 0.9 and medium effect size of 0.4, the sample size were 188 respondents. In addition, anticipated 10% drop outs yielded 210 total respondents which consisted of 105 respondents as intervention group and 105 respondents as control group. An accidental sampling technique was used to recruit the respondents.

The researcher determined both intervention and control group as research sample. Intervention group consisted of respondents in hospital which had no triage system and control group was respondents who were in hospital using conventional triage system. The researcher took data from both intervention and control group. Taking data was implemented by the researcher collaborated with nurse and doctor who performed triage to their patients. The patients who got triage were based on the inclusion criteria by the researcher. The implementation of EWS as triage method in Emergency Departments simultaneously used CTAS method and was done by the doctor as an expert of CTAS triage who had ACLS certification and 5 year experience in Emergency Department both hospital as research place and hospital as control group. The result was compared to the triage result using EWS.

**ETHICS**

The study has got the approval from Research Ethics Committee of Health Research Ethics Committee of Medical Faculty, Diponegoro University. Researchers obtained approval from the Health Research Ethics Commission with No.111 / EC / FK-RSDK / III / 2017. The researcher explains purpose of the research conducted and the impact that may occur during and after data collection. If the responses are willing to be researched, then they must sign the approval sheet.

The study was conducted in Emergency Department in RSI. Muhammadiyah Tegal and RSUD dr. Soesolo Tegal Regency. The research observed the distinction of response time between patients with EWS and patients with conventional triage; whether there was significant difference between those patients or not. To identify the variables after intervention in each intervention group and control group data analysis used was independent t test. Data analysis used spss program.

**RESULT**

Based on table 1, it showed that the most patient category was yellow numbered 72 respondents (68.6%) and the least category was patient with blue category, 8 respondents (7.6%). It described that the most patient category based on conventional triage system was yellow, 58 respondents (55.2%). Table 2 showed response time of patient management in Emergency Departments using EWS. Mean of emergency patients using EWS triage was 2.75 minutes while respondents using conventional method had mean numbered 3.28 minutes. Table 3 showed the result of using T test independent indicated that there was significant effect of applying EWS as triage system on response time of patient management in Emergency Departments with p value (= 0.001). The response time average of intervention group was 3.2 minutes, while control group was 3.6 minutes.

**DISCUSSION**

The research result showed that the most respondents’ category that came to Emergency Departments and was given triage with Early Warning Score (EWS) was in yellow where it was non urgent patient. The patients who were in yellow category had \( 1 – 5 \) for EWS score. Those patients had interference on one of the physiological scores. The second place of patient category was red criteria. The patients’ condition in the criteria had interference on three or more of physiological indicators. The patients with blue category got the lowest number. Their score was \( \geq 10 \) with loss of consciousness and severe shortness of breath. It was suitable for the research result of Early Warning Score indicated that the most category was patients with yellow category. \cite{17,18} The result stated that some
respondents coming to the Emergency Department and getting conventional triage were in yellow category or in urgent category. The patients’ condition in yellow category was dominated by pain complaint, a closed fracture, fever with a temperature of 37.8°C, and mild dehydration. The result was appropriate to the patients’ number that visited to the Emergency Department in some hospitals in Indonesia, namely in yellow category. Increased patient visits with non-urgent category could cause the density in the Emergency Department. The patient density in the Emergency Departments could make management retardation of patients with emergency condition. It means that the mortality improvement of emergency patients which were able to be saved if they got fast management in health service.

The average of response time with triage method of EWS was faster than response time on patient management in Emergency Departments that used conventional triage method. The EWS method had advantages of recognizing emergency patients quickly so that it was able to do appropriate early management and accelerate response time of patient management in Emergency Departments. EWS was effective track-and-trigger system to identify so fast and gave aid of patients who came to the Emergency Departments.

Fast service and effective treatment were the beginning stage of patient survival. Emergency patients should be identified quickly, so that they got relevant treatment which was conducted by postponement care firstly. Different triage system has been validated to be applied to the Emergency Departments and acute care. Orlando explained about totally interactive conducted step by step; the speed indicated that the patient need should be undertaken to give appropriate action so that the patients got fast aid of getting fast, appropriate and accurate principle.

The EWS method could detect patient urgency accurately so that it could advance first aid of patient with death risk. Some studies stated that EWS was recommended as an instrument to observe patient urgency quickly so that the patient got fast treatment. EWS was a simple assessment system and sensitive instrument to observe emergency patients. EWS system could be performed for response activation of medical team to give aid of emergency patients. EWS system could be applied as triage instrument identifying patients who were in the highest death risk. The research findings showed that EWS category was more than 5 which needed intensive observation.

EWS system had been evolved as an instrument to detect the general physiological interference happening on patient urgency; it was detected by simple observation.

CONCLUSION
Considering the Emergency Department condition of hospitals in Indonesia which had limitation on human resources, facilities and infrastructures, and significant result of improving the response time of patient management in Emergency Departments, it could be concluded that Early Warning Score (EWS) was as good triage method to be applied to triage nurse. The Ministry of Health, The Republic of Indonesia should formulate standard of response time for each category based on the triage. It was to avoid the retardation on emergency patients even with death risk. The research result showed that patients with emergency category based on the triage should have priority to get first management so that it could prevent the death risk.

ACKNOWLEDGEMENT
Praise be Allah SWT for all the blessings and grace so that the study entitled "Early Warning Score as a triage system increases response time of patient management in Emergency Departments" can be finished. In the preparation of this study, researchers achieved guidance and support from various parties. Therefore, the researcher would like to express his gratitude to Mr. dr. Achmad Zulfa Juniarto, Msi. Med.Sp. And, PhD and Ms. Ns. Nana Rochana, S.Kep, MN as the mentors and the members of this study. The researchers also would like to thanks to the director of RSI Muhammadiyah Tegal and RSUD dr. Soeselo Kabupaten Tegal who has granted the research permit.

REFERENCES
Administration of Tempeh Deep Fried In Vitamin A Fortified Or Unfortified Palm Oil To Mice (Mus Musculus) : Effect On Serum Retinol

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ABSTRACT

Repeated use of palm oil to deep fry Tempeh is extensively employed in domestic and street food vending practise. Fortification of vitamin A in commercial cooking oil is mandatory by SNI as vitamin A-fortified cooking oil is considered as one of effective vehicles to reduce vitamin A deficiency. The aim of this research was to determined serum retinol level of mice (Mus musculus) administered Tempeh which has been deep fried in vitamin A-fortified or unfortified palm oil. Three types of cooking oils were tested i.e. vitamin A-fortified palm oil (POvitA), unfortified palm oil (PO), and coconut oil (CO) as control. The oils were used to deep fry tempeh repeatedly for five times. The fifth fried tempeh from each cooking oil was administered to three groups of mice (1.5 months old) which was randomly assigned as 1) POvitA, 2) PO, and 3) CO in line with the types of oil being tested. Administration of the fried Tempeh was done for 14 days, in which seven days for transition feeding and seven days full Tempeh feeding. Serum retinol and body weight were measured before and after administration. The result showed that in each group, there was a significant raise of serum retinol and body weight after 14 days of experiment (p<0.05). At the end of the experiment there was no significant difference (p>0.05) in serum retinol and body weight of mice between groups. This study suggested that compared to vitamin A fortified oil, administration of Tempeh deep fried in unfortified cooking palm oil or coconut oil produced similar raise in body weight and serum retinol in normal mice.

Keywords: tempeh, serum retinol, mice

INTRODUCTION

Deep fried foods are very popular as frying cooks food quicker and gives attractive flavor and texture. The most popular frying oil is palm oil which is also a good medium for lipid soluble vitamin A i.e. β-carotene, retinol palmitate, and retinyl acetate (Allen et al., 2006). According to Indonesian standard, frying oil must contain 45 IU vitamin A/g oil (SNI, 2012). Vitamin A fortified frying oil is considered as one of effective vehicles to overcome vitamin A deficiency which remains a problem in Indonesia and worldwide (Depkes, 2009; WHO, 2017). Commercial vitamin A fortified palm oil is now available in the market.

During deep frying palm oil is heated to 150-200°C and the oil undergoes chemical, physical, and sensory changes so that it affects the quality of the oil itself and the fried foods (Yamsaengsung and Moreira, 2002). Vitamin A fortified palm oil will also undergoes similar changes. As foods have been fried, the oil becomes part of the fried foods and so does the vitamin A from the oil. The migrated vitamin A from vitamin A fortified frying oil into the fried foods will provide vitamin A to consumers. Tempeh is one of the most popular foods being fried in palm oil and it is a common practice in household and street vending practise to repeatedly used. We aimed to study Tempeh deep fried in palm oil after the same oil was repeatedly used for four times to deep fry Tempeh. The fifth fried Tempeh was then given to mice to determine its effect on the serum retinol.

METHOD

1. Chemicals

Cloroform, diethyl ether, 4 M HCl solution, 0.1M iodine solution, distilled water, 50% KOH solution, 90% alcohol solution, 0.1 N NaOH solution, hexane, 95% ethanol solution, acetone, trifluoroacetate (TFA), anhydrous sodium sulfanate, retinol and carotenoid standard compounds, phenol-phthalein indicator, starch,
sodium tiosulfate, potassium iodate, glacial acetic acid, and nitrogen.

2. Determination of Carotene Content of Frying Oils

Carotene standard compound (100 g) was dissolved in 100 mL chloroform to obtain Solution A. Ten millilitres of Solution A was pipetted and diluted to 100 mL by addition of chloroform to obtain Solution B. Solution B contains 100,000 µg carotene per 100 mL. Solution B was pipetted in triplicates to 5 mL reaction flasks, by 25 µl, 50 µl, and 75 µl. Then each solution was vaporized using nitrogen and 10 µl chloroform was added to dissolve vitamin A. Trifluoroacetate solution in chloroform (2:1) (2.5 mL) was added and the absorbance was measured at 620 nm for 30 seconds. A standard curve was then plotted.

A three times weight of 95% ethanol solution and 50% KOH solution was added to 20 to 50 g sample and refluxed for 30 minutes. Rigorous mixing is required if agglomeration occurs. Distilled water was added at two times of sample weight and followed by extraction using hexane of 2-3 times sample weight. The extracts were poured into separating funnels and washed several times using distilled water (100 mL) until the washing solutions did not form red color responses to phenolphthalein indicator. The extracts were then evaporated using nitrogen to yield 20 mL solutions.

Samples were gradually introduced to chromatographic columns filled with alumina particles, which was pre-wetted by 20 mL hexane. The vitamin A was eluted by addition of 30 ml 15% acetone solution in hexane. The final volume of the eluate vitamin A containing was set to 50 mL and the absorbance was measured at 450 nm to determine the carotene content. Five milliliters eluate containing carotene was pipetted and evaporated prior to addition of trifluoroacetate solution in chloroform (2:1). The absorbance was measured in 30 seconds at 620 nm. The carotene content was then calculated as follow:

\[ \text{Carotene (µg / 100g)} = \frac{A1 \times K \times V0 \times 100}{A2 \times V1 \times B} \]

- \( A1 \): absorbance of sample
- \( A2 \): absorbance of carotene standard solution
- \( K \): concentration of carotene standard solution (µg / 100g)
- \( V0 \): final volume of eluate
- \( V1 \): volume of sample used for carotene determination
- \( B \): sample weight.

3. Tempeh preparation for In Vivo Feeding Test

Fresh tempeh with X brand was purchased from a home industry in Semarang. Three commercial cooking oil, namely the coconut oil (CO), unfortified palm oil (PO), and palm oil fortified with vitamin A (POvitA) were purchased from a supermarket in Semarang. Deep frying method was applied in a fryer set using 1000 mL cooking oil at 175±5°C. Five pieces of tempe were fried at 175±5°C for 2 minutes. The frying processes were repeated 5 times with 20 minutes interval. The time interval was used to heat the cooking oil to the desired temperature.

4. Laboratory Animals for in vivo feeding test

Twenty-one male mice (Mus musculus) strain Swiss aged 1.5 month of 30-40 g body weight were used in this research. The use of those animals had been approved by ethics committee of Universitas Diponegoro as declared under Ethical Clearance No. 541 / EC / FK-RSDK / 2014.

5. In vivo feeding test of Fried Tempeh

The mice (Mus musculus) were randomly grouped into 3 different treatments as the followings: those fed with tempe fried using coconut oil (CO), those fed with tempe fried using unfortified palm oil (PO) and those fed with tempe fried using palm oil fortified with vitamin A (POvitA). Each group comprised of 7 mice. The treatments included acclimatization to new environment (7 days), pre-test serum retinol, adaptation to fried tempe as feed (7 days), feeding of fried tempe (7 days), and post test serum retinol. During acclimatization to new environment, the mice were fed with 10 g of commercial feed and ad libitum drink. During adaptation to fried tempe as feed, the mice were fed using mixture of commercial feed and fried tempe for 7 days with the following compositions: 10:0; 7.5:2.5; 5:5; 2.5:7.5; 0:10; 0:10; 0:10. Then the mice were fed using fried tempe for 7 days. Theree hours after feeding at the 7th day, blood samples were taken from the mice and were subjected to serum retinol test. Feeding of rats with only fried tempe was to ensure that the fortican vitamin A came from cooking oil trapped in the tempe after frying.

6. Determination of serum retinol of mice

The determination of serum retinol was conducted according to the method previously developed by Miller and Yang (Shan et al., 2012). The blood sample was taken from sinus orbitalis part of mice (Mus musculus) using microhematocrit flask. The blood was introduced into a microtube and centrifuged at 6000 rpm for
5 minutes. The serum was separated and placed in a new microtube. After protein separation using ethanol and nitrogen, the retinol was extracted using hexane. The residue was dissolved in 0.1 mL methanol. One part of the sample (20μl) was injected to an HPLC column (4.5 mm × 250 mm, 5μm, Symmetry C18, Waters). The mobile phase was a mixture of methanol and water (98:2). Retinol identification was carried out by measuring the absorbance of UV light at 325 nm by the sample in the dark to prevent exposure of sample to sun light.

7. Statistical Analyses

The mice (Mus musculus) body weight and serum retinol data before and after treatments were analyzed using Analysis of Variance (Anova) and T test. If significantly different data exist, further Least significant Difference (LSD) analysis was applied. Abnormal data were analyzed using Kruskal Wallis and Wilcoxon. The statistical analyses were carried out with the assistance of SPSS software.

RESULTS

The results of in vivo test, which included changes in body weight and serum retinol of mice (Mus musculus) in their respective group are presented in Table 1.

Table 1. The carotene content of coconut oil (CO), unfortified palm oil (PO), and palm oil fortified with vitamin A (POvitA) in frying oil under repeated usage.

<table>
<thead>
<tr>
<th>Frying Oil</th>
<th>Carotene (μg/g)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fresh oil</td>
</tr>
<tr>
<td>CO</td>
<td>39.25</td>
</tr>
<tr>
<td>PO</td>
<td>480.38</td>
</tr>
<tr>
<td>POvitA</td>
<td>401.03</td>
</tr>
</tbody>
</table>

Table 1 shows the carotene content in all of the fresh cooking oil (before used for frying of tempe). After being used repeatedly (5 times) to fry tempe, the cooking oils still contained carotene, and even at higher content, except for POvitA where the carotene content decreased. No clear reason can be deduced from this fact because the measurement was carried out once.

The increased in carotene content of unfortified palm oil after repeated frying was possibly from carotene of the tempe which dissolved to oil during frying. The Provitamin A (carotene) in food may reduce after frying due to its transfer from the food to the frying oil during frying process (Ghidurus et al., 2010; Bordin et al., 2013).

Table 2. Body weight and serum retinol of mice (Mus musculus) (n=7) after deep-fried Tempeh feeding for seven days*

<table>
<thead>
<tr>
<th></th>
<th>CO</th>
<th>PO</th>
<th>POvitA</th>
<th>p Anova</th>
<th>p Kruskal Wallis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Weight (g)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre test</td>
<td>32.71±2.21</td>
<td>34.29±1.25</td>
<td>32.57±3.36</td>
<td>0.364A</td>
<td></td>
</tr>
<tr>
<td>Post test</td>
<td>33.23±3.07</td>
<td>35.73±2.92</td>
<td>33.47±2.99</td>
<td>0.253A</td>
<td></td>
</tr>
<tr>
<td>Δ body weight</td>
<td>0.52±1.25</td>
<td>1.44±2.06</td>
<td>0.90±3.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p T test</td>
<td>0.317B</td>
<td>0.114B</td>
<td>0.495B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serum Retinol (ppm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre test</td>
<td>0.69±0.29c</td>
<td>0.94±0.48c</td>
<td>0.90±0.34c</td>
<td>0.256C</td>
<td></td>
</tr>
<tr>
<td>Post test</td>
<td>1.55±0.39c</td>
<td>1.85±1.30c</td>
<td>2.00±1.36c</td>
<td>0.834C</td>
<td></td>
</tr>
<tr>
<td>Δ retinol serum</td>
<td>0.86</td>
<td>0.91</td>
<td>1.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p Wilcoxon</td>
<td>0.018D</td>
<td>0.046D</td>
<td>0.043D</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Tempeh which has been deep fried in four-times used oil
a: no significant different based on Anova Test (p=0.05)
b: no significant different based on T test (p=0.05)
A: significant value based on Anova Test
B: significant value based on T test
Δ: changes in body weight during feeding of fried tempe
c: no significant different based on Kruskal Wallis Test (p=0.05)
C: Kruskal Wallis (p>0.05)
D: Wilcoxon (p>0.05)
Table 2 presents the changes in body weight and serum retinol of mice (Mus musculus) fed by fried tempe. No significant different (p>0.05) of body weight before and after treatment on mice in CO, PO, dan POvitA groups. It was also no significant different of body weight (p>0.05) in mice (CO, PO, dan POvitA) after 7 days treatment. The serum retinol of mice in CO, PO, dan POvitA groups are also insignificantly different (p>0.05), either before or after feeding with fried tempe. The serum retinol of mice in CO, PO, dan POvitA groups increased after 7 days feeding with fried tempe, but they were not significantly different.

The analysis of serum retinol shows that before feeding with tempe, the retinol content of all testing animals were the same. Similarly, the increase in retinol content of the mice after 7 days treatment with tempe were insignificantly different. Those results together with the fact of increase in body weight indicated that the type of cooking oil used for frying of tempe did not affect the serum retinol content. The increase in retinol serum was not significant in both palm oil and coconut oil groups. Palm oil naturally contains provitamin A in the form of carotene. This provitamin A will be oxidatively decomposed to retinal in the intestine. Then, retinal can be reduced to retinol (Suparmi dkk, 2014). Further, retinol is esterified to retinyl palmitate by Acyl CoA Retinyl Acyl Transferase (D’Ambrosio et al., 2017; Murwani, 1992). Retinyl ester, some carotenoids and fat components, which are not decomposed are stored in the form of chylomicron and were transferred to the target tissues (Lintig, 2012). Most of the retinoid and carotenoid in the kilomicron was carried by limpha to the liver and the rest was transferred to the extra hepatic tissue or other liver tissue (Paik, 2004). In the liver, the unused vitamin A (retinol) will be reesterified by retinol asiltransferase (RAT) to form retinyl ester as reserve (Ross, 2004). Liver is the main reserve organ for vitamin A and carotene (Murwani, 2002). However, some carotenoids may also be stored in the fat tissue in the body.

As shown in Table 1, although without fortificant retinyl palmitate, the supply of retinol can be obtained from carotene that naturally contained in palm oil (PO). Therefore, both group of mice fed with tempe fried using palm oil or palm oil fortified with vitamin A experienced an increase in body weight and serum retinol content. Beside, the control mice fed with tempe fried using coconut oil (CO) also gained similar body weight and increased serum retinol content. Our investigation revealed that the carotene content of palm oil (PO) and palm oil fortified with vitamin A (POvitA) was about ten times than that of coconut oil (CO). This fact suggested that the retinol supply can be from the oil itself and also from the tempe. Fresh tempe contains Provitamin A in the form of carotenoid (Astuti, 1999; Depkes, 1991), which is formed during fermentation of soybean. There are 14 strains of Rhizopus sp that can produce carotenoid during tempe fermentation, but only 7 strains of them can form β-carotene (Denter et al., 1998). Natural soybean contains approximately 1 μg carotenoid, while transgenic soybean contains 1,400 times carotene content than the natural ones (Kurosu, 2011). Another possible reason is that the serum retinol of CO group mice originated from mobilization of preserved serum retinol in their liver. The complete feed fed to mice before being used in this research was commercial feed, which contained vitamin A. During 1.5 month breeding, the reserve of vitamin A had already adequate. When required, the reserve vitamin A is mobilized from the liver through blood circulation so that the serum retinol content remain stable.

CONCLUSION

Fortification of vitamin A in palm oil used for frying of foods does not improve the serum retinol of normal mice and also possibly on consumers with normal serum retinol. For healthy consumers without vitamin A deficiency, the use of unfortified palm oil, coconut oil, and palm oil fortified with vitamin A for frying of tempe provides closely similar effects.

REFERENCES
22. Shan, JMM; Chao-xu, WMM; Lan, LMM; Dan, ZMD. 2012. Vitamin A deficiency aggravates iron deficiency by upregulating the expression of iron regulatory protein-2. Nutrition 28: 281-87.
Correlation Basic Task Of The Mother Based On The Status Of Work With The Level Of Independence Of Toddler In Tlogotunggal Village Sumber Sub District Regency Of Rembang

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ABSTRACT

Background: Mother’s employment status is very important for the level of independence of children, if the level of independence of children not invested early will result in children dependent on parents. After an interview with posyandu cadres the number of children under five 70. Interviews with 10 working mothers with toddlers said their children are independent and 10 housewives say their children are not yet independent. The purpose of this research is to know the relation of basic task of the mother based on the status of work with the level of independence of toddler aged children in tlogotunggal village sumber sub district regency of rembang.

Methods: This research is a correlation research with cross sectional approach. The sampling technique used proportionate random sampling, with respondents 60 mothers with toddler age children. The statistical test used is Spearman Rank non parametric test.

Results: The characteristics of mothers with toddler age children dominantly aged 25-29 were 39 (65%), housewife job was 31 (51,7%), dominant child age 3 years 29 (48,3%) with male gender As many as 33 (55%) respondents. The employment status of the mother with good category is 42 (70%) with self-supporting category as much as 22 (36,7%), so get correlation coefficient value ρ = 0,609 p value = 0,000 <0,05.

Conclusion: Ha accepted H0 rejected, so there is a correlation basic task of the mother based on the status of work with the level of independence of toddler aged children in tlogotunggal village sumber sub district regency of rembang.

Keywords: The main task of the mother, Mother’s employment status, Level of independence, toddler aged children.

INTRODUCTION

Toddler mass is a period in human life starting from the age of 12 months to 36 months. This mass is called toddler because the child is too old to be called a baby and too young to be called a child (Adebenih, 2011). Factors that affect the independence of children are internal and external factors. Internal factors such as physiological conditions (body condition, health and gender) and psychological. External factors such as environment, love and affection, parental care and experience in life (Wiyani, 2014).

According to WHO (2011) estimates the number of toddlers in the world reached 1600 million children under five. The high level of dependence of children in daily activities becomes a huge burden for parents. The number of children who are still in dependence on parents reaches 40-50% of the entire population in the world. The problem of dependence on self-care often is often found in children toddler age 1-3 years. Dependence of self-care as an inability to perform activities independently without the help of parents.

Independence is a skill to help oneself, both physically and psychologically. Physical independence is the ability to take care of oneself, while psychological independence is the ability to make decisions and solve problems encountered. Physical independence is very influential on psychological independence (Yunawati, 2016).

Based on the results of the 2011 population census in Indonesia, based on the age group 1-3 years with the number of children 13,624 inhabitants, the independent child of 99.27%, while the non-independent children by 0.73% (Heriawan, 2011). In line with the results of
research Zuhrotul (2016), most of the children in the village of Brumbungan Kidul are self-sufficient children in self-care that is 66.7% or 68 children aged 1-3 years and non-self-dependent children in self-care 33.3% or 32 children Age 1-3 years with the number of 100 children aged 1-3 years.

Parents who are busy working or careers result in less attention to children. Children who should master a variety of physical skills, language and try to explore their independence become a lazy child and tend not independent. Independence of children with busy parents outside the home will be different from children who are housewife. Achievement of child development requires attention and parenting especially mother (Frisca, 2014).

The results of data processing of the Central Bureau of Statistics of Rembang City precisely in the District of Sumber 2015, most of the Resource of Women residents work in fisheries, agriculture, and forestry. The number of female residents in Sumber Sub-district in 2015 amounted to 17,688 people. The number of mothers who work in Sumber Sub-district is 37% and housewives account for 54% of the total number of women in Kecamatan Sumber. The number of Women in Tlogotunggal Village is 1,673 people and mothers with toddler-age children are approximately 70 mothers. There are 45% of working mothers and 53% of housewives.

The results of interviews with posyandu cadres said the number of children under five in Tlogotunggal Village Sumber Sumber Rembang 70 children under five years old consisting of 32 male and 38 female under-fives. The average mother who has children under five working as Fishermen and Farmers. Interviews with 10 working mothers with toddlers said that their children can bathe, eat, dress in doing independently, and interviews with 10 housewives said that their children ate fed, did not want to take their own drink, bathed and assisted in mother's assisted clothes.

Based on the phenomenon found, researchers are interested in conducting research entitled "correlation basic task of the mother based on the status of work with the level of independence of toddler aged children in tlogotunggal village sub district regency of rembang". The purpose of this study is to determine the relationship between the basic tasks of the mother based on employment status with the level of independence of children aged toddler.

METHODS

This research is a non experimental research using analytic survey research design. The type of research used in this study is cross sectional. Cross sectional research is a research to know the relation between variables where independent variable and dependent variable are identified at the same time, meaning that in cross sectional study each respondent only observed one time only and measurement of respondent variable done at the time of the research, then the researcher did not follow up (Riyanto, 2011). The population in this study were mothers with toddler age children in Tlogotunggal Village, Sumber sub district regency of Rembang amounted to 70 respondents. Sampling technique using proportioned random sampling, sampling method using slovin formula that is as many as 60 mothers with toddler age children in tlogotunggal village sumber sub district regency of rembang.

RESULT

Correlation Basic Task Of The Mother Based On The Status Of Work With The Level Of Independence Of Toddler Aged Children in tlogotunggal village sumber sub district regency of rembang
DISCUSSION

Characteristics of Respondents

1. Characteristic Picture of Respondents by Mother Age in tlogotunggal village sumber sub district regency of rembang.

Based on the results of the research shows that most respondents in tlogotunggal village sumber sub district regency of rembang is age 25-29 years with the number of 39 or 65% of 60 respondents. In line with research Dian (2015) stated that the average age of the most mothers at the age of 25-35 years as many as 34 (68.0%) of respondents who have children age toddler, age is considered age.

This is in line with research Zuhrotul (2016) mentioned that in addition to the low parent education, the age of relatively young parents ie age 20-24 years (42.2%). Age that is too young or too old will cause parenting role given by parent to be less optimal, this is because to carry out the role of parenting optimally needed physical and psychosocial strength to do it, in contrast to the mature age, more optimal parenting, physical strength and psychosocial more mature.

2. Characteristic Picture of Respondents Based on Work of Mother in tlogotunggal village sumber sub district regency of rembang.

Based on the result of the research indicate that most frequency at work mother with toddler age child in Tlogotunggal Village Sumber Rembang Regency is housewife with frequency 31 (51.7%) respondent. This is in accordance with the Central Bureau of Statistics namely the National Social Economic Survey 2013 in the urban majority of housewives 63.3% and who work 29.6%, while in rural housewives 52.7% and mothers work 41.1%.

This is in line with Indriani’s (2014) study, stating that the working status of the majority of working mothers is 55.9% or 33 respondents, while mothers who are not working 44.1% or 26 respondents, if the mother goes to work then, the child will be left with his brother And mothers will get additional for the economy, but in fact working mothers will result in less attention to the family including children, so that children will try to learn to meet the needs of his own life.

3. Characteristics of Respondents Based on Mothers with Toddler Age Children in tlogotunggal village sumber sub district regency of rembang.

Based on the result of the research shows that the lowest frequency of toddler children in Tlogotunggal Village SumberRembang is 1 year old child with frequency 13 or 21.7% and highest frequency of 3 years with frequency 29 or 48.3% from 60 toddler age children. In line with research Zuhrotul (2016) said that of 102 respondents most frequencies 3-year-old children as much as 75.5% or a number of 68 people.

Stage Autonomy vs Shame and Doubt according to Erik Erikson’s at the age of 2-3 years, children begin to look independent because the physical and psychological development is quite able to help children in running activities independently. This stage is also the development of feelings of shame and hesitation to perform activities independently, so ideally parents create a supportive atmosphere to help children develop self-control ability without losing self-esteem.

4. Characteristics Based on Gender of Children in tlogotunggal village sumber sub district regency of rembang.

Based on the results of the study showed that the frequency of most sexes of children aged toddler in in tlogotunggal village sumber sub district regency of rembang is male with frequency 33 or 55% from 60 children age toddler.
This is in accordance with research Zuhrotul (2016) showed that of the 102 respondents obtained a uniform data between boys and girls that is equal to 50% or a number of 51 people. Gender determines the degree of autonomy of the child. A boy is more in need of parental assistance in learning activities and solving problems in everyday life, which results in boys being less independent than girls. In line with Munandar's opinion (2008) the independence of girls is higher than that of boys raised by mothers working outside the home.

Main Duty of Mother Based on Job Status
The result of the research on 60 respondents shows that most of the respondents have the main duty of mother based on the status of work in good category with the amount of 42 people (70.0%), very good category with the number of 16 people (26.7%), and enough category 2 People (3.3%).

Given the magnitude of problems faced by children in the growth and development, then the role of a mother to give more attention, guidance, and more optimal supervision to their children (Nurhidayah, 2008).

Working mothers result in reduced moments of mother and childhood, so that the mental development and personality of the child can be disrupted (Mehrota 2011 in Imaniah 2013).

Level of Independence Of Toddler age Children
Based on the result of this research indicate that most of the respondents have independent self-reliance rate with 22 children (36.7%), respondent having independence level assisted with 20 children (33.3%), and children with independence level with independent Number of 18 children (30.0%).

This is in accordance with the 2011 population census in Indonesia, based on the 1-3-year age group of independent children 99.27% and non-dependent children by 0.73% (Heriawan, 2011).

The degree of independence of children is adjusted to the age and level of maturity of children, in addition to the independence of children is determined by innate factors. An independent mother gives birth to an independent child, it means that the quality of the child's independence depends on the quality of the mother's independence, the more independent the mother is, the more independent their child will be. Working moms usually have an independent nature, so that the trait can be decreased to their child. A child cared for by working mothers tends to be self-sufficient because working mothers signify independent mothers, so that self-reliance has been implanted in children by innate factors and habits (Mariyam and Apisah, 2008).

Correlation Basic Task Of The Mother Based On The Status Of Work With The Level Of Independence Of Toddler Aged Children in tlogotunggal village sumber sub district regency of rembang.
This research use statistical test of rank spearman test in get \( \rho = 0.609 \) and \( p \) value = 0.000. The result of the research shows that there is a significant correlation between the relation of mother principal task based on job status with level of independence of toddler age children in Tlogotunggal Village Sumber Rembang Regency, with \( p \) value 0.000 <0.05. It was found that the highest level of independence of children in the self-reliance category (36.7%), the level of independence of children in the category of assisted (33.3%), and the level of independence of children in self-dependent category (30.0%).

The majority of children's independence in the self-sufficiency category is due to the majority of maternal employment status in either category, so that the mother can educate children more independently. Mom will never get tired of counseling the child while at home, before the mothers go to work the various advice will surely be conveyed. The advice that mom had given without the realization of the mother, the child becomes more independent from his age.

The result of the research indicates that the status of the mother's job with the main task is to have a 1-year self-sufficient child (1.7%) due to the age of the three-year-old child with the working mother's status, giving the child freedom to do positive things, not always spoiling the children. Free time for children, always support or motivate the wishes of children, while for the level of independence children can eat, drink with a cup, wear clothes, pass urine, wear socks independently, Children want to deliver something to a neighbor with their own.

Maternal job status with good duty, but 19 (31.6%) assisted independence level, not independent 17 (28.3%) due to child age factor and closest brother supervision, most of new age of one year old children who can not eat yet, Wear clothes, defecate, pass urine independently, do not know confident, responsible, discipline, or associate.

CONCLUSION
Based on the results of research and discussion can be drawn the following conclusions:
1. This research characteristic of mothers with toddler age children in tlogotunggal village sumber sub district regency of rembang the most dominant age 25-29 years as many as 39 or 65%, job as housewife as much 31 or 51.7% and characteristic of respondent based on child age The dominant age of 3 years of 29 or 48.3% with male gender of 33 or 55%.

2. Most of the basic tasks of the mother based on employment status in tlogotunggal village sumber sub district regency of rembang in good category with the number of 42 people (70%).

3. The level of autonomy of toddlers aged children in tlogotunggal village sumber sub district regency of rembang the highest frequency of independence is self-supporting category with 22 children (36,7%).

4. There is a correlation coefficient value $p = 0.000 <0.05$, $\rho$ (Rho) = 0.609, so $H_0$ is rejected and $H_a$ is accepted, it means there is a correlation basic task of the mother based on the status of work with the level of independence of toddler aged children in tlogotunggal village sumber sub district regency of rembang.

SUGGESTION
1. For the Profession
This research is expected to increase the insights of nursing science, where this result can be used as information for nurses, especially the profession in the field of children and community nursing to provide counseling to the community about the development of children, in order to create a new generation in accordance with the age-appropriate development and provide information or knowledge on how to create Children are more independent so as not to depend on others.

2. For the Institution
The results of this study, both of high school of health Widy Husada, Puskesmas as a center of health services as a reference or scientific discourse that can be used to conduct further research relating to the level of independence of children aged toddler.

3. For the Community
For people, especially mothers with toddler age children, it is expected that the public will pay more attention to the level of independence of children every day so as not to be spoiled and not always dependent on others. Counseling the child while at home, before the mother goes to work various advice would be useful for the child, because the advice that mother had given without the realization of the mother, the child becomes more independent from his age.

4. For Further Researchers
It is expected that the next researcher can do research one of the factors that influence toddler age child besides maternal job status and using different sampling technique.

BIBLIOGRAPHY
Effects of Smoking On Differential Leucocyte Count Between Smokers And Non Smokers

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ABSTRACT

Background : Smoking is one of the global problems causing different disease. Smoking cause variation in different parameters of blood. Smoke exposure causes increasing inflammatory cytokines release from the epithelial cells. All of them can influence the growth, differentiation and activation of leucocytes.

Objective : The aim of this research was to compare the effect of smoking on differential leucocyte count between smokers and non smokers.

Method : A crosssectional comparative study was conducted in State Polytechnic of Jember. Thirty subjects which is consist of 15 smokers and 15 non smokers were included in this study. Differential leucocyte count was estimated by manually method. Independent T-test was applied for parametric data and Mann Whitney U test was applied for non parametric data, p-value less than 0.05 was considered statistically significant.

Result : Mean±SD of neutrofil for smokers was 54,87±5.3 and for non smokers was 59,8±5,9 (p=0,024; p < 0,05). Mean±SD of lymphocyte for smokers was 38,49±4,9 and for non smokers was 33,6±5,8 (p = 0,035; p < 0,05). Mean±SD of monocyte for smokers was 6,93±1.5 and for non smokers was 6,53±1,8 (p = 0,534; p > 0,05). P-value of eosinofil and basophyl for smokers and non smokers was p = 1,0; p > 0,05.

Conclusion : The study showed that the lymphocyte level of smoker group was higher than the non-smoker group.

Keywords : smokers, differential leucocyte count

INTRODUCTION

Smoking is one of the global problems causing many disease. Smoking is a risk factor for many chronic diseases, including cardiovascular, respiratory, gastrointestinal diseases, variety of cancers and the other diseases1,2. Indonesia is one of largest number of active smokers in the world after China and India3,4. According data of the Global Adult Tobacco Survey (GATS) 20115 about 59.9 million adults in Indonesia are smokers. Smoking behavior of the population increase from 34.2% in 2007 to 36.3% in 2013. The prevalence of smokers in East Java is high, that is 23.9%, with the average number of cigarettes smoked 11.5 per day6,14.

More than 4000 substances of gases or particles have been identified from cigarette smoke7,15. These chemicals are generally toxic, carcinogenic and addictive for human body7. Cigarette smoke contains many oxidants and free radicals that cause damage to lipids, proteins, DNA, carbohydrates and other bio-molecules8,22. Each puff of tobacco contains approximately 1014 oxidant molecules in the tar phase and approximately 1015 in the gas phase including oxygen and nitrogen derived free radicals8.

Free radical and oxidants on cigarette can cause variation in different parameters of blood24,25. Its characterized by increase of erythrocytes, leukocytes, platelets numbers and hemoglobin level in the blood9,16,17,18. Exposure to free radical and oxidants causes increased release of inflammatory cytokines from the epithelial cells. All of them can influence the growth, differentiation and activation of leucocytes (i.e., neutrophils, macrophages, lymphocytes, and dendritic cells) in many ways, including through continual exposure to oxidative stressors10,11,23. Exposure free radicals such as those contained in cigarette smoke causes an increase the number of circulating cytokines such as interleukin (IL)-6, IL-1β, and granulocyte macrophage colony stimulating factor (GM-CSF). IL-6 is a proinflammatory cytokine responsible for the exclusion of neutrophils, monocytes, eosinophils, and basophils. Increasing the number of these cytokines will also affect hematopoiesis. Increased GM-CSF affects the number of neutrophils, eosinophils, and erythrocytes24,25.
Nevertheless, there are a few studies about the effect of smoking on changed differential leukocyte count. The aims of this research is to compare the effect of cigarette smoking differential leucocyte count between smokers and non smokers.

METHODS
This study was comparative crosssectional study which purposive sampling technique. The location of this study in State Polytechnic of Jember. The duration of the study was two months from April 2017 to Mei 2017. Total of 30 sample size which compromised of 15 smokers and 15 non smokers were included the study. All were apparently healthy male subjects between the age group of 25-35 years. Laboratory tests of differential leucocyte count were performed in Prosenda Laboratory Clinic. Differential leucocyte count was estimated by manually method. Venous blood was collected by venipuncture. The participants were informed about research and those who were willing to participate were included in the study, written consent was taken from the subjects. Data were entered in MS Excel 2010 and consequently analysed by using statistical software SPSS 22. Independent T- test was applied for parametric data and Mann Whitney U test was applied for non parametric data, p-value less than 0.05 was considered statistically significant at 95% confidence intervals

RESULTS
The effect of smoking was assessed on the peripheral differential leukocyte count in healthy male smokers and the data was compared with non-smokers. The normality test used shapiro wilk test showed that the eosinophil were not normally distributed. While the neutrophil, monocytes and lymphocytes showed normally distributed. The basophil can not be analyzed because there is no basophil cell in both of groups.

Table 1. Differential Leucocyte Count, (N=30)

<table>
<thead>
<tr>
<th>Differential Leucocyte Count</th>
<th>Mean ±SD</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lymphocyte</td>
<td>38±1,3</td>
<td>33,6±1,5</td>
</tr>
<tr>
<td>Neutrophil</td>
<td>54,87±1,4</td>
<td>59,8±1,5</td>
</tr>
<tr>
<td>Monocyte</td>
<td>6,9±0,4</td>
<td>6,5±0,5</td>
</tr>
<tr>
<td>Eosinophil</td>
<td>0,2 ±0,1</td>
<td>0,2 ±0,1</td>
</tr>
</tbody>
</table>

*Independent T – Test p < 0,05
**Mann Whitney U p < 0,05

The result of differential leukocytes count (i.e. Lymphocyte, Neutrophil, Monocyte, Basophil and Eosinophil) both of groups were in the normal range. Nevertheless, the lymphocyte count for the smoker group and non smoker group was 38±1.3 and 33,6±1,5 respectively. The ‘p’ value was < 0,035 which was of statistically significance. The lymphocyte shows a definite increase in smokers when compared to non-smokers. The neutrophil count in non smoker group was higher than smoker group with p value 0,024 which was statistically significance (Table 1). The monocyte count for smokers was 6,93±1.5 and non smokers was 6,53±1,8 with p value 0,534 which was statistically no significance, but the number of monocyte was increase in smoker when compare to non-smoker. The p value of eosinophil was 1 which was statistically no significance (Table 1).

DISCUSSION
Cigarette smoke increases the total peripheral leukocyte count, but the effect on differential leukocyte count in the peripheral blood is unexplored. Therefore, it was necessary to investigate it. In other study, we observed that all of the different leukocyte subsets within the normal range. The lymphocyte count in the smokers group was higher than the non-smokers group, but the neutrophil count was higher in the non-smokers group than the smoker group.

Neutrophil count was significantly decrease and the Lymphocyte count was significantly increase in smoker group. This results is correlated with previous study by Taylor and Gross et al12 and Jain et al10. The increased in lymphocyte count might be due to residual chronic inflammation of respiratory tract.10,21 The inflammatory reaction caused by the cigarette smoke in the bronchial airway thus altere immune cells (lymphocyte, neutrophil and monocytes) also go with related researches10,11,13. Increasing lymphocyte count might cause the decrease of neutrophil count, it was relatively decreased of differential leucocyte count. Nicotine might be induced the release of catecholamine’s, steroid hormones and chronic
inflammation of respiratory tract. The other possible explanation was the increase of secretion IL-6 induced by free radical in cigarette smoke, as known IL-6 affect to hematopoiesis (GM-CSF). For the future study, we have planned to assess these free radical and oxidant levels in smokers which will show the definite relationship between the lymphocyte and cigarette smoke.

CONCLUSION

The study showed that the lymphocyte level of smoker group was higher than the non-smoker group, that is indicating an inflammatory reaction caused by the cigarette smoke.

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REFERENCES

2. The Centers for Disease Control and Prevention (CDC), 2013. CDC in Indonesia Fact Sheet. Atlanta.
12. Taylor RG, Joyce H, Gross E, Holland F, Pride NB. Bronchial reactivity to inhaled histamine and annual rate of decline in FEV1 in male smokers and exsmokers Thorax. 1985 Jan;40(1):9–16
20. Rahfiludin, MZ and Ginandjar, P. 2013. There was no difference in immune response of heavy smokers and mild smokers due to


Effects of Pilates Exercise on Anthropometry of The Obese Adolescents

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ABSTRACT

Background: Lack of physical activity and the abundance of essential nutrients may lead to obesity that affects an increased of Body Mass Index (BMI). This condition may cause various diseases. Pilates is a light intensity exercise which can be performed by obese teenagers. This study aims to examine the effect of pilates exercise on anthropometry of the obese adolescents represented by BMI.

Material and Methods: It was a Randomized controlled pre and post experimental trial. The inclusion criteria are adolescents aged 15-18 years old at the time of the study, meets category Obesity according to the WHO Growth Chart (adult BMI ≥ 30.2 yo – 18 yo BMI ≥ persentil 95), filling informed consent to participate in research, and able to understand instruction. The exclusion criteria are abnormalities of the limbs or spine, severe musculoskeletal pain complaints, history of surgery or fracture at lower limbs, on medication with benzodiazipines, antihypertensives (vasodilation), aminoglycoside antibiotics, chemotherapy, severe visual impairment, participating in another physical activity and balance training (yoga, martial arts, etc.) at least 3 times per week which is still ongoing until the time of the study. Thirty students, obesity adolescents of SMKN 04 Semarang City, become participant.

Intervention: Subjects were randomly divided into two different groups. The control group were doing daily activities as usual, and the intervention group underwent pilates exercise. The exercise was held two times a week for six weeks.

Result: Both groups showed improvement in BMI throughout the study period. In the control group, there was a decrease in BMI (p = 0.165) but not statistically significant. For the treatment group, there was a statistically significant decrease in BMI (p = 0.001) between pre and post treatment. The decline of BMI in the treatment group was better than the control group but was not statistically significant (p = 0.954).

Conclusion: Pilates exercise may help improve anthropometry of the obese adolescents represented by BMI.

Keywords: Pilates exercise, anthropometry, Body Mass Index (BMI).

INTRODUCTION

During the past two decades, the prevalence of overweight and obesity in children has increased worldwide. Historically, a fat child meant a healthy child, and the concept of ‘bigger is better’ was widely accepted by paediatricians and caretakers. In recent years, however, this perception has drastically changed as we have learnt that obesity in childhood causes a wide range of serious complications and increases the risk of premature illness and death later in life.¹,²

Obesity is starting to become a worldwide health problem. According to the World Health Organization (WHO), there will be about 2.3 billion overweight people aged 15 years and above, and over 700 million obese people worldwide in 2015. Today, about one in five school-aged children (ages 6–19) has obesity. Twenty five percent of children in the US are overweight and 11% are obese. About 70% of obese adolescents grow up to become obese adults. Although a few developed countries such as the United Kingdom and Germany experienced a drop in the prevalence rate of obesity in the past decade, the prevalence of obesity continues to rise in many parts of the world, especially in the Asia Pacific region.³,⁴

The results of Indonesia’s Basic Health Research (RIKESDAS) in 2013 show that the problem of obesity in children aged 16-18 years is 7.3 %, consisting of overweight (5.7%), and obesity (1.6%). Central Java is included in one of fifteen provinces with prevalence of obesity above national prevalence with prevalence of overweight 5.9% and obesity 1.8%. In Central Java, especially in 2010, the prevalence of obesity in aged-school children 6-12 years was...
higher than the national prevalence of 10.9%. The results of this study also proves that the increase in national prevalence of excess body weight, because in 2007 only 1.4%, while in 2013 increase to 7.3%.  

Assessing child overweight and obesity is not as straightforward as it may seem, but there is now consensus that indicators based on weight and height measurements, such as weight-for-height or BMI (ie, weight (kg)/height (m)^2) as one of anthropometric parameter, should be used for clinical practice and epidemiological studies to classify child body weight status. BMI is easy to determine and has been considered as the gold standard for defining overweight and obesity, and has been correlated with percentage body fat.  

Obesity is one of the factors that inhibits physical activity, and causes low levels of physical activity and leads to lower cardiorespiratory fitness. Regular physical activity has been associated with a reduced risk of obesity among adolescents, there is a need to find innovative ways to increase their physical activity. Pilates is a series of low impact muscle contraction exercises. Pilates is a form of physical fitness exercise introduced by Joseph Pilates (1880-1967) in the early 20th century. Pilates designed a comprehensive method of muscle stretching and strengthening with the goal of building a strong body under the philosophy of mind-over-body control that calls "contrology". According to Lange et al. (2000), Pilates exercises provides benefits in physiological (e.g., resistance, strength, muscle power), psychological (e.g., mood, attention, motivation), and motor functions (balance, static and dynamic posture, general coordination). In a survey by von Sperling and Brum (2006), 18.4% of the subjects believed that regular practice of the Pilates method would increase lean mass and thus muscle tone. However, published scientific evidence on the effects of Pilates exercises on BMI are scarce.  

**OBJECTIVE**

To examine the effectiveness of Pilates exercise on anthropometry of the obese adolescents aged 15-18 years old represented by BMI.

**METHODS**

This study was a randomized controlled pre and post experimental trial conducted at SMKN 4 Semarang, Indonesia from October until November 2015. The total number of subjects were 30 adolescents who met the obesity category according to the WHO Growth Chart (adult BMI ≥ 30.2 yo – 18 yo BMI ≥ percentile 95) aged 15-18 years, at the time of the study, filling informed consent to participate in research, and able to understand the instruction of pilates exercise. Each subject that met the study criteria was included in the study sample. The exclusion criteria are abnormalities of the limbs or spine, severe musculoskeletal pain complaints, history of surgery or fracture at lower limbs, on medication with benzodiazepines, antihypertensives (vasodilation), aminoglycoside antibiotics, chemotherapy, severe visual impairment, participating in another physical activity and balance training (yoga, martial arts, etc.) at least 3 times per week which is still ongoing until the time of the study. All subjects were selected by a simple random sampling.

All participants were required to complete the entire intervention program. Subjects who attended the training < 80% or < 10 times of a total 12 times of practice, subjects who missed exercise 3 consecutive times during the exercise period, or absence during evaluation was considered drop out. This study was approved by the Ethics Committee of the Medical Faculty Diponegoro University/Kariadi Hospital Semarang, Central Java, Indonesia. All subjects has been fulfilled an informed consent prior to their participation.

The subjects were randomly divided into experimental and control groups. The experimental group was given a pilates exercise program, two times a week for 6 weeks while the control group performed daily activities as usual. Before the intervention was given 5 minutes warm up and after intervention was given 5 minute cooling down. BMI value was assessed before treatment and at the end of 6th week of treatment. There was no drop out, so the data which analyzed as a whole is 30 subjects.

**Anthropometric measurements:**

Weight and height were measured using standard procedures. Weight was measured to the nearest 0.1 kg using an electronic portable scale (Seca). To ensure accuracy the scale was checked for zero reading before each weighing and calibrated with a known weight on the morning of each data collection. Student height was measured, in the standing position without shoes and socks, to the nearest 0.1 cm using a portable stadiometer attached to the Seca weighing scale. From these measurements the BMI (weight in kilograms divided by height in meters squared) was computed. Overweight was defined as BMI 85th to < 95th percentile for age and obesity as BMI ≥ 95th percentile for age.
according to World Health Organization criteria.\textsuperscript{14,15}

Homogeneity test is done first on the characteristics of the subject. The Saphiro-Wilk test was used to determine the normality of the data. For data with a normal distribution, unpaired t-test was used to determine the significance difference of mean of BMI value change between experimental group and control group, for data with abnormal distribution was used Mann-Whitney test. To analyze the difference of mean of BMI value before and after intervention in each group, paired t-test was used if normal distribution or Wilcoxon test if abnormal distribution. SPSS® version 16.0 software was used for all statistical analyses. The level of confidence was chosen as 95 % (p < 0.05).

**RESULTS**

Research subjects were adolescents aged 15-18 years old with obesity in High School of SMKN 4 Semarang, Central Java, Indonesia who met inclusion and exclusion criteria and completed the exercise program for 12 times. The total number of research subjects were 30 children with simple randomized group division. The subjects were randomly divided into experimental and control groups. The experimental groups which given Pilates exercise was 15 children and control group was 15 children. There was no drop out, so the data analyzed as a whole was 30 children. Figure 1 shows the flowchart of this study. The basic characteristics of subjects of the study are shown in Table 1. No statistically significant differences between the groups were found in the physical characteristics at baseline.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Intervention Groups (n=15)</th>
<th>Control Groups (n=15)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>17.20 ± 0.94</td>
<td>16.87 ± 0.91</td>
<td>0.323\textsuperscript{v}</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Male</td>
<td>13 (86.7%)</td>
<td>13 (86.7%)</td>
<td>1.000\textsuperscript{£}</td>
</tr>
<tr>
<td>- Female</td>
<td>2 (13.3%)</td>
<td>2 (13.3%)</td>
<td></td>
</tr>
<tr>
<td>Physical Activity in 24 hours (kкал)</td>
<td>1.47 ± 0.02</td>
<td>1.52 ± 0.02</td>
<td>0.145\textsuperscript{§}</td>
</tr>
</tbody>
</table>

\textsuperscript{v}Mann Whitney test; \textsuperscript{£}Pearson chi square; \textsuperscript{§}independent t-test

Data of BMI value as the results of the preand post-treatment and Δ BMI at the end of the period after 6 weeks of treatment were shown in Table 2. Both groups showed improvement in BMI throughout the study period. In the control group, there was a decrease in BMI (p = 0.165) but not statistically significant between pre and post treatment. For the treatment group, there was a statistically significant decrease in BMI (p = 0.001) between pre and post treatment. The decline of BMI in the treatment group was better than the control group but was not statistically significant (p = 0.954).

**Table 2. Comparison and difference of BMI value in intervention and control group.**

<table>
<thead>
<tr>
<th>BMI</th>
<th>Intervention Group n=15</th>
<th>Control Group n=15</th>
<th>Statistic Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre intervention</td>
<td>32.56 ± 2.75</td>
<td>32.62 ± 3.00</td>
<td>P=0.724\textsuperscript{a}</td>
</tr>
<tr>
<td>Post intervention</td>
<td>32.20 ± 2.78</td>
<td>32.50 ± 2.96</td>
<td>P=0.954\textsuperscript{d}</td>
</tr>
<tr>
<td>Δ BMI</td>
<td>0.36 ± 0.03</td>
<td>0.12 ± 1.34</td>
<td>P=0.954\textsuperscript{d}</td>
</tr>
</tbody>
</table>

Index: \* Significant p < 0.05; \textsuperscript{a}Independent t-test; \textsuperscript{b} Paired test; \textsuperscript{c}Wilcoxon test \textsuperscript{d}Mann Whitney

Δ BMI = change of mean score of Body Mass Index between pre & post intervention.
DISCUSSION

In this study, the subjects of both the intervention and control groups was 15 adolescents. All subjects were able to complete, so the total of all subjects in this study was 30 people. There were no significant differences between the two groups in the characteristics of the subjects such as age, sex, and physical activity. Thus these variables do not affect the difference of the results of this study.

In the treatment group administered by the pilates exercise program, there was a significant difference between the BMI levels before treatment and the end of 6th week (p=0.001). This shows that there is an improvement in the anthropometry parameter represent by BMI of obesity adolescents. But, there was no significant difference between both treatment group and control group after the treatment (p=0.954). This may be due to the duration of pilates exercise was too short only 20 minutes including warm up and cooling down. According to Olson et al. (2004), completion of 30-45 minutes pilates mat exercise program elicited sufficient stimuli to induce positive changes in energy expenditure (EE) in kilojoules per minute (kJ/min) to reduce BMI. Therefore, Pilates studies where BMI did not change might have not provided sufficient training stimuli (Segal et al., 2004).

The finding in this study was similar with Russel Jago at all (2005). They found that pilates exercise for 4 weeks lowered the BMI percentile of 10- to 12-years-old girls. Although there is a small reduction in the BMI percentile, they hypothesized that the pilates exercises was not an aerobic activity a more intense intervention might further enhance the potential to affect the BMI percentile of the heavier girls.

This study also consider two confounding variables that may affect the results of the study, such as the physical activity level and food intake. After analysis, it was proven that during the study period in both groups there was no change of physical activity pattern and food intake.
intake. These two confounding variables are important to be considered because they will affect the BMI changes.

The limitation of this study is that a lack of control in the nutritional status of the experimental subjects. Research has shown that changes in BMI are better accomplished with the combined effects of Energy Expenditure (i.e., exercise) and a reduction in energy intake (i.e., diet). Therefore, it makes sense to control for the nutritional status of participants performing Pilates exercise aimed to achieve changes in BMI (Jakicic et al., 2001).

CONCLUSION

Although there was no significant difference between the treatment group and the control group on changes in BMI after treatment (p = 0.954), the pilates exercises decreased significant BMI levels in the treatment group before and after the experiment (p = 0.001). So it can be concluded that pilates exercise may improve anthropometry of obese adolescents represented by the decline of BMI.

REFERENCES
Article Review: *Is Simple Ulnar Nerve Decompression Simple?*

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ABSTRACT
Introduction: Cubital tunnel syndrome is the second most common entrapment neuropathy of the upper limb. The minimally invasive operation techniques for Cubital Tunnel Syndrome is increasing and more data support the safety, efficiency and morbidity of this procedure. There are two major surgical approaches: Simple Decompression on Elbow, and Transposition of the ulnar nerve. Although many of the operating techniques have been introduced, none of these techniques have been shown to be superior. The purpose of this article is to provide a broader overview of existing modifications on simple ulnar nerve decompression so that decision-making can be more accurate.

Method: We systematically searched Medline (PubMed) databases using the following keywords: ‘simple ulnar nerve decompression’ and being published in the last 5 years. Ten studies were included in this review.

Result: Symptomatic improvement was observed as a positive result of these simple ulnar nerve decompression techniques. There was complete sensory recovery in 60% of severe cases. The addition of the transposition technique is added with modified simple decompression simply decrease intraneural pressure on elbow site.

Conclusion: Modified simple decompression and simple ulnar nerve decompression techniques are encountered in the form of long incision lines, extensions to other compression areas and additions with other decompression techniques. Each has its own advantages and indications, the choice of technique ultimately depends on the operator’s level of proficiency as it all shows good result and not simple as it said.

Keywords: ulnar neuropathy, simple decompression, modified

INTRODUCTION

Ulnar nerve compression is the second most common nerve entrapment of the upper extremity after carpal tunnel syndrome. Although the incidence of cubital tunnel has not been well reported, it is estimated to be around 1% in United States. Nerves may be injured anywhere along their course, peripheral nerve compression or entrapment occurs more at specific locations, such as sites where a nerve courses through fibroosseous or fibromuscular tunnels or penetrates muscles. Ulnar nerve can be entrapped at multiple sites of the upper extremity, from the cervical nerve roots C8/T1 and brachial plexus to more distal sites at the elbow, forearm and wrist. Elbow entrapment is seen most commonly and has been referred to as the tardy ulnar nerve palsy in the past. ‘Cubital tunnel syndrome’ is the term introduced by Feindel and Stratford in 1958 because of its similarity to carpal tunnel syndrome.

It is categorized into two major etiologies, namely primary or idiopathic, and secondary or symptomatic. The idiopathic form is characterized by the absence of bone or nerve structural abnormalities, congenital abnormalities such as cubitus valgus, ulnar nerve luxation, presence of the anconeus epitrochlearis muscle, or deformities of the medial head of the triceps muscle, can be documented. And secondary or symptomatic form can be characterized by external trauma, pressure, bony impingement, , medial epicondyle, degenerative or inflammatory diseases, metabolic or nutritional disorders.

CLINICAL FEATURES

The diagnosis of cubital tunnel syndrome requires a careful examination and history of illness. Symptoms are typically a combination of numbness, weakness, and paresthesias in the ulnar nerve distribution. The most common presenting symptoms include numbness in the ring and little fingers, weakness of grip, hand clumsiness, atrophy of the hand muscles, and elbow discomfort. In most patients, sensory complaints precede motor deficits. Paresthesias present early in the disease and progress to
motor dysfunction as the compression of the nerve becomes more severe and chronic. The patients’ preoperative clinical manifestations were determined with Dellon’s staging system (as seen in Table 1).

<table>
<thead>
<tr>
<th>Table 1. Dellon's classification of cubital tunnel syndrome</th>
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<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Sensory</td>
</tr>
<tr>
<td></td>
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<tr>
<td>Motor</td>
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</tbody>
</table>

The initial examination should assess vibratory and light touch sensation in the ulnar distribution. More severe cases can also show abnormal 2-point discrimination. The examiner may also find positive Wartenberg and Froment signs in more advanced cases. A Tinel sign which is commonly associated with cubital tunnel syndrome and up to 24% of asymptomatic individuals may manifest a positive finding, has a 98% negative predictive value. A Scratch collapse test has a sensitivity of 69% and an accuracy of 89%. Hand diagram for patient is often used to help portray the involvement of the sensory ulnar nerve distribution to the examiner. Many diagnostic studies are also helpful in confirming the suspected diagnosis and can also rule out specific causes of cubital tunnel compression. But the choice still upon on local availability. Electrophysiology is considered valuable to rule out other possibilities in the differential diagnosis. Plain X-rays should be obtained to look for degenerative changes of the cervical spine and elbow, as well as bony compression from spurs or previous fractures and useful if there is concern about a neck, chest, or elbow osseous abnormality. MRI findings of cubital tunnel syndrome are enlargement and hyperintense signal just proximal to the cubital tunnel, and a caliber change with flattening distally. Mild enlargement and edema of the ulnar nerve at the medial epicondyle can be seen in asymptomatic individuals on MRI. Tests of MCV motor conduction velocity (MCV) at different sites along the ulnar nerve are very helpful in diagnosing cubital tunnel syndromes. Normal value of MCV measured by from proximal to the elbow to the level of wrist has been reported to be 61.4±6.5 m/s. MCVs that are decreased by more than 33% or 10 m/s in above the elbow to below the elbow segment compared with the below the elbow to wrist segment are considered significant and suggestive of cubital tunnel syndrome. Clinical evaluation is paramount in the diagnosis of cubital tunnel syndrome because electrodiagnostic testing is not adequately sensitive to detect changes associated with the syndrome.

TREATMENT

Conservative, nonsurgical treatments should be tried initially as they are effective in relie of the symptoms in up to 50% of the cases. Nonsurgical treatment should be tried for at least 3 months before surgical intervention, especially in mild cases. The goals at this stage of treatment are to decrease both the severity and frequency of symptoms as well as to prevent disease progression. Patients meeting surgical indications and failing nonoperative management are then considered for surgery.

The evolution of the surgical treatment of cubital tunnel can be analyzed through the various technique periods of decompression. The first period (1816–1897), ulnar compression as a clinical entity was described and the first report of a surgical treatment was published. The second period (1898–1959) was characterized by the description of all known surgical treatments. In the most recent period (1960–present), new techniques have not been developed, but evaluation of the results obtained with various treatments has been attempted.

There are two major surgical approaches: Simple Decompression on Elbow, and Transposition of the ulnar nerve. Although many of the operating techniques have been introduced, none of these techniques have been shown to be superior. And as many other authors discussed, all surgical techniques show similar success rate, but above all the most simple is need to be done. Caution to avoid iatrogenic injury to the medial antebrachial cutaneous nerve, avoiding new points of compression during transposition, and preventing destabilization of the nerve and the associated recurrence of entrapment are all paramount to success. And the role of surgeon experience, skill in performing cubital tunnel decompression can be
a potential contributor to variations in outcomes to compare between studies.\textsuperscript{10}

**SIMPLE DECOMPRESSION**

Simple decompression also known as insitu decompression called so because it is simple and easy to perform.\textsuperscript{2} Although simple "liberation of the ulnar nerve" was performed as early as 1878, British surgeon Geoffrey Osborne would be the first to gain significant support for simple decompression of the nerve by dividing the eponymous ligament.\textsuperscript{5}

First type of surgical treatment is simple decompression, by either open or endoscopic release of the Osborne's band. For many surgeons, the treatment algorithm often begins with in situ release, followed by subcutaneous or submuscular transposition if perching or subluxation is noted during surgery.\textsuperscript{10} Advantages of simple decompression is the low complication rate. In contrast to other methods, in situ decompression avoids damage to the vascular supply of the nerve. The operation is less traumatic to the patient and requires minimal or no postoperative immobilization. The other advantages of the modified in situ technique include the ability to release the ulnar nerve in areas of compression with minimal disturbance of the blood supply and addresses primary focus to the lesion. This procedure avoids subluxation of the ulnar nerve, which may lead to recurrence of symptoms secondary to repeated contusion of the nerve as it snaps over the medial epicondyle. Disadvantages include limited decompression and possibly missing compression at other sites. Simple decompression, however, is not appropriate in a poor bed, severe cubitus valgus, or a subluxing nerve.\textsuperscript{1,3,10} This is surgical treatment reserved for mild cases, with recent onset of symptoms and mild sensory changes on the nerve studies.\textsuperscript{1}

Surgical procedure for conventional simple deroofing of the ulnar nerve is needed for a relatively long incision, about 6-8 cm above and below the elbow. (shown in fig 1)\textsuperscript{8} But since the term *minimally invasive surgery* was first coined by Wickham in 1987, the length of surgical incisions and the extent of soft tissue dissection continue to decrease. The incision is designed as a 1.5- to 3.0-cm longitudinal or transverse skin incision marked at the midpoint between the medial epicondyle and the olecranon. (shown in fig 2)\textsuperscript{2,5} And further more for endoscopic technique using a small 1-cm to 3-cm skin incision was made at the cubital tunnel to serve as a portal for the USE (Universal Subcutaneous Endoscope) system.\textsuperscript{7} Different incision lines provide clues to the use of simple decompression techniques to be used. This consideration is inseparable from the various etiologies, indications and results of the investigation obtained. In simple decompression incision lines will always be done on the cubital tunnel. The differences will begin to appear at the time the incision becomes progressively deeper into the various fascia and the ulnar nerve has been identified. Then the addition of actions such as anterior transposition, epicondylectomy, or use of endoscopic devices. The addition of this action is carried out with various considerations such as the prevention of subluxation on the leprosy patient then the addition of anterior transposition, or to obtain the result of a smaller intraoperative intraneural pressure added anterior action transposition or other specific etiology.\textsuperscript{6,8}

![Fig1. Shown a small 1,-3cm incision line made for minimal insicion ulnar nerve decompression](image)

Study by joshua adkinson et all on tren in surgical treatmant for ulnar nerve decompresion, surgeon case volume was the factor most strongly associated with the use of a particular procedure. Specifically, we found that surgeons with the highest volume of cubital tunnel syndrome cases were significantly more likely to use in-situ release. One may surmise that surgeons with a high volume of cubital tunnel syndrome patients would be increasingly aware of the expanding role and established effectiveness of in-situ release.
The other technique is transposition of the nerve. It is so called because of there are transfer of the ulnar nerve from its original position to a safer place of friction. The primary different of an anterior transposition is that it is more technically demanding than a simple ulnar nerve decompression. This technique is preceded by the same incision line as a conventional simple decompression technique but ultimately require an extension of the incision line of approximately 15 cm above the cubital tunnel area, making this technique a more invasive technique. Because by making a large incision line it will increase the risk of scarring, injury to vascular, longer healing period and longer immobilization. The risk of complications is increased when the nerve is moved from its natural bed, and there is a potential for devascularization of the ulnar nerve. There are three types of anterior transposition, as follows: Subcutaneous, Intramuscular, Submuscular it depends on kind of flap that operator use. However, considering the 7% reported postoperative persistent symptoms rate following in situ decompression that consequently requires secondary anterior submuscular transposition, release only at the cubital tunnel is not always sufficient for all disorders clinically diagnosed as cubital tunnel syndrome. Even in some study the intraneural pressure will decrease to 0 mmHg by adding anterior transposition after simple decompression.

Minimally invasive approaches for the treatment of cubital tunnel syndrome are becoming increasingly common place as evidence supporting the safety, efficacy, and lower relative morbidity of these procedures accumulates. There are many potential reasons why surgeons have returned to performing the less invasive in situ release. It is possible that the etiology of cubital tunnel syndrome has evolved from posttraumatic and cubitus valgus deformity to idiopathic causes. But perhaps more important than the choice of technique are surgical precision and avoidance of complications.

**COMPLICATION**

Even though it is said simple but every technique can give its respective complications. Complications can not be avoided because any form of surgery is an invasive action it can only be reduce. However, with minimal techniques, complications such as minimal scarring, iatrogenoc injury to the ulnar nerve, vascular disorders, and even all disadvantage due to limitations of this technique stil can be a complication of simple decompression action. Even in the endoscopic action will also give complications like injury to posterior branch of the medial antebrachial cutaneous nerve is a common complication especially during endoscopic procedures. This injury can present as painful scar or hyperesthesia in the medial forearm. Persistent symptoms of cubital tunnel syndrome are often present due to incomplete release of the ulnar nerve or postoperative scarring. All actions at the time of operation, will be evaluated with Bishop score criteria (as seen in table 2). This can be used as a reference of quantitative assessment of the achievement of the results of surgery action. Every complications that have occurred will certainly reduce the score on the criteria Bishop.
CONCLUSION

So the term of simple decompression is not simple as it said, it can consist with additional techniques, various instruments in use and the complication can be complex too. Simple decompression is more precisely said in situ decompression or basic decompression. Because all the decompression techniques always start in the same incision line at the same site and basic goal is deroofing the tunnel. Due to the result of any decompression which shows good result compared to conservative although it has not shown superiority among all the techniques, but according to the author's consideration in general case of tunnel syndrome can be selected in situ decompression technique this because it is easier to do so easy to learn operator, minimal complication because minimal operating area. However, etiology still provides important clues in the selection of certain techniques beyond in situ decompression.

REFERENCES

5. Tsubone T et all  Simple Decompression Of The Ulnar Nerve For Cubital Tunnel Syndrome Is Enough? Poster No. 163. 56th Annual Meeting of the Orthopaedic Research Society
Compliance of Iron Supplementation, Prevalence And Determinant of Anemia In Pregnant Women

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ABSTRACT

Introduction: Iron deficiency anemia in pregnancy is associated with low birth weight, preterm birth and increasing risk of maternal and infant death. In Indonesia, iron tablet supplementation program for pregnant women has been already running and performed during antenatal care (ANC) visits, but the prevalence of anemia remains high. This study is aimed to identify the prevalence of anemia and compliance of iron supplementation, and to analyze factors related to anemia in pregnant women.

Methods: Cross sectional study was held on September-November 2016 in the work area of Rowosari Public Health Center, Semarang. Participants were 22-40 weeks pregnancy women. Data collection was done by measuring hemoglobin concentration with Hemocue and interview using questionnaire. Statistical analyses with 95% confidence intervals were considered to be significant if p<0.05 and 95% CI of OR did not pass 1.

Results: Among the 90 participants, the prevalence of anemia was 31.1%. Compliance rate of iron consumption were 71.1% (47.8% strictly compliant and 23.3% partial compliant). Bivariate analysis results showed partial compliant (OR = 8.67 (95% CI = 1.05-71.69), p = 0.03) and parity (OR = 10.17 (95% CI = 1.09-95.65); p = 0.03) as anemia risk factor. Education level, knowledge, gestational age, ANC visit, gestational age and income level were not associated with anemia.

Conclusion: There are significant association between compliance of iron supplementation and parity with anemia in pregnant women. The government needs to improve compliance of iron supplementation by involving family and community empowerment to reduce prevalence of anemia.

Keywords: Anemia, pregnancy, iron supplementation, compliance

INTRODUCTION

Anemia is the lack of the number of red blood cells. WHO defines anemia if blood hemoglobin levels <12 g/dL in non-pregnant women and <11 g/dl in pregnant women. Globally, the prevalence of anemia in children is 42.6%, in pregnant women by 38.2%, in non-pregnant women by 29%. In Indonesia, the prevalence of anemia among pregnant women aged 15-49 years is 30% which hemoglobin concentration <11 g/dl and 0.5% which hemoglobin concentration >7 g/dl.

Multiple factors like sociodemographic, economic, education, nutritional, and health related factors can cause anemia in pregnant women. Factors associated with anemia from previous studies were parity, wealth index, taking iron supplementation during pregnancy.

Anemia may result from a number of causes, in which approximately 50% of cases of anemia are considered to be due to iron deficiency. Iron deficiency anemia in pregnancy can be associated with low birth weight, preterm delivery, and increased risk of maternal and perinatal mortality.

Iron and folic acid supplementation in pregnant women is the most common strategy in reducing iron deficiency anemia during pregnancy especially in developing countries. Iron supplementation can reduce the risk of anemia in pregnant woman by 70% and decrease iron deficiency by 57%. Iron tablet consumption is associated with pregnant women’s awareness and compliance.

Study from Indonesia Health and Demographic Survey data in pregnant women in the last five years (2002-2007) showed only 21% of pregnant women consume iron tablets according to minimum amount of 180 tablets as WHO recommended. One of the possible reasons for pregnant women do not consume according recommendation is their uncompliance. This data has a weakness of having no information about the amount of iron tablets received in pregnant women and the source of iron tablets received. The prevalence of anemia in pregnancy in Semarang city from previous study is still high by 48.7%. There is no recent study about
anemia and factors associated with anemia in Semarang. The aim of this study is to identify the prevalence of anemia and compliance of iron supplementation, and to assess factors related to anemia in pregnant women in the work area of Rowosari Public Health Center, Semarang City.

MATERIAL AND METHODS
This study was an observational study with cross-sectional design in the work area of Rowosari Public Health Center, Tembalang Sub-district, Semarang City. Areas were Rowosari, Meteseh, Bulusan, Tembalang and Kramas villages. The study was conducted in September-November 2016. The number of participants were all pregnant women (n=90) in 5 villages by criteria 20-40 weeks gestational age and could communicate well and approved participate the study by inform consent.

Dependent variable was anemia defined decreasing blood hemoglobin concentration <11 g/dl during pregnancy and measured by Hemocue. Categorization of anemia according to WHO criteria was categorized into 3 criteria: severe (haemoglobin level <7 g/dl), moderate (haemoglobin level 7-9.9 g/dl) and mild anemia (haemoglobin level 10-10.9). Independent variables included compliance of iron tablet consumption, age, education, income level, knowledge, frequency of antenatal care visit, parity, and gestational age.

In Indonesia, iron supplementation is the supplementation of iron and folic acid in the form of tablets, each tablet of 60 mg elemental iron in the form of Ferro Sulfate, Ferro Fumarate, or Ferro Gluconate and 0.4 mg folic acid. Compliance in consuming iron tablets is the obedience of pregnant women to do health worker advice (midwife, doctor, obstetric) to consume iron tablets. Compliance was measured by the accuracy of the amount of tablets consumed and the procedure consuming the tablet. Compliance of participants in consuming iron supplementation divided into three categories. Participants who reported regular consumption (once daily) for 90 days of pregnancy and not missing any dose per week and consume iron tablet by using water were considered as strictly complying with iron supplementation guidelines. Participant was considered partially compliant if pregnant women consumed 90 iron supplementation irregularly and consumed iron tablet with tea, coffee. Category of non-compliant participant were defined as not consume iron tablets any, or take iron tablets <90 tablets.

Data collection was done by measuring hemoglobin concentration by Hemocue and independents variables was collected by interview with questionnaire. The researcher used chi square statistic test for bivariate analysis.

RESULTS
a. Characteristic of participants
Results of this study are shown in tables 1-3. Table 1 showed the majority of participants were aged >30 years. A half of all participants were senior high school educated. More than half (67.8%) of the study participants had no working, but had more income than regional minimum wage in Semarang City (> Rp 1.909.000, -).
Table 1. The characteristic of participants in the work area of Rowosari PHC, Semarang, 2016

<table>
<thead>
<tr>
<th>Variable</th>
<th>n (90)</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;20</td>
<td>2</td>
<td>2.2</td>
</tr>
<tr>
<td>20-30</td>
<td>38</td>
<td>42.2</td>
</tr>
<tr>
<td>&gt; 30</td>
<td>50</td>
<td>55.6</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary school</td>
<td>6</td>
<td>6.7</td>
</tr>
<tr>
<td>Junior high school</td>
<td>12</td>
<td>13.3</td>
</tr>
<tr>
<td>Senior high school</td>
<td>45</td>
<td>50.0</td>
</tr>
<tr>
<td>Bachelor degree/post graduate</td>
<td>27</td>
<td>30.0</td>
</tr>
<tr>
<td><strong>Working status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not working</td>
<td>61</td>
<td>67.8</td>
</tr>
<tr>
<td>Working</td>
<td>29</td>
<td>32.2</td>
</tr>
<tr>
<td><strong>Income level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less</td>
<td>16</td>
<td>17.8</td>
</tr>
<tr>
<td>Good</td>
<td>74</td>
<td>82.2</td>
</tr>
<tr>
<td><strong>Knowledge</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less</td>
<td>14</td>
<td>15.6</td>
</tr>
<tr>
<td>Good</td>
<td>76</td>
<td>84.4</td>
</tr>
<tr>
<td><strong>Gestational age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 28 weeks</td>
<td>65</td>
<td>72.2</td>
</tr>
<tr>
<td>&lt;28 weeks</td>
<td>25</td>
<td>27.8</td>
</tr>
<tr>
<td><strong>The frequency of ANC visit</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2.2</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>4.4</td>
</tr>
<tr>
<td>≥ 4</td>
<td>83</td>
<td>92.2</td>
</tr>
<tr>
<td><strong>Parity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 3</td>
<td>5</td>
<td>5.6</td>
</tr>
<tr>
<td>≤ 3</td>
<td>85</td>
<td>94.4</td>
</tr>
<tr>
<td><strong>Compliance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-compliant</td>
<td>26</td>
<td>28.9</td>
</tr>
<tr>
<td>Partially compliant</td>
<td>21</td>
<td>23.3</td>
</tr>
<tr>
<td>Strictly compliant</td>
<td>43</td>
<td>47.8</td>
</tr>
</tbody>
</table>

Knowledge level of anemia and iron tablet supplementation were categorized into 2 (good and less). Good knowledge was to score ≥ 60% and less knowledge if score < 60%. The majority of participants had good knowledge. The majority of the participants were pregnant women of gestational age ≥ 28 weeks. Almost all of participant (92.2%) had more than 4 times of antenatal care visits to midwife, doctor, or obstetrician. The majority of participants had maternal parity ≥ 3. Compliance rate of iron consumption in this study was quite high (71.1%).

Table 2. Prevalence of anemia among pregnant women in Rowosari PHC, Semarang, 2016

<table>
<thead>
<tr>
<th>Variable</th>
<th>N (90)</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anemia</td>
<td>28</td>
<td>31.1</td>
</tr>
<tr>
<td>Severe anemia</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Moderate anemia</td>
<td>8</td>
<td>8.9</td>
</tr>
<tr>
<td>Mild anemia</td>
<td>20</td>
<td>22.2</td>
</tr>
<tr>
<td>No anemia</td>
<td>62</td>
<td>68.9</td>
</tr>
</tbody>
</table>
b. Prevalence of anemia among pregnant women

The overall prevalence of anemia in this study was 31.1%. There was no participant classified as severe anemia. The majority of anemia participants were categorized as mild anemia.

Table 3. Factors associated with anemia among pregnant women in Rowosari PHC, Semarang, 2016

<table>
<thead>
<tr>
<th>Variable</th>
<th>Anemia</th>
<th>The p-value</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;20</td>
<td>1 (3, 6%)</td>
<td>1 (1, 6%)</td>
<td>0.56 0.43 (0.025-7.31)</td>
</tr>
<tr>
<td>&gt; 30</td>
<td>12 (42, 9%)</td>
<td>26 (42, 2%)</td>
<td>0.87 0.93 (0.37-2.31)</td>
</tr>
<tr>
<td>20-30</td>
<td>15 (53, 6%)</td>
<td>35 (56, 5%)</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>6 (21, 4%)</td>
<td>12 (19, 4%)</td>
<td>1.00 1.00 (0.28-3.54)</td>
</tr>
<tr>
<td>Medium</td>
<td>13 (46, 4%)</td>
<td>32 (51, 6%)</td>
<td>0.69 1.23 (0.44-3.439)</td>
</tr>
<tr>
<td>High</td>
<td>9 (32, 1%)</td>
<td>18 (29%)</td>
<td></td>
</tr>
<tr>
<td>Income level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less</td>
<td>2 (7, 1%)</td>
<td>14 (22, 6%)</td>
<td>0.13 0.26 (0.06 to 1.25)</td>
</tr>
<tr>
<td>Good</td>
<td>26 (92, 9%)</td>
<td>48 (77, 4%)</td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less</td>
<td>2 (7, 1%)</td>
<td>12 (19, 4%)</td>
<td>0.21 0.32 (0.07-1.54)</td>
</tr>
<tr>
<td>Good</td>
<td>26 (92, 9%)</td>
<td>50 (80, 6%)</td>
<td></td>
</tr>
<tr>
<td>Gestational age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 28 weeks</td>
<td>19 (67, 9%)</td>
<td>46 (74, 2%)</td>
<td>0.53 0.73 (0.28-1.95)</td>
</tr>
<tr>
<td>&lt;28 weeks</td>
<td>9 (32, 1%)</td>
<td>16 (25, 8%)</td>
<td></td>
</tr>
<tr>
<td>The frequency of ANC visits</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-2 times</td>
<td>0 (0%)</td>
<td>3 (4, 8%)</td>
<td>0.55 1.48 (1.28-1.70)</td>
</tr>
<tr>
<td>≥ 3</td>
<td>28 (100%)</td>
<td>59 (95, 2%)</td>
<td></td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 3</td>
<td>4 (14, 3%)</td>
<td>1 (1, 6%)</td>
<td>0.03 * 10.17 (1.09-95.65)</td>
</tr>
<tr>
<td>≤ 3</td>
<td>24 (85, 7%)</td>
<td>61 (98.4%)</td>
<td></td>
</tr>
<tr>
<td>Compliance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-compliant</td>
<td>14 (50%)</td>
<td>12 (19, 4%)</td>
<td>0.05 0.37 (0.13-1.09)</td>
</tr>
<tr>
<td>Partially compliant</td>
<td>1 (3, 6%)</td>
<td>20 (32, 3%)</td>
<td>0.04 * 8.67 (1.05-71.69)</td>
</tr>
<tr>
<td>Strictly compliant</td>
<td>13 (46, 4%)</td>
<td>30 (48, 4%)</td>
<td></td>
</tr>
</tbody>
</table>

c. Factors associated with anemia in pregnant women

Table 3 showed no statistical relationship between participants age, education, income level, knowledge, gestational age, frequency ANC and anemia (p value >0.05, OR < 1 and CI (confidence interval) was wide). There was no significant relationship between frequency ANC and anemia (p >0.05), but CI did not pass 1. This could be due to less large of the study samples. In the present study, there was significant association between partially compliant in iron tablet consumption and anemia (OR = 8.67, 95% CI = 1.05-71.69, p = 0.03) with reference to strictly compliant. Pregnant women having partially compliance in iron tablet consumption had risk of 8.67 times having anemia compared than pregnant having strictly compliance in consumption of iron tablets. There was no increased risk of anemia in non compliant pregnant women compared than strictly
compliant (OR = 0.37, 95% CI = 0.13 to 1.09, P = 0.05).

Table 3 showed that there was statistical correlation between parity and the incidence of anemia (OR = 10.17, 95% CI=1.09-95.65, p = 0.03). Mothers with parity >3 were at risk 10.17 times having anemia compared than mothers with parity ≤3.

**DISCUSSION**

The prevalence of anemia among pregnant women in the study area was 31.1%. This prevalence is almost consistent with prevalence of anemia among pregnant women in Indonesia of 30%. However, this prevalence is lower than the prevalence of anemia from previous study in Semarang City in 2009 of 48.7%. This is probably related to the better prevention programs of anemia in Semarang City. According to the public health problem category by World Health Organization, the prevalence of anemia in this study is categorized as a moderate level public health problem.

Among many factors that may cause anemia, iron deficiency anemia is the most common cause of anemia in pregnancy and responsible for 50% of anemia during pregnancy reflecting the increased demands for iron in pregnancy. One of the common program in anemia prevention and treatment is iron tablet supplementation.

The compliance rate of pregnant women in the consumption of iron tablet supplementation in this study was also quite good at 71.1%. Non-compliant pregnant women (28.9%) may be associated with side effects of iron tablet supplementation. Side effects include the discomfort in epigastrium, nausea, vomiting and diarrhea. Participants who experienced side effects in the study were 10.3%, such as nausea and vomiting. Nausea during pregnancy is probably affected by the physiological process as a result of hormonal adaptation. In this study, bivariate analysis showed that compliance rate was significantly associated with anemia in pregnant woman. Similar result was reported by other studies conducted in Ethiopia. Previous study also showed that pregnant women who consume iron tablet supplementation with sufficient quantities have a smaller risk of anemia. Iron supplementation can increase hemoglobin and feritin levels during pregnancy.

In this study, parity was also associated with anemia in pregnancy. This is according to previous study conducted in India that multiparity tend to have anemia in pregnancy. Parity more than 3 is one of risk factors of anemia in pregnancy. This is due to too often pregnancy can decrease the nutrient and micronutrient reserves of the mother's body.

Other independent variables unrelated to pregnancy anemia were maternal age, education level, income level, knowledge, gestational age, and frequency of ANC visits. Other studies have also shown that maternal age, gestational age, education level, and occupational status are not associated with anemia in pregnant women. This may be due to other factors not studied by researcher such as pregnant women's diets.

**CONCLUSION**

The prevalence of anemia in pregnant women in Rowosari Public Health Center, Semarang City is still high of 31.1%. Factors associated with anemia are compliance and parity. The suggestion that can be done is by increasing the compliance of iron consumption in pregnant women to reduce the risk of anemia by involving family and society around pregnant mother; in pregnant women with multiparity, iron consumption should be more than non multiparitywomen; subsequent research as a supporter of this study is expected with a larger sample size and with more complete variables, especially for food recall.

**ACKNOWLEDGMENTS**

We thank to Medical Faculty of Diponegoro University for funding the research. Our special thanks and appreciation goes to all of study participants, Rowosari Public Health Center staff, and health survey personels for their consistent support during the study.

**REFERENCES**


5. Gebre, A. & Mulugeta, A. Prevalence of Anemia and Associated Factors among


7. Kozuki, N., Lee, A. C., & Katz, J. Moderate to severe, but not mild, maternal anemia is associated with increased risk of small-for-gestational-age outcomes. J NUTR, 2012; 142(2); 358–62. http://doi.org/10.3945/jn.111.149237

8. Steer, P. J. Maternal hemoglobin concentration and birth weight. AM J Clin Nutr 2000; 71(suppl); 1285S–7S.


The Identification of Antibiotics-Resistant Bacteria Isolated from Cijantung and Cibuluh Stream Flows of Ciliwung River in Jakarta and Bogor

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ABSTRACT

Introduction: In Indonesia, river is a dependable source of water for human activities. River can be reservoir for antibiotic-resistant bacteria. The antibiotic resistance can spread and get transmitted into human, increasing risk of bacterial infection treatment failure. Thus, the aim of this study is to investigate the presence of antibiotic-resistant bacteria from two streamflows of Ciliwung river, Cijantung and Cibuluh.

Methods: Isolation of two different bacteria morphologies was obtained from growing samples on EMB agar. A single colony from respected group was confirmed by Gram staining and IMVIC test, followed by MIC microdilution test towards ampicillin, amoxicillin, chloramphenicol, and tetracycline.

Results: Our results indicate that from 6 tested colonies, colonies A and F were resistant to tetracycline and amoxicillin; colony B was resistant to tetracycline; colony E is resistant to all tested antibiotics; colonies C and D were susceptible to all tested antibiotics.

Conclusion: The highest occurrence is resistance to tetracycline (66.7% of tested colonies). Resistance was observed in all antibiotics tested in Cibuluh, the downstream part of Ciliwung. Further study is required to identify the species and the mechanisms of antibiotic-resistant bacteria at different Ciliwung river streamflow.

Keywords: antibiotics-resistant bacteria, river, Gram negative

INTRODUCTION

In Indonesia, especially in rural area, people still use river as water source for daily activities, such as cooking, drinking, and washing. However, hospitals or households in Indonesia have not properly handling their waste that eventually run into the river. In 2016, around 57.76% of villages are handle their household waste improperly [10]. In addition, Ministry of Health Republic of Indonesia stated that 82.64% of hospitals are not performing standardized medical waste management [10]. Waste water disposal into rivers can create reservoir of antibiotic resistance [1, 2, 3, 11, 19, 21]. Antibiotic-resistance is an emerging condition in the world where the microorganism still persists in the presence of antibiotic, hence increasing the risk of treatment failure and health care expenses in infected patients [7, 10]. In Indonesia, several Gram negative bacteria such as Pseudomonas aeruginosa, Enterobacteriaceae, Klebsiella pneumoniae and Acinetobacter baumanii were found to be resistant to antibiotics in several hospitals [7, 9, 15]. In this situation, the identification of antibiotic-resistant bacteria in water source is important to prevent the spread of antibiotic-resistant bacteria, especially among Gram negative bacteria. A study found that 60-80% of E. coli isolated from Boyong river were resistant towards various antibiotics such as amoxicillin and streptomycin [19]. Therefore, the objective of this study is to investigate the presence of antibiotic-resistant bacteria from two stream flows of Ciliwung river in Jakarta and Bogor. These areas were selected due to its location as assembling point between downstream, middle, and upstream flows. Cijantung streamflow is located between downstream and middle stream of Ciliwung river. Meanwhile, Cibuluh streamflow is located between upstream and middle stream.

MATERIALS AND METHODS

1. Sample collection

Samples were collected from two stream flows of Ciliwung river: Cijantung and Cibuluh area located in East Jakarta (-6.310174, 106.856787)
and West Java (-6.575313, 106.803633), respectively (Figure 1). At each location, 6 sampling points were measured with the distance between point is 3 meters. Water was collected 20 cm deep from river surface [12]. From 1 sampling point, 40 ml of water sample was collected into sterile falcon tube in triplicate. All samples were stored in 4°C and transported to Indonesia International Institute for Life Sciences (i3L) Laboratory.

2. Bacterial isolation and identification

Samples were centrifuged at 5,000 x g for 5 minutes [20]. Small amount of supernatant (~200-300 µl) was left to resuspend the pellet and 100 µl of sample was spread on EMB agar and incubated at 37°C overnight. Two different colonies on EMB agar were observed after 24 hours, which were colorless and black with greenish metallic sheen colonies. A single colony from respected group was confirmed using gram staining and IMVIC test (Indole, Methyl red, Voges-Proskauer, and Citrate) according to standard methods [8, 16].

3. Antibiotic-resistant bacterial analysis

Single colony from respected group was transferred into 10 ml of LB Broth and incubate at 35-37°C, 150 rpm overnight. When the bacteria already reached OD ~0.5, antibiotic-resistant test to determine MIC (Minimum Inhibitory Concentration). In this experiment, microdilution about 150 µl total broth volume was used; 75 µl of antibiotic was mixed with bacteria culture at the same volume. Antibiotics used in this experiment were amoxicillin, ampicillin, chloramphenicol, and tetracycline. The respected antibiotics were dissolved into respected solvents according to national standard. The dilution range was 0.25 - 32 mg/l for amoxicillin, ampicillin, chloramphenicol and 0.25 - 16 mg/l for tetracycline [23]. MIC calculation was done in duplicate. The 96-well plates were incubated at 37°C for 18 hours. The results were interpreted according to literature [23].

RESULTS

A total of 36 samples were spread on EMB agar. After overnight incubation, only 6 samples (~16.7%) were positive for target colonies. Within each positive water samples, only 1 target colony was observed, making a total of 6 target colonies (Table 1). Target samples were indicated to be Gram negative as Gram positive bacteria will not grow due to the presence of eosin Y in EMB agar [4]. There were 1 and 3 colonies with black and green metallic sheen morphology were found from Cijantung and Cibuluh stream respectively. There were two colorless colonies were found from Cibuluh stream, but no colorless colony was isolated from Cijantung stream. All samples were confirmed as rod-shaped Gram negative by Gram staining. Moreover, the IMVIC tests supported the identification and distinction of these two different colonies (Table 1). These six samples were sub-cultured twice to get a single colony with uniform morphology and color.

Based on MIC analysis (Table 2), our results showed that from 6 tested colonies, colonies A and F were resistant to tetracycline and amoxicillin; colony B was resistant to tetracycline; colony E was resistant to all tested antibiotics; colonies C and D were susceptible to all tested antibiotics. The highest occurrence is resistance to tetracycline (66.7% of tested colonies), followed by amoxicillin (50% of tested colonies), ampicillin and chloramphenicol (16.7% for each antibiotic). There was no isolate from Cijantung has resistance, while 4 (80%) colonies from Cibuluh were resistant to at least one antibiotic.

![Figure 1. Cijantung and Cibuluh sampling location respective to Ciliwung river (Modified from [22])](image)
Table 1. Result of isolated colonies on EMB agar and its identification using IMVIC test.

<table>
<thead>
<tr>
<th>Colony</th>
<th>Source</th>
<th>Morphology</th>
<th>Biochemical test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Indole</td>
</tr>
<tr>
<td>A</td>
<td>Cibuluh</td>
<td>Colorless colonies</td>
<td>-</td>
</tr>
<tr>
<td>B</td>
<td>Cibuluh</td>
<td>Black colonies with green metallic sheen</td>
<td>+</td>
</tr>
<tr>
<td>C</td>
<td>Cijantung</td>
<td>Black colonies with green metallic sheen</td>
<td>+</td>
</tr>
<tr>
<td>D</td>
<td>Cibuluh</td>
<td>Black colonies with green metallic sheen</td>
<td>+</td>
</tr>
<tr>
<td>E</td>
<td>Cibuluh</td>
<td>Colorless colonies</td>
<td>-</td>
</tr>
<tr>
<td>F</td>
<td>Cibuluh</td>
<td>Black colonies with green metallic sheen</td>
<td>+</td>
</tr>
</tbody>
</table>

Table 2. Result of MIC analysis from six tested colonies.

<table>
<thead>
<tr>
<th>Colony</th>
<th>Amoxicillin</th>
<th>Ampicillin</th>
<th>Chloramphenicol</th>
<th>Tetracycline</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MIC (mg/l)</td>
<td>Interpretation</td>
<td>MIC (mg/l)</td>
<td>Interpretation</td>
</tr>
<tr>
<td>(A)</td>
<td>&gt;32</td>
<td>Resistant</td>
<td>&lt;2</td>
<td>Susceptible</td>
</tr>
<tr>
<td>(B)</td>
<td>&lt;2</td>
<td>Susceptible</td>
<td>&lt;2</td>
<td>Susceptible</td>
</tr>
<tr>
<td>(C)</td>
<td>&lt;2</td>
<td>Susceptible</td>
<td>&lt;2</td>
<td>Susceptible</td>
</tr>
<tr>
<td>(D)</td>
<td>&lt;2</td>
<td>Susceptible</td>
<td>&lt;2</td>
<td>Susceptible</td>
</tr>
<tr>
<td>(E)</td>
<td>&gt;32</td>
<td>Resistant</td>
<td>&gt;32</td>
<td>Resistant</td>
</tr>
<tr>
<td>(F)</td>
<td>&gt;32</td>
<td>Resistant</td>
<td>&lt;2</td>
<td>Susceptible</td>
</tr>
</tbody>
</table>

DISCUSSION
There have been several cases of Gram negative that have antibiotic resistance. Enterobacteriaceae isolates from hospitals were shown to be resistant towards several antibiotics, such as carbapenem and beta-lactam [9]. In addition, Pseudomonas aeruginosa and Klebsiella pneumonia that were isolated from ICU of Fatmawati Hospital, Jakarta showed resistant to third generation cephalosporin and fluoroquinolones [15]. In aquatic environment, 10 bacteria isolated from sediment in intertidal area around mangrove plantation in Wonorejo, Surabaya, showed resistance to ampicillin, chloramphenicol, and tetracycline [14]. In Boyong river, Sleman, 60-80% of E. coli isolates showed antibiotic resistance [19]. From Batang Arau river, Padang, E. coli associated with Geres filamentous fish were isolated and found to be resistant to ceftazidime and cefotaxime [3]. Molecular detection have also shown the occurrence of antibiotic resistance genes (ARG) in Cauvery River, India [13] and River Danube [11].

In spite of similar environment conditions, only colonies from Cibuluh showed antibiotic resistance to tested antibiotics while no colony from Cijantung showed resistance. Four (80%)
colonies from Cibuluh were resistant to at least one antibiotic and one (20%) colony was resistant to all antibiotics tested. Difference in river landscape might contribute to presence of antibiotic resistance [13]. As the river runs through urban and agriculturally influenced areas, concentrations of antibiotic can increase. It has been shown that prevalence of antibiotic-resistant *E. coli* increased in lower reach and estuary region of Dongjiang River, South China [21].

In conclusion, Gram negative bacteria isolated from Cibuluh area of Ciliwung river showed resistance towards tetracycline, chloramphenicol, amoxicillin, and ampicillin. Further study is required to identify the species of antibiotic-resistant bacteria at different Ciliwung river streamflow and its resistance mechanism. Then, mitigation can be conducted properly.

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REFERENCES


**Psychosocial associated and predictors of Post Stroke Depression 3- 6 months after onset: A Systematic Review**

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2 Professor in Nursing Faculty Indonesia University)
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4 Psychology Faculty, Diponegoro University
*Corresponding Author: fitriaha@yahoo.co.id

**ABSTRACT**

**Objective.** The aim of study was investigated the psychosocial factor and predictor associate with post stroke depression 3 until 6 months after onset

**Method:** The Database search included Medline, Academic Search Complete, CINAHL, Psychology and Behavioral Sciences Collection. The search was limited to articles written 2005 and 2017. The subject is ischemic stroke 3 until or 6 months after onset. All articles were assessed for eligibility using the Critical Appraisal Skills Program (CASP) evaluation method.

**Results:** There are 89 articles related. The articles were elicited with the criteria inclusions. Eighteen articles related with criteria. Nine articles eligible in the study. The presence of post stroke depression was ranged. The Psychosocial which are related post stroke depression are female gender, education, trouble paying bill, past history of depression, Depressiveness at 8 weeks, stress full life event exposure in the month preceding stroke, stress of health, acceptance resignation and avoidance, social support and family stress.

**Conclusion:** Psychosocial associated and predictor of post stroke depression should be treated. The psychological should be considered as an integrated treatment with medical treatment as well.

**Keywords:** Psychosocial, Post Stroke Depression

**INTRODUCTION**

Stroke depression widely ranged investigated. The impacts of PSD were recurrent stroke after 1 year, fatigue, unresolved depression, thinking of suicide, low quality of live and family burden (1)(2)(3)(4)(5)(6)(7)(8). Furthermore, depression in acute stroke enhanced the mortality risk in acute stroke survivor (9). In ischemic stroke, pattern of depression was increased in 3 month after onset and persistence until 6 month (10). Developing the protocol treatment PSD in ischemic stroke should be considering the related factor. Factors related not only the biological factor, but also psychological factor. Related factor both biological and psychological in ischemic stroke was established (11). But, the systematic review of psychosocial factor of PSD in stroke ischemic 3 until 6 month after onset was not established. Thus, this paper aimed to investigate the associated psychosocial factor in PSD of stroke ischemic patient. This review is essential in developing psychological protocol as well as the biological protocol.

**METHOD**

A systematic search was conducted using the keyword terms/phrases “post stroke depression,” and “3 months”, or “post stroke depression” and “6 month”. The databases searched included Medline, Academic Search Complete, CINAHL, Psychology and Behavioral Sciences Collection. The search was reviewed and published in the period of 2006–2015. The criteria of studies are stroke ischemic patients 3 to 6 months after onset, the patients were ≥ 18 years on stroke onset, quantitative correlated between various factors and PSD, article with full text, published in peer-review journal and written in English. The information about author, study population, sample size, follow up period, study design, assessment of PSD, association between psychosocial factor and PSD were examined. The article was examine with Critical Appraisal Skill Programme (CASP).
RESULT

A total of 1,172 abstracts and articles were obtained during the first search. There are 89 relevant topics. The articles were elicited with the criteria inclusions. Eighteen articles related with criteria. Only 10 articles have result the psychosocial factor. Nine articles included review.

The presence of PSD was ranged. Stroke Depression at 2 weeks after onset is 3% (12), 18.2 (13) and 27.47% (14). Post Stroke Depression at 2 months is 19 % (12). Post Stroke Depression at 3 months 12.9 (13), 17.7 (15), 23.6 % (16), and 37% (17). Post Stroke Depression at six Month 7.5 (13), 24.2% (12), and 29.5% (18). The incidence of PSD at 3 months 27.3% (19), 28.8 (20), and 6.59 (14).

The subjects of studies were ischemic stroke patient on three month onset and six month after onset. Four studies had conducted first survey of post stroke depression on 10 days (20), 14 days or two weeks (14)(16)(17) (20), two months (18) and follow up on 3 months (14)(16)(20) and six months (18). One study was conducted one time survey on three month after onset only (19). One study was conducted three times survey, first survey was conducted on 14 days after onset, and follow up on two months and six months after onset (12).

The instrument of PSD was Hamilton Depression Rankin HDRS (19)(20) (12), Beck Depression Inventory (BDI) (16)(17)(20), Hamilton Depression Scale (HAMD) (14)(17)(20) Geriatric Depression Scale (GDS) (18) and DSM IV (12)(18).

Bivariate and Multivariate relationship between characteristic and psychological factor was shown in table 2. The characteristic that associated with PSD was Female gender (14)(12)(19). One study was remove the female gender characteristic in regression model (14). Education is other characteristic related PSD (17). Economic was one of related factor, it was trouble paying bill (17).

Depression was associated with PSD (12)(17)(18)(19)(20). The circumstances of depression were past history of depression (12)(17)(19) Melancholy Index of Hamilton Depression Rankin Scale (HDRS) (20) and depressiveness at 8 weeks (18). Stressful life event exposure in the month preceding stroke was correlated with PSD (12). Stress in health also related with PSD (17). Coping that related with PSD are acceptance resignation and avoidance (16). Social support was related with PSD(18), and social support in degree of social support circumstance was related as well. As the support system, stress in family also related PSD (17).
### Table 1: Study Characteristic

<table>
<thead>
<tr>
<th>Title</th>
<th>Sample and setting</th>
<th>Method</th>
<th>Tool</th>
<th>Prevalence and Incidence</th>
<th>Psychosocial Finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression predictors within six months of ischemic stroke: The DEPRESS Study, Guiraud (2016) (12)</td>
<td>210 patients at admission (14 ± 2 days), 3 months, 6 months and 1-year</td>
<td>prospective cohort study Multivariate logistic Model</td>
<td>DSM –IV HDRS Interview for Recent Life Events</td>
<td>Depression was diagnosed in 61 patients (24.3%, 95%CI: 19.0–29.6), including 7 (3%) 14 days after onset, 50 (19%) at the two-month visit, and 61 (24.3%) at the six-month visit.</td>
<td>female gender; prior history of depression; Stressful life event exposure in the month preceding stroke</td>
</tr>
<tr>
<td>Depression after minor stroke: Prevalence and predictors, Shi (2015) (13)</td>
<td>757 patients at admission (14 ± 2 days), 3 months, 6 months and 1-year</td>
<td>Logistic regression analyses</td>
<td>The Hamilton Rating Scale for Depression-17 (HRSD-17)</td>
<td>Presence of PSD at admission (14 ± 2 days) is 18.2, 3 months is 12.9 and 6 months is 7.5</td>
<td>Not specified at 3 and 6 months</td>
</tr>
<tr>
<td>A Prospective Study of the Incidence and Correlated Factors of Post-Stroke Depression in China, Zhang (2013) (14)</td>
<td>102 patient ischemic stroke 2 weeks And three months.</td>
<td>prospective hospital-based study Multiple stepwise logistic regression analysis.</td>
<td>Hamilton depression Scale (HAMD)</td>
<td>The incidence of PSD was 27.47% two weeks after stroke. At three months 6.59% at this time point.</td>
<td>Female Gender</td>
</tr>
<tr>
<td>Poststroke depression and 508 patients</td>
<td>508 patients</td>
<td>Multiple logistic</td>
<td>Beck</td>
<td>Presence of PSD 13.7% of Education</td>
<td></td>
</tr>
<tr>
<td>Study Title</td>
<td>Subjects/Design</td>
<td>Methodology</td>
<td>Outcome</td>
<td>Factors Related to Acute and Subacute Stages</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Emotional incontinence factors related to acute and subacute stages</td>
<td>Choi-Kwon (2012) (15)</td>
<td>At admission (4.7 days) and 3 months, regression analysis, Depression Inventory (BDI)</td>
<td>patients at admission and in 17.7% at 3 months later.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factors associated with post-stroke depression and fatigue: lesion location and coping styles, Wei (2016) (16)</td>
<td>368 patients 7 days and 3 months, Multiple logistic regression analysis, Beck Depression Inventory (BDI) and DSM-IV</td>
<td>Presence of PSD 19.3% of the patients at admission and in 23.6% at 3 months.</td>
<td>Avoidance Acceptance-Resignation; Subjective Support; Objective Support; Degree of Social utilisation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age, subjective stress, and depression after ischemic stroke, Michael (2016) (17)</td>
<td>322 patients 3 month, Linear regression</td>
<td>Center for Epidemiological Studies Depression (CESD-10) scale</td>
<td>Presence of depression was 37%</td>
<td>Age, History of Depression, Trouble paying bills, Family Stress, Health Stress</td>
<td></td>
</tr>
<tr>
<td>Influence of early depressive symptoms, social support and decreasing self-efficacy on depression 6 months post-stroke, Volz (2016) (18)</td>
<td>88 patients 8 weeks and 6 months after stroke, Longitudinal Study</td>
<td>Social Support Questionnaire (F-SozU) Geriatric Depression Scale (GDS), DSM IV</td>
<td>Presence of PSD 29.5%</td>
<td>General Self-Efficacy, depressiveness at 8 weeks, social support</td>
<td></td>
</tr>
<tr>
<td>A prospective cohort study of the incidence and determinants of post-stroke depression among the mainland Chinese patients, Zhang T (2010) (19)</td>
<td>One 165 patients consecutive ischemic stroke at 3 months, Stepwise logistic regression</td>
<td>modified Ranking Scale (mRS), Hamilton Depression Rankin Scale (HDRS), Mini Mental Status Examination (MMSE)</td>
<td>Incidence of post-stroke depression was 27.3%</td>
<td>female gender, past history of depression</td>
<td></td>
</tr>
<tr>
<td>Post-stroke depression: can we predict its development from the acute stroke phase, Fuentes (2009) (20)</td>
<td>85 patients acute cerebral infarction (CI) 10 days and repeated at the 3-month follow-up, A prospective and observational cohort study, Multivariate Regression</td>
<td>Hamilton Depression Rankin Scale (HDRS)</td>
<td>There are 28.8</td>
<td>melancholy index upon admission with developing PSD at the 3-month</td>
<td></td>
</tr>
</tbody>
</table>
### Tabel 2 Statistic Analysis

<table>
<thead>
<tr>
<th>Psychosocial</th>
<th>Bivariate</th>
<th>Multivariate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>ρ=0.659</td>
<td>Multivariate logistic Model female gender</td>
</tr>
<tr>
<td>female gender</td>
<td>ρ=0.005</td>
<td>OR= 2.07 (1.03–4.16) ρ&lt;.05,</td>
</tr>
<tr>
<td>Education Level</td>
<td>ρ=0.519</td>
<td></td>
</tr>
<tr>
<td>Household Status (Living alone)</td>
<td>ρ=0.84</td>
<td></td>
</tr>
<tr>
<td>Marrital Status</td>
<td>ρ=0.853</td>
<td></td>
</tr>
<tr>
<td>Working Status</td>
<td>ρ=0.324</td>
<td></td>
</tr>
<tr>
<td>Level f Social Support</td>
<td>ρ=0.146</td>
<td></td>
</tr>
<tr>
<td>prior history of depression</td>
<td>ρ=0.001</td>
<td></td>
</tr>
<tr>
<td>Family history of depression</td>
<td>ρ=0.977</td>
<td>OR=3.85 (1.67–8.85) ρ&lt;.01,</td>
</tr>
<tr>
<td>Stressful life event exposure in the</td>
<td>Not Available</td>
<td></td>
</tr>
<tr>
<td>month preceding stroke (12)</td>
<td></td>
<td>OR 2.68 (1.18–6.07) ρ&lt;.05</td>
</tr>
<tr>
<td>Female Gender (14)</td>
<td>χ² = 5.7453 ρ=0.0165</td>
<td>multiple stepwise logistic regression analysis</td>
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<tr>
<td></td>
<td>OR=3.1483 (95% CI 1.2144–8.1622)</td>
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<tr>
<td>Male</td>
<td>NS</td>
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<tr>
<td>Education(15)</td>
<td>ρ &lt; 0.05</td>
<td>ρ &lt; 0.05</td>
</tr>
<tr>
<td>Age</td>
<td>NS</td>
<td>Multivariate Logistic Regression</td>
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<tr>
<td>Sex</td>
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<td>Education</td>
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<td>Weekly Working Time</td>
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<td>MCMQ</td>
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<tr>
<td>Confrontation</td>
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<td>Avoidance</td>
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<tr>
<td>Acceptance-Resignation</td>
<td>ρ &lt; 0.01</td>
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<td>Social Support Rating Scale</td>
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<td>Subjective Support</td>
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<td>Objective Support</td>
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<td>Degree of Social utilization (16)</td>
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<td>Age</td>
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<td>Linier Regression</td>
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<td>ρ &lt; 0.01</td>
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<td>55-64</td>
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<td></td>
<td>Reference Group</td>
<td>( R^2 = 0.20 )</td>
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<tr>
<td>65-74</td>
<td>( \rho = 0.11 )</td>
<td>( \rho = 0.48 )</td>
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<td>75+</td>
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<td>( \rho = 0.71 )</td>
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<tr>
<td>Sex</td>
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<td>( \rho = 0.16 )</td>
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<tr>
<td>Race</td>
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<td>( \rho = 0.17 )</td>
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<tr>
<td>Marrital Status</td>
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<tr>
<td>Education</td>
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<tr>
<td>Employment Status</td>
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<tr>
<td>History of Depression</td>
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<tr>
<td>Trouble paying bills</td>
<td>( \rho &lt; 0.01 )</td>
<td>( \rho = 0.03 ), ( R^2 = 0.21 )</td>
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<tr>
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<td>( \rho &lt; 0.01 ), ( R^2 = 0.23 )</td>
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<tr>
<td>Health Stress (17)</td>
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<td>( \rho &lt; 0.01 ), ( R^2 = 0.24 )</td>
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<td>Logistic regression analysis Removed</td>
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<td>Depressiveness at 8 weeks</td>
<td>( (r=.51, \rho&lt;.01) )</td>
<td>depressiveness (OR=1.41, ( \rho&lt;.01 ))</td>
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<tr>
<td>Social Support (18)</td>
<td>( (r=.36, \rho&lt;.01) )</td>
<td>social support (OR=95, ( \rho&lt;.03 ))</td>
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<tr>
<td>Years of Education (19),</td>
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<td>melancholy index upon admission (20),</td>
<td>Not available</td>
<td>Multivariate Regression PSD at the 3-month (OR 2.99; 95% CI 1.53–5.84; ( \rho = 0.001 )) t-test ( \rho = 0.047 ) exploratory ROC analysis which showed an area under the curve (AUC) of 0.87 (95% CI 0.77–0.97) (sensitivity 52.9%; specificity 90%, positive predictive value 69.2%; negative predictive value 81.8%; diagnostic precision 78.9%).</td>
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</table>
DISCUSSION

The follow up survey was proved the correlation between the characteristic and psychosocial with PSD. It is proper with pattern of post stroke depression which arise until 3 month and 6 months (10).

There was various measurement of PSD. The gold standard of depression measurement is DSM IV. Meanwhile studies used the HDRS (19)(20)(12). In diagnostic test, HDRS has good validity in measuring PSD, sensitivity 62.5 and specificity 91.7. So, this measurement was valid in PSD measurement. The Beck Depression Inventory valid to measure the PSD also (21). Other depression measurement was valid presented in many studies. There were many model of PSD because of many various independent variables. Furthermore, meta analysis demanding conducted. Economic and education were related with PSD. Low income make patient have a little chance to meet their need. Low education made the patient have no chance in making decision.

The previous psychosocial condition would be associated PSD on 3 or 6 months after onset. The multivariate analysis gains the domains as the predictor of PSD on 3 or 6 month after onset. Female Gender was correlated with PSD. One study Female Gender has correlation with PSD but removed in multivariate statistical analysis (14). Previous study show that the number of PSD in female is larger than men (22). Reasons for the gender difference in PSD are not clear yet, but may include both genetic factors (e.g. differences in brain functioning and organization) and psychosocial factors.

Our finding support that prior depression as a predictor of PSD (12) (17)(18)(19)(20). The depression was ranged past history of depression, depression at admission until 8 weeks after onset. The depression would be developed soon after onset until 3 month after onset. The past depression will react with daily stress, the circumstances of stress was stroke it’s self. Furthermore, this depression be contributed the development of continuum PSD (23)(24). Stressful live event predicted the PSD (12). General Adaptation Syndrome (GAS) theory was depicted that stress pursuing the depression if maladaptive coping arise (25). The maladaptive coping was limitation of acceptance resignation and avoidance of stroke condition. Further, maladaptive coping became a predictor of PSD (16).

The result of study showed that social support was the predictor of PSD (18). As a support system, family stress will impact the PSD also (17). Nurse should consider the changing the mood and conduct the strategy of intervention (26)(27) as well medical treatment.

The strategy of searching the review was complete, with various search of database, and supplemented by hand searches of the reference file. But, relevant studies in other languages have been derelict. The researcher was less competed and compared among the findings. Different tool were used in the research. Model of associated factor, risk factor and predictor were various in variables. The researcher also may feel reluctant to speak to survivors in what are often miserable and difficult circumstances.

CONCLUSION

The models of correlate and predictor of PSD was various. The domains are female gender, education, trouble paying bill, past history of depression, Depressiveness at 8 weeks, stress full life event exposure in the month preceding stroke, stress of health, acceptance resignation and avoidance, social support, family stress. The psychological predictors should be considered in strategy of nursing intervention as well medical treatment.

REFERENCES
7. Kielbergerova L, Mayer O-J, Vanak J,


Using Psychoeducation for Family with Schizophrenia Patients in Community Level: A Review

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ABSTRACT

Introduction: in recent years there has be incerased in the role played by families. Specialy families in the treatment of schizophrenia. Family was a core caregiver who influences patient care.

Purpose: the aim of this study is to assess the psychoeducation for relatives of patients with schizophrenia as nursing intervention in community level.

Methods: this systematic review do a search on the publication of articles search system EBSCO by keywords psychoeducation, family, caregiver and schizophrenia. Search is limited on 2006-2017 edition, can be access in full text and have been scholarly peer reviewed with RCT and QE design, used psychoeducation for family primary caregiver. Appropriate articles are then analyse using critical appraisal tools. Data extracted from articles have been classified, discussed, and concluded.

Results: ten articles with 7 high quality and medium quality for others. Discussed results show that psychoeducation is an effective intervention for relatives of patients with schizophrenia. Psychoeducation improvement knowledge, family coping, quality of life, family cohesion, functioning and atmosphere, change attitudes of relatives and was a support for the family in the patient care, reduction of family burden, depressive sympotms, and family expressed emotion.

Conclusion: psychoeducation can be one of nursing intervention for family in community nursing especially mental health aggregate. Improvement knowledge, family coping, quality of life, family cohesion, functioning and atmosphere, change attitudes of relatives and was a support for the family in the patient care, reduction of family burden, depressive sympotms, and family expressed emotion.

Keywords: caregiver; family; psychoeducation; schizophrenia

INTRODUCTION

Schizophrenia is a severe mental disorder. Patients with schizophrenia experience chaos in the mind, nature, feelings, and behavior (Hawari, 2001). Schizophrenic disorders are chronic with recurrence, resulting in irreversible dysfunction and disability (Wibawaningsih, 2015).

People with schizophrenia need treatment for long periods of time. Families should be involved in health care teams and the entire therapeutic process in order to be an effective and major health resource (Hunt, 2013). The family is expected to be a system that can provide support in the creation of sustainable health care, not only provide physical but psychological and social care that will establish a healthy coping mechanism for people with schizophrenia and achieve a good quality of life(Gamble & Brennan, 2006; Tim FIK, 2016).

Family psychoeducation therapy is one element of the family's mental health program by providing information and education through therapeutic communication. Psycho-education has been shown to improve general symptoms and reduce rejection and family burden (Stuart & Laraia, 2009). Psychoeducation treats the family as a source rather than a stressor, focusing on solving real problems, helping behavior to adapt to stress. Providing information to the family about the disease will reduce the client's tendency to relapse and reduce the effect of the disease on other family members (Townsend, 2011).

Psychoeducation can be a standard practice of service. Hospitals are able to improve...
community-based services through psychoeducation (Adam, 2015). This is reinforced by the results of a literature study from Jeppesen, which states that psychoeducation can reduce recurrence, decrease the rate of re-hospitalization, improve drug compliance and reduce the length of hospitalization which will provide benefits for mental health service providers (Jeppesen et al., 2005).

The result of Wardani's research revealed that the need of mental health service needed is continuous service in the form of follow up care. The family expects the monitoring of the client's condition at home. Knowledge of how to care for clients, health education about schizophrenia and its medicine (Wardani, Hamid, Wiarsih, & Susanti, 2012).

OBJECTIVE
The systematic reviews is to assess the psychoeducation for relatives of patients with schizophrenia as nursing intervention in community level.

METHODS
Systematic reviews used in this paper. The inclusive and exclusive criteria are randomized and quasi experimental research study. Where focused to research who give the intervention for primary caregiver or relatives of patients with schizophrenia. Psychoeducation as the main intervention in nursing. Investigation this published article on academic search complete and medline using the key words (appendix 1). Appropriate article with the inclusive and exclusive criteria then be analyzed. This systematic reviews used articed published on 2010-2016 where can access by full text on pdf format and scholarly (peer reviewed journals).

This systematic reviews used Critical Appraisal Skills Programme (CASP) for rate research quality from www.casp-uk.net then extraction process and synthesis method. Main data from the articles such as: researchers and year, design, place, characteristic of sample, main intervention and result. All of data include in data extraction table. This data synthesis used narrative method with classified the result of data extraction. The collected data has been analyzed and be conclude.
RESULTS
Investigation with 4 keywords in searching Ebsco and got 10 articles (table 1).

<table>
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<tr>
<th>Researcher</th>
<th>Year</th>
<th>Methods</th>
<th>Attitudes of relatives</th>
<th>Family cohesion</th>
<th>Burden</th>
<th>Depressive symptoms</th>
<th>Quality of life</th>
<th>Family expressed emotion</th>
<th>Coping</th>
<th>Support</th>
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<td>2009</td>
<td>Quasi experiment 45 family samples.</td>
<td>Changes of attitudes of relatives</td>
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<td>Increased</td>
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Based on table 1, three articles have medium quality with quasy experimental and corelational analytic and 1 article has high quality with randomized controlled trial design. Both used mindfulness therapy for adult survivors sexual abuse.

**DISCUSSION**

Maldonado et al. use sample used as many as 45 families who are carers in schizophrenic patients in public mental health outpatient center in Africa, Chile. The control group received the usual treatment of monthly interviews with mental nurses and the intervention group received psychoeducation therapy for 18 weeks of sessions. The results showed that psychoeducation can change the behavior of caregiver (Maldonado, Urizar, & Garcia, 2009).

Bechdolf research results showed that the quality of life improved significantly for both treatments ie 0.25 for cognitive behavior and 0.29 for psychoeducation (Bechdolf et al., 2010). Yamaguchi doing research related to psychoeducation that shows that psychoeducation effectively decreases emotional expression, family subjective burden and depression experience (Yamaguchi, Takahashi, Takano, & Kojima, 2006). The decrease in family burden influenced by psycho-education is increasingly reinforced by Nasr research, which shows the effectiveness of this therapy in families with family members of schizophrenic psychiatric disorders (Nasr & Kausar, 2009). Psychoeducation can also provide experience to families through joint problem solving, direct emotional support, and socialization groups consisting of all members of psychoeducation from various family (Jewell, Downing, & McFarlane, 2009).

Psychoeducation impact comparison on burden of care, coping styles, and treatment benefits for families experiencing. Comparison with routine care, show that psychoeducation interventions helped reduce relapse rates and rehospitalization. Its also helps in improving pataient functioning levels with reduce the burden of caregivers (Chakraborty, Bhatia, Anderson, Nimargaonkar, & Deshpande, 2014).

As Tsourt et al. psychoeducation appropriate affect over range everyday family affairs and of communicating their emphatic involvement toward one another. Effectively decreasing objective and subjective family burden, indicated to a reduction in psychosocial and emotional hardship and promotes a ppositive family atmosphere (Tsouri, Gena, Economou, Bonotis, & Mouzas, 2015).

**CONCLUSION**

In addition to contributing caregivers of schizophrenia family members, psychoeducation a valuable resource for them. Empowering relatives and supporting them in their role as caregivers. In this way, psychoeducation may potentiate therapeutic work for caregivers of schizophrenia family member in community nursing especially tertiary prevention. Its may serve as widely available, potentially cost effective way for clients. Psychoeducation can be one of nursing intervention for family in community nursing especially mental health aggregate. Improvement knowledge, family coping, quality of life, family cohesion, functioning and atmosphere, change attitudes of relatives and was a support for the family in the patient care, reduction of family burden, depressive sympotoms, and family expressed emotion.

**REFERENCES**


Level of Self-Care and Its Correlation with Self-Confidence and Social Activity in Patients with Tuberculosis

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ABSTRACT

Introduction: Supported self-care is effective to help patients with pulmonary tuberculosis and their families cope with the life challenges, care for the disease, and reduce the complications and all associated symptoms. Self-care maintains the patient's activities and health, as well as promotes well-being.

Objective: This study aimed to determine the correlation between self-care, self-confidence, and social activity in patients with pulmonary tuberculosis.

Methods: The present study used a cross-sectional study design. Questionnaires were completed by the patients in pulmonary health center of Magelang. The sampling method used was purposive sampling which was based on some criteria developed by the researcher. The patients who met the criteria were 74, and they agreed to participate in the study. The data were collected using four different questionnaires (demographic, self-care health card, self-confidence scale, and social activity scale). Spearman rank correlation was tested to analyze the correlations between self-care and self-confidence in managing the sources of stress and also the correlations between self-care and social activities.

Results: The results of this study reported that 96% patients had independent self-care, and 85% respondents were very confident in managing stress sources. It indicated that the patients had an ability to manage their stress' sources. Also, 73% respondents were not disrupted in their social activities because of the disease. Based on the bivariate analysis, it was found that there was a significant correlation between the level of self-care and self-confidence in managing the source of stress (p = 0.004), and there was also a significant correlation between the level of self-care and the patient's level of social activity (p = 0.000).

Conclusion: Self-confidence and social activity had an effect on self-care. The patient who had a high level of self-care would have increased patient’s social activity and self-confidence.

Keyword: Self-care, self-confidence, social activity

INTRODUCTION

Tuberculosis (TB) is a disease of global concern. TB worldwide is a public health problem which requires targets for its control. Globally, there were an estimated 9.6 million cases of tuberculosis in 2014. Most of the estimated number of cases was in Asia, India, Indonesia, and China are the countries with the highest tuberculosis sufferers of 23%, 10%, and 10% respectively of all patients in the world (WHO, Global Tuberculosis Report, 2015).

Tuberculosis is a chronic condition. People with chronic diseases will experience some physical and psychological changes, continuous medication, dependence on family members and limitations in practical activities that hinder their interaction with society and promoting of well-being (Pinto, 2006). When health changes occur, the ability to make necessary adaptations to those changes is influenced by a wide range of variables that include understanding the necessary changes, the readiness and motivation to change, and the motoric and sensory abilities to execute those activities (Alspach, 2011).

In the case of patients with TB, self-care is important because it can contribute to the reduction of treatment abandonment. Orem's theory of nursing describes self-care as comprising all of the voluntary activities that individuals undertake to maintain their health, life, and general well-being. Self-care practices are activities an individual performs aided or unaided to maintain a healthy life (Gumeiy, 2010). Self-care practices are patterned and sequential actions which when effectively performed will contribute in specific positive ways to human structure integrity, human functions, and human development. For self-care to be effective, the clients should have the knowledge, and skills to do self-care.
Supported self-care is effective to help people with pulmonary tuberculosis, and their families cope with the life challenges, treat the disease, and reduce complications and associated symptoms. Self-care maintain patient’s activities, patient’s health, and promote well-being (Pinto, 2006). Patients need self-confidence, social support, and positive life’s goals to be successful in self-care. Self-confidence is developed from partially and overall from habits. Patients need social support or assistance from friends, family, other patients, and health or social professionals.

The purpose of life can be a positive motivator in self-care. A positive life’s goal is personal and can only be selected by the patient himself (Spero, 2005). Support of self-care will help patients improve their condition (Pinto, 2006). The high ability of the patient would increase the patient’s social interactions and beliefs.

OBJECTIVES
The present study aimed to determine the correlation between self-care, self-confidence and social activity in patients with pulmonary Tuberculosis. In specific, the study aimed to (1) determine the level of self-care in patients with pulmonary tuberculosis, (2) determine the level of self-belief in managing stress in patients with pulmonary tuberculosis, (3) determine the level of social activity in patients with pulmonary tuberculosis, (4) determine the correlation between self-care and self-confidence in managing stress sources in patients with pulmonary tuberculosis, and (5) determine the correlation between self-care and social activity in patients with pulmonary tuberculosis.

METHODS
The study used a cross-sectional design. Questionnaires were completed by the patients in the pulmonary health center of Magelang. Patients were recruited through the pulmonary health center of Magelang in June – July 2016. Patients were eligible to participate in the study if they were diagnosed as having tuberculosis, undergoing medical treatment, and had signed informed consent. Patients with insufficient of understanding or lack of communication, having psychiatric problems and refusing to involve in the study were excluded. The sampling method used was purposive sampling which was based on some criteria developed by the researchers.

The patients who met the criteria were 74 and agreed to participate in the study. Respondents were informed that there were no right or wrong answers and that their answers would be kept confidential. The participation was voluntary, and no incentive was offered to take part in the study. After signing the informed consent, the respondents were asked to complete the questionnaires. Each respondent took 15–20 minutes to complete the questionnaires.

The data collection was accomplished through the use of four separate questionnaires. The four included questionnaires are (1) demographic survey: sex, age, education, marital status and other information. (2) self-reliant health card, consisting of 16 questions; (3) self-belief scale in managing sources of stress, consisting of 6 questions, and (4) social activities scale, consisting of 4 questions.

Data were double-entered for verification using Statistical Package for the Social Sciences (SPSS) 20.0 for Windows statistical software. Descriptive statistics were used to establish the frequency, range, mean and standard deviation (SD) of the demographic and illness characteristics of the samples. Spearman rank correlation was undertaken to analyze the correlations between self-reliance and self-belief in managing sources of stress. The correlation between self-care and social activities was also tested using Spearman rank. Before the correlation test was performed, the normality of the data was tested using the Kolmogorov-Smirnov test.

The study was approved by the Research Ethics Committee of the Faculty of Medicine, Diponegoro University. Respondents were given detailed information about the purpose and procedures of the study, and a written consent was obtained. All participation in this study was voluntary, and respondents were allowed to withdraw from the project during the period of the study without any consequences.

RESULTS
Level of self-care
The level of self-care shows how a person with pulmonary tuberculosis can live independently with reduction of treatment abandonment. The level of self-care pulmonary tuberculosis patients is shown in Table 1.
Self-care is the practice of activities that the individuals initiate and perform on their behalf in maintaining the life health and well-being. The results of this study reported that 71 (96%) respondents had independent self-care. Therefore, self-care practice focuses on independent daily needs and adherence to the prescribed treatment. This is to identify factors related to feasibility preferences, as well as the ability of clients.

**Self-confidence in managing sources of stress**

Self-confidence in managing the stress of their health problems is shown in Table 3.

<table>
<thead>
<tr>
<th>Level of self-confidence in managing sources of stress</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very confidence</td>
<td>63</td>
<td>85</td>
</tr>
<tr>
<td>Not confidence</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 3 shows information about the level of self-confidence. The results of the analysis reported that 63 (85%) respondents were very confident in managing stress sources and no patients were not confident to do that. It indicated that the patients had an ability to manage their stress’ sources.

**Level of social activity**

Social functioning often comprises roles at the workplace, in the community, and within the family. Level of social activities tuberculosis patients is seen in Table 3.

<table>
<thead>
<tr>
<th>Level of social activity</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not disrupted</td>
<td>54</td>
<td>73</td>
</tr>
<tr>
<td>Sometimes disrupted</td>
<td>19</td>
<td>26</td>
</tr>
<tr>
<td>Disrupted</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>100</td>
</tr>
</tbody>
</table>

The results of the analysis shown in Table 3 indicated that 54 (73%) of respondents were not disrupted in their social activities because of pulmonary tuberculosis.

**Level of self-care and its correlation with self-confidence and social activity in patients with pulmonary tuberculosis**

The correlation between level of self-care and self-confidence in managing the source of stress is shown in Table 4. The result of this study reported that the p-value was <0.05, meaning there was a relationship between the level of self-care of patients with the patients’ self-confidence level in managing stress’ sources.

<table>
<thead>
<tr>
<th>Variable</th>
<th>self-confidence</th>
<th>social activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>mean</td>
<td>F</td>
<td>P value</td>
</tr>
<tr>
<td>self-care</td>
<td>.004</td>
<td>.000</td>
</tr>
</tbody>
</table>

**Correlation between the level of self-care and the level of social activity**

Table 4 shows that the result of the analysis in this study obtained a p-value of 0.000. The p-value was <0.05, and therefore it was concluded...
that there was a relationship between the level of self-care of patients and the patients' level of social activity.

DISCUSSION

Pulmonary tuberculosis is a disease that affects the quality of life. It gives effects on the physical and psychological changes of the patients, and dependence on family members. Self-care management is important to promote independent self-care and improve the quality of life. Self-care management can contribute to the reduction of treatment abandonment. The results of this study reported that 71 (96%) respondents had independent self-care. This indicates that the patient had an ability to do things in life with good self-management. Patients were independent to meet their daily needs. It is also shown that the self-care of tuberculosis patients at the pulmonary health center in Magelang had a high level of self-care.

Sixty-three or 85% respondents were capable of managing the stress they had. Patients were confident that they had an ability to solve their health problems. In addition, 54 (73%) respondents showed that the disease did not disturb the hobbies, housework, and shopping. Based on the bivariate analysis, a p-value of < 0.05 was found in both correlation tests. This shows that there was a significant correlation between the level of self-care and the level of self-confidence in managing the source of stress, and there was also a significant correlation between the level of self-care and the level of social activity of the patients.

Patient capacity has been defined as the available abilities and resources a patient can mobilize to address the demands of healthcare and life. Limitations in the capacity can give effects on a patient’s ability or readiness to do work (Shippee, 2012). Patients with multiple chronic conditions and their caregivers may face challenges in meeting the demands of both self-care and healthcare. Characterizing the role that the capacity plays in this effort has become an important area of investigation. Insights to date suggest that a key and distinguishing aspect of capacity is that it is distributed amongst many life activities and linked to the social networks of patients. The patients' capacities consist of six domains: personal, physical, mental, social, financial, and environmental. Personal, social, financial, and environmental capacities may be limited by scarcity: patients may be stressed or burnt out, lack adequate literacy, suffering from isolation, living in poverty, or being at a distance from health care and social support (Boehmer et al., 2016).

The third domain in patient capacity is mental. Chronic health problems are associated with psychological stress and depression. The present study showed that the majority of patients before the implementation of self-care management were complaining from many psychological symptoms like feeling worried, angry, difficult to relax, difficult to concentrate during work, constantly frustrated, feeling stressed and feeling depressed (Kastien-Hilka et al., 2016).

The result of this study found that the patient had a high independent self-care which could solve their health problems. Being independent in the social domain was increased when the self-care in a high level of independence. It is shown where the majority of patients do not feel any limitations in social activities. Also, the personal capacity had the good confidence to make positive coping mechanisms to reduces stressor. Patients were confident to manage all the health problems. When the patient capacity is inadequate to shoulder the work of health care and life, the patients may not be able to access to and use of healthcare and the potential for self-care. This can have a negative effect on health outcomes (Shippee, 2012).

Diagnosis and treatment of pulmonary tuberculosis can have an impact on social health including a reduced social functioning and an increased financial burden as a result of stigmatization (Hansel et al., 2004). Social functioning often comprises roles at the workplace, in the community and within the family (Chang et al., 2004; Hansel et al., 2004). Social functioning was shaped by the person’s attributes and their social network. It includes the patient's personal ability to socialize, the ability of their social network to accept the patient's chronic condition, the changes the condition had caused, the provision of instrumental support, and the social relationships with their healthcare teams (Boehmer et al., 2016). Some patients were unable to socialize effectively, either due to a pre-existing social disorder or as a consequence of living with pulmonary tuberculosis. The infectious nature of pulmonary tuberculosis can lead to a stigma and disruption of social interaction with others, resulting in social isolation (Dhuria et al., 2009).
CONCLUSION

Patients with tuberculosis at the pulmonary health center in Magelang had a high level of self-care. The patients independently meet their daily needs and manage their stress resources and never felt disturbed by social activity. They could reduce and be adaptable with the effects of the disease. There was a highly statistically significant correlation between the patients’ level of self-care, self-confidence and social activity. The results of the analysis showed a positive correlation between the level of patients’ self-care, self-confidence and social activity.

REFERENCES


Effectiveness Self Help Groups On Stress, Anxiety, and Depression Level In Nursing Home Residents at Semarang

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*Corresponding Atuhor : nurullya.rachma@gmail.com

ABSTRACT

Introduction: Decreased health status and emotional problems in the elderly interact with one another. Where the health problems experienced by the elderly do not activity as usual, and feel helpless. If this is left for long periods, the elderly may experience emotional problems such as stress, anxiety, and depression. Environmental factors, also contribute to the occurrence of emotional problems. Lack of support from the family, feeling helpless and hopeless, is a problem experienced by the elderly living in nursing homes, in addition to the declining health status. An intervention through group process, self help groups (SHG), is expected to be effective in overcoming the emotional problems experienced by the elderly.

Purpose: The study aims to describe the effectiveness of SHG to decrease the level of stress, anxiety, and depression before and after SHG intervention in nursing home residents.

Methods: The research method is quasi experiment with pre test-post test with control group design. Twenty respondents who experienced stress, anxiety and depression, were divided into treatment and control groups, each of 10 people. Data analysis using paired T-test.

Result: The results showed changes in stress, anxiety, and depression before and after being given SHG intervention with p value <α.

Conclusion: Nurses are expected not only to provide support and nursing care, but must consider the physical and psychological environment of elderly in nursing homes. So the elderly will feel right at home, surrounded by people who love them.

Keywords: Self Help Groups, Stress, Anxiety, Depression

INTRODUCTION

Aging is a natural process that occurs in every human being including growth, development and death (Stannley & Patricia, 2006). Along with the aging process, there will be physical, psychological, and social degradation that interact with each other. This condition makes an elderly more at risk of various health problems (Lueckenotte & Meiner, 2006). Health problems experienced this result in elderly are less able to perform daily activities. The impact of this condition is the emergence of some emotional problems in the elderly (Allender & Spradley, 2005).

Emotional problems because of the aging process include feeling depressed or stressed, and anxious about his future, feeling lonely because of the loss of spouse, depression, feel his life is over and has no purpose of life anymore (Allender & Spradley, 2005). Feelings appear because they feel old, weakened body and can not do activity and play social life like when young (Suardiman, 2011). The elderly living environment will also affect the elderly's life biologically, physically, psychologically, and socially (Martono, 2009).

Nursing home is a place to live provided to meet the welfare of the elderly who live there (Witoelar, 2012). The elderly are treated and assisted to meet their needs, especially clothing, food and shelter (Azizah, 2011). So that the nursing homes can serve as a comfortable shelter, care, and protection, and where the elderly interact (Kemensos RI, 2008). However, some elderly people also feel the negative impact when they have to stay at the nursing home. They feel useless, lonely, and lack of affection, having to live apart from the family (Cahyawati, Sukarti, Indahri, 2010).

Research on Social and Biology Stressor of elderly in nursing homes and living with family reports that stress in elderly people at nursing homes and family is influenced by internal and external factors, affecting the physical and psychological of the elderly (Rosita, 2012). Psychological problems that lasted for a long
time, without any adaptation process will affect the motivation and self-esteem of the elderly (Azizah & Lilik, 2011). This condition will affect the elderly psychology, so that in the long term the elderly can experience depression.

The group process is a form of nursing intervention that is done in conjunction with the community through the formation of peer or social support based on the conditions and needs of society (Stanhope & Lancaster, 2004; Hitchcock, Schuber & Thomas, 1999). This group process is performed by forming self help groups of elderly who are detected to experience stress, anxiety and moderate to mild depression. With the elderly group, it is expected they can independently solve their problems.

OBJECTIVE

The purpose of this study is to determine the effectiveness of self-help groups to reduce stress, anxiety and depression levels in the elderly before and after SHG intervention.

METHODS

This research is a quantitative research, with quasi experimental. The design used is pre and post test control group. Population amounting to 35 elderly people living in Harapan Ibu Nursing Homes at Semarang. Sampling using purposive sampling technique. Sample inclusion criteria include: elderly aged 60 and older, mild to moderate cognitive status (measured using SPMSQ), still able to communicate verbally well, no hearing and vision impairment. The sample size was 20 elderly, divided into two groups, 10 intervention group and 22 control group.

The research instrument used the Depression Anxiety Scale 21 questionnaire (DASS 21). The questionnaire was used to measure the level of anxiety, depression, and stress in the elderly before and after the self help groups intervened. The standard was developed by Lovibond (1955), which has the lowest validity value of 0.51 and the highest 0.65, with a value of 0.90.

RESULTS

<table>
<thead>
<tr>
<th>Table 1. Distribution Stress, Anxiety, and Depression Level Before and After Self Help Groups in Intervention and Control Group (n = 20)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variable</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Stress</td>
</tr>
<tr>
<td>Normal</td>
</tr>
<tr>
<td>Mild</td>
</tr>
<tr>
<td>Moderate</td>
</tr>
<tr>
<td>Severe</td>
</tr>
<tr>
<td>Σ</td>
</tr>
<tr>
<td>Anxiety</td>
</tr>
<tr>
<td>Normal</td>
</tr>
<tr>
<td>Mild</td>
</tr>
<tr>
<td>Moderate</td>
</tr>
<tr>
<td>Severe</td>
</tr>
<tr>
<td>Worse</td>
</tr>
<tr>
<td>Σ</td>
</tr>
<tr>
<td>Depression</td>
</tr>
<tr>
<td>Normal</td>
</tr>
<tr>
<td>Mild</td>
</tr>
<tr>
<td>Moderate</td>
</tr>
<tr>
<td>Severe</td>
</tr>
<tr>
<td>Σ</td>
</tr>
</tbody>
</table>
Table 2. Distribution Stress Level Before and After Self Help Groups in Intervention and Control Group (n = 20)

<table>
<thead>
<tr>
<th></th>
<th>Pre - Post</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>Intervention Group</td>
<td>5.8</td>
</tr>
<tr>
<td>Control Group</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Table 2. showed significant differences in stress levels before and after treatment in the intervention group (p value 0.000, α = 0.05). While in the control group there was no difference of stress level before and after treatment (p value 0.078).

Table 3. Distribution Anxiety Level Before and After Self Help Groups in Intervention and Control Group (n = 20)

<table>
<thead>
<tr>
<th></th>
<th>Sebelum – Sesudah</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>Intervention Group</td>
<td>4.4</td>
</tr>
<tr>
<td>Control Group</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Table 3 showed the difference in anxiety levels before and after treatment in the intervention and control group (p value 0.015, and 0.078).

Table 4. Distribution Depression Level Before and After Self Help Group in Intervention and Control Group (n = 20)

<table>
<thead>
<tr>
<th></th>
<th>Sebelum - Sesudah</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>Intervention Group</td>
<td>4.4</td>
</tr>
<tr>
<td>Control Group</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Table 4 showed the differences in the level of depression before and after treatment in the intervention and control group (p value 0.015, and 0.01)

DISCUSSION

Aging process makes the elderly experience anatomical and physiological changes. This condition can be both normal and pathological (Lueckenotte & Meiner, 2006). But along with increasing age, normal conditions because the aging process can turn into pathological. This causes the elderly vulnerable suffer from various degenerative diseases. Some health problems in the elderly are also often handled well, such as cataracts, uncontrolled hypertension, uncorrected hearing loss and smoking (Thakur, Banerjee, Nikumb, 2013). As obtained during the preliminary survey, many respondents suffered degenerative diseases and physical health problems such as hearing and vision, mobility impairment, and pain.

The physical health problem is a stressor, and affects the psychological condition of the elderly. Generally elderly people experience more than one health problem (multipathology), as experienced by the respondents (Gilbert, Roughhead, McDermott et al, 2013). The results of the study in the intervention group seen five respondents experiencing mild stress, and four people experiencing severe stress. Stress is a change in the internal and external environments that result in disruption of one's function, so the elderly must be able to adapt to the stressor in order to survive (Potter & Perry, 2005). Respondents can not adapt to various physical health problems experienced, so most of them experience stress.

The emotional response of elderly living in a nursing home can be positive or negative (Soo Jung, 2013). When the elderly responds positively to life in the nursing home, he will adapt to the situation and conditions. Research by Tiong, et al. (2013) reported factors that make the elderly at risk for depression are length of stay in the nursing home for more than 2 years, there is a history of depression, complaints of
pain and lack or absence of contact with another residents of the nursing home. In this study, as many as five respondents suffered from mild depression and 5 respondents with moderate depression. Identification with questionnaires showed that most respondents felt unworthy, and lacked interest in various activities at the nursing home. All respondents have been in the nursing home for more than 2 years and have more than one health problem. Depression experienced by the respondent is a disease, although not all elderly people are depressed.

Bivariate analysis results show Self Help Group (SHG) activity, effective to reduce stress, anxiety, and depression in intervention group. Levels of stress, anxiety, and depression decreased with p value <α. SHG activities are conducted through group process, four times with frequency once a week, and the duration of each meeting is approximately one hour. In each activity, respondents mutually, explored feelings, provided support, and conducted activities that were entertaining, and increased the social interaction of the respondents. Elderly who regularly social interaction slightly decreased of cognitive function (Ristau, 2011). Meaningful interactions for the elderly improve psychological health (Department for Communities and Local Government, 2011). This can be identified by measuring the level of happiness and emotional well-being; improvement of physical health, such as decreased blood pressure. In addition, the elderly routine interacts further strengthen relationships with other nursing home residents, trust each other, and decreased negative prejudices. Through meaningful interaction to the respondent, make the level of stress, anxiety, and depression decreased.

CONCLUSION

Significant changes in levels of stress, anxiety, and depression in intervention groups before and after SHG intervention. While in the control group, there are differences in the level of anxiety and depression, but for stress there is no difference. It is recommended for nurses in addition to providing nursing support and care, also paying attention to the physical and psychological environment to the elderly living in nursing home. This will make the elderly feel like staying at home, feeling appreciated, and surrounded by people who love and care for them.

REFERENCES

5. Gilbert, A, Roughead, L, McDermott, R., et al. (2013) Multiple chronic health conditions in older people: Implications for health policy planning, practitioner and patient, National Health and Medical Research Council of Australia from an Ageing well Ageing Productively Program Grant
10. Martono HH, (2009) Social Service-Welfare in the elderly (Indonesian version), Fourth edition, The publishing center of the Department of Internal Medicine, Faculty of medicine University of Indonesia : Jakarta
11. Rosita (2012) Biological social stressors in the elderly in the nursing home and living with the family (Indonesian Version), BioCulture. vol. 1 No. 1 : 43-52


The Association Between Menstrual Cycles And The Severity Of Acne Vulgaris

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ABSTRACT

Introduction: Acne vulgaris (AV) is the most common skin disorder affecting teenagers, especially females. Menstruation is a hormonal cycle that is often associated with AV. The aim of this study was to prove the association between menstrual cycles and the severity of AV.

Method: This study was a cross-sectional study. The menstrual cycle comprised of menarche, menstrual flow, menstrual length and menstrual cycle regularity was the independent variable and the dependent variable was the severity of AV. Samples were taken from 120 female high school students, consisted of 4 groups: 30 students without AV, 30 students with mild AV, 30 students with moderate AV and 30 students with severe AV, respectively. The subjects were selected by consecutive sampling. The association between menstrual cycle and AV severity was analyzed by Kruskal-Wallis followed by Mann-Whitney, and Chi-square test. The differences of menstrual cycle between groups were tested by Mann-Whitney.

Results: The menarche, menstrual flow, menstrual length and menstrual cycle regularity between the groups without AV, mild AV, moderate AV and severe AV were significantly different. The menstrual cycle in severe AV was significantly different from groups without AV, mild AV and moderate AV, whereas among other groups were not significant. The differences of the menstrual regularity between other groups were not significant.

Conclusion: The menstrual cycle in female teenagers with severe acne were significantly different from those without acne and with mild or moderate acne. The more abnormal menstrual cycles, the more severe AV they had.

Keywords: Menstrual cycle, Severity of acne vulgaris

INTRODUCTION

Acne vulgaris (AV) or acne is a skin disorder on the face, back or chest characterized by blackheads, papules, nodules, pustules, or cysts most commonly found in adolescents and young adults.¹ ² ³ ⁴ Menstruation is a physiological change in a woman's body periodically and influenced by the reproductive hormones either estrogen or progesterone. This usually occurs every month from adolescence to menopause.⁵ The menstrual cycle occurs about 28 days. However, not all women have a similar menstrual cycle. Cycles occur every 21 days to 30 days. The menstruation lasts approximately 5 days, however it can also occur 2 days to 7 days, and the longest is 15 days.⁶ ⁷ The menstrual cycle is associated with AV, therefore the purpose of this study is to determine the association of the menstrual cycle with the severity degree of AV.

METHODS

The design of this study was cross-sectional, carried on December 2016. The subjects were high school female students in Semarang. The sample size was 120 people, comprised of 4 groups; 1 control group was 30 students without AV, and 3 groups were students suffered from AV according to AV severity classification of Lehmann (30 students with mild AV, 30 students with moderate AV, and 30 students with severe AV, respectively). The subjects were selected by consecutive sampling. The inclusion criteria were students who had AV for more than 1 month, with mild, moderate or severe degree. The exclusion criteria were students who did not complete the questionnaire. The independent variable was menstrual cycle concluding menarche, menstrual flow, menstrual length and menstrual cycle regularity. The dependent variable was the severity of AV. The association between menstrual cycle and AV severity was analyzed by Kruskal-Wallis followed by Mann-Whitney, and Chi-square test. The differences of menstrual cycle between groups were tested by Mann-Whitney.
RESULTS
A total of 100 high school female students in Semarang who suffered from AV and 30 students without AV participated in this study. Ten students were excluded because of incomplete fulfilling the questionnaires. Female students with mild AV were 30, moderate AV were 30, severe AV were 30, and without AV were 30.

The average age and BMI of the four groups did not differ significantly (p > 0.05). The family history of AV in the group without AV was 16.7%, mild AV 33.3%, moderate AV 50%, and severe AV 70%. This was statistically significantly different (p < 0.05). (Table 1)

Table 1. Mean age, mean body mass index, and family history of AV among four groups in high school female students in Semarang on December 2016, with a sample size of 120 people

<table>
<thead>
<tr>
<th>Variable</th>
<th>Without AV</th>
<th>Mild AV</th>
<th>Moderate AV</th>
<th>Severe AV</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n=30)</td>
<td>(n=30)</td>
<td>(n=30)</td>
<td>(n=30)</td>
<td></td>
</tr>
<tr>
<td>Age (year)</td>
<td>16.9 ± 2.9</td>
<td>16.6 ± 4.9</td>
<td>17.1 ± 1.8</td>
<td>16.9 ± 5.6</td>
<td>0.9a</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>20.4 ± 6.1</td>
<td>20.4 ± 6.1</td>
<td>21.2 ± 5.5</td>
<td>21.7 ± 5.2</td>
<td>0.4a</td>
</tr>
<tr>
<td>Family history of AV (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>5 (16.7)</td>
<td>10 (33.3)</td>
<td>15 (50.0)</td>
<td>21 (70.0)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>25 (84.3)</td>
<td>30 (66.7)</td>
<td>15 (50.0)</td>
<td>8 (30.0)</td>
<td>0.040b</td>
</tr>
</tbody>
</table>

aKruskal-Wallis (p>0.05) age did not differ significantly, (p>0.05) BMI did not differ significantly, bChi-square, (p<0.05) Family history of AV was significantly different.

The menarche age in this study ranged from the age of 7 to 14 year-old. The menarche, menstrual flow, menstrual length were significantly different (p<0.05) by using Kruskal-Wallis. The regularity of menstrual cycles in the group without AV was 100%, mild AV 20%, moderate AV 66.7%, and severe AV 36.7%. By using chi square test, the menstrual regularity was significantly different (p<0.05) as well. Statistically, the menstrual cycle of these four groups was significantly different (p <0.05). (Table 2)

Table 2. Menstrual cycle includes menarche, menstrual flow, the menstrual length, the menstrual regularity among four groups; in high school female students in Semarang on December 2016, with the sample size of 120 people

<table>
<thead>
<tr>
<th>Variable</th>
<th>Without AV</th>
<th>Mild AV</th>
<th>Moderate AV</th>
<th>Severe AV</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n=30)</td>
<td>(n=30)</td>
<td>(n=30)</td>
<td>(n=30)</td>
<td></td>
</tr>
<tr>
<td>Menarche (age)</td>
<td>11.8 ± 9.12</td>
<td>12.56 ± 3.80</td>
<td>10.96 ± 7.87</td>
<td>8.26 ± 8.95</td>
<td>0.044a</td>
</tr>
<tr>
<td>Menstrual flow (day)</td>
<td>28.0 ± 1.02</td>
<td>28.0 ± 3.12</td>
<td>20.2 ± 4.50</td>
<td>16.7 ± 4.10</td>
<td>0.038a</td>
</tr>
<tr>
<td>Menstrual length (day)</td>
<td>4.0 ± 2.13</td>
<td>4.9 ± 5.14</td>
<td>5.8 ± 9.80</td>
<td>10.5 ± 3.17</td>
<td>0.041a</td>
</tr>
<tr>
<td>Menstrual regularity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular</td>
<td>30 (100)</td>
<td>20 (66.7)</td>
<td>14 (46.7)</td>
<td>11 (36.7)</td>
<td>0.025b</td>
</tr>
<tr>
<td>Irregular</td>
<td>0 (0.0)</td>
<td>10 (33.3)</td>
<td>16 (54.3)</td>
<td>19 (63.3)</td>
<td></td>
</tr>
</tbody>
</table>

aKruskal-Wallis (p<0.05) menarche, menstrual flow, menstrual length were significantly different; bChi-square, (p<0.05) the menstrual regularity was significantly different.

Further analysis (post-hoc) by Mann-Whitney unpaired test. The menstrual cycle of severe AV group was significantly different (p = 0.007) from those without AV, mild AV, moderate AV, and severe AV. The differences of the menstrual regularity between other groups were not significant (p > 0.05) (Table 3)
DISCUSSION

The age of the four groups statistically did not differ significantly (p > 0.05). Nearly 80% of adolescents and young adults aged between 11 and 30 year-old suffered from acne vulgaris. This is because the androgen hormones in woman begin to rise before puberty and reach its peak in adults, then decrease in menopause period.1

The mean of BMI was significantly different in the four groups (p < 0.05). BMI was assessed using WHO standard (2006), with the classification underweight (BMI < 18.50), normal (BMI = 18.50-24.49), overweight (BMI ≥ 25.00), and obese (BMI ≥ 30.00). The body mass index is a factor related to the severity degree of AV. Patient with high BMI scores will experience severe AV.2,9

The family history of AV in the group without AV was about 16.7%, mild AV 33.3%, moderate AV 50%, and severe AV 70%. This was significantly different (p < 0.05). Several studies have shown that genetic factors influenced the onset of acne. In identical twins, the risk of acne vulgaris is very high, including the distribution and variety of acne vulgaris.10

Menstrual cycle concluded of menarche, menstrual flow, menstrual length and the menstrual regularity. Menarche on this study ranging from 7 to 14 year-old. The regularity in the group without AV was 100%, mild AV 20%, moderate AV 66.7%, and severe AV 36.7%. 1,2,3,4 Study in Italy found the association of menstruation characteristic with the risk of the AV occurrence. The subject who had regular menstrual cycles (67.3%) had menarche over 12 year-old (48.0%).8 The menstrual cycle was statistically different in four groups (p < 0.05).

In terms of menstrual cycle, the group of severe AV had significantly different menstrual cycle compared to the group without AV, mild AV, and moderate AV (p < 0.05), while the difference of menstrual cycle among other groups was not significant (p > 0.05). Patients with severe AV had abnormal menstrual cycles. It showed that the more abnormal menstrual cycles, the more severe AV they had. Menstrual episodes in women are associated with the onset of AV and its exacerbations. In the menstrual period, the skin becomes more oily and may lead to premenstrual acne. Oily skin reflects the increasing activity of sebaceous glands. The increasing activity of sebaceous glands is associated with extremely low levels of estrogen before and during the menstrual period.11

CONCLUSION

The menstrual cycle in women with severe AV differs significantly from those without AV, mild AV, or moderate AV. The more abnormal menstrual cycle, the more severe AV will be. Therefore, women’s menstrual period is associated with the onset of AV.

REFERENCES

6. Goodman NF, Cobin RH, Futterweit W, Glueck JS, Legro RS, Carmina E. American association of clinical endocrinologists, american college of endocrinology, and androgen excess and pcos society disease


Differences Of Erythrocyte Fragility And Hemoglobin Levels (Hb) In Light Smokers, Moderate - Heavy Smokers And Non Smokers

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ABSTRACT

Introduction: A large amount of oxidant content in cigarette smoke increases the amount of oxidative stress in smokers. Such free radicals can directly damage the cell membrane (including erythrocytes) with membrane lipid peroxidation, which may cause lysis of the erythrocytes. This hemolysis releases Hb and the cellular constituents into the blood plasma so that the serum or plasma to appear pale red to cherry red in color. This can be determined by measuring the erythrocyte fragility and Hb levels.

Research Method: This research is descriptive analytic research with cross sectional approach. The study period is January 2017-August 2017. Samples are students of Diponegoro University, not smokers, light smokers, and moderate smokers who meet the inclusion and exclusion criteria of 81 people divided into 3 groups. The erythrocyte Fragility data and Hb levels are the primary data. Data is processed by using SPSS.

Results: The result shows that the mean of Hb level of non smokers, light smokers, and moderate-heavy smokers is respectively 17.12±3.262 g/dL; 17.70±2.88 g/dL; dan 18.70±2.69 g/dL (p=0.144). There's a significant increase of percentage of erythrocyte fragility both in moderate-heavy smokers (55.268%) and light smokers (47.710%) if it is compared to non smokers (28.264%) (p=0.000)

Conclusion: This research shows that there's no significant increase of Hb level among moderate-heavy smokers, light smokers, and non-smokers; and there's a significant increase of erythrocyte fragility in NaCl 0.4% concentration between moderate to heavy smokers and light smokers in compare to non-smokers.

Keywords: Smoker, Erythrocyte Fragility, Hb Level.

INTRODUCTION

Smoking is the cause of death of one in ten adults worldwide, with a mortality rate of 6,000,000 people per year. This total includes the estimated 600,000 people due to the effects of being a passive smoker.2 According to World Health Organization (WHO) report 2015, Indonesia ranked third in the number of smokers, which is 60,270,600 inhabitants.3 Central Bureau of Statistics (BPS) in Health Survey 2015 mentions that 5.24% of children and adolescents aged 10-19 years, as well as 23.63% of teenagers aged 20-29 smoked.4 The number of smokers is expected to increase steadily if there is no attempt to control the production of tobacco.6

The prevalence of various health hazards (lung cancer, stroke, cardiovascular disease, respiratory disease, and osteoporosis) is associated with smoking.13 Smoking also involves risk factors for atherosclerosis, obstructive pulmonary disease, age-related macular degeneration, cataracts and myocardial infarction.14 Figures the prevalence was found to be higher in smokers than nonsmokers. In addition, the severity of the disease was positively correlated with the number of cigarettes consumed.15

Cigarette smoke contains at least 3500 chemicals that are carcinogenic, mutagenic, free radical, heavy metal, and even radioactive materials.16 Active molecules such as aldehydes, hydrogen cyanide, phenols, nitrosamines, polycyclic aromatic hydrocarbons, and hydroquinone radicals are common in cigarette smoke. A large amount of oxidant content in cigarette smoke increases the amount of oxidative stress in smokers.17 Oxidative stress itself is recognized to exacerbate a symptom of many diseases including hemolytic anemia.
Reactive oxygen species (ROS) and reactive nitrogen species (RNS) in biomolecularly reacted cigarettes in the body are known to also increase the morbidity of existing diseases. High doses of ROS can cause biological systems unable to cope with excessive ROS causing modification biomolecules chemically, metabolic malfunctions, and destructive macromolecules.

The main ingredients of cigarettes containing 8% tar (nicotine, carcinogens) and 92% of the gaseous components (carbon monoxide, ammonia, hydrogen cyanide, and others) enter the blood and expose blood components such as erythrocytes, leukocytes, platelets, and blood plasma. Research on the physiological, biochemical and toxicological properties of erythrocyte membranes has been widely pursued. This is because erythrocytes and their components play an important role in the integration of metabolism and oxygen and nutrient supply, so that erythrocyte analysis can provide basic information about a physiological and biochemical process.

Constituents in cigarettes can be particulate (solid), gas phase, or both. Mainstream smoke and sidestream smoke are divided into particulate (solid) phases containing tar, as well as gas phases containing toxic gases, volatile organic components, ROS, and free radicals. The particulate phase also includes carboxylic acid, phenol, water, humectants, nicotine, terpenoids, paraffins, tobacco-specific nitrosamines (TSNAs), PAHs, and catechol. Free radicals are present in solid phases, whereas reactive oxygen species (ROS) are present in the gas phase. Free radicals and ROS in the sidestream smoke gas phase are continuously produced during cigarette burning and the concentration increases with the shortness of the cigarette. Excessive free radicals increase the activity of lipid peroxidase (LPO) and decrease the erythrocyte antioxidant status that causes damage to the erythrocyte membranes so that the erythrocytes will be easier to lyse and consequently there will be a decrease in the number of erythrocytes. With the destruction of erythrocyte membranes, toxins in cigarettes such as benzene, carbon monoxide (CO), and hydrogen peroxide can enter into erythrocytes. The main constituent of cigarette smoke in the gas phase is carbon monoxide (CO), which contains up to 23 milligrams in smoke produced by a cigarette. Hemoglobin will bind more carbon monoxide than oxygen because its affinity is 245 times higher and forms carboxyhemoglobin (COHb) compared with oxygen. This affects respiration, especially inhibited cell respiration by the reduced oxygen carried by hemoglobin to the peripheral tissues.

Lipid peroxidation of cell membranes facilitates erythrocyte cells to have hemolysis, i.e. lysis of the erythrocyte membrane that causes free hemoglobin. Next the protein precipitates in the erythrocytes, and forms the body of Heinz. This body of Heinz destroys the membrane flexibility and embraces the membrane shape. The presence of the Heinz body indicates that the erythrocytes have experienced oxidative stress. The formation of Heinz bodies and the presence of peroxidative lipids in cell membranes, facilitates erythrocyte cells to experience hemolysis.

One classification of smokers is using the Brinkman index. The degree of smoking according to the Brinkman Index is the result of multiplication between smoking duration and the average number of cigarettes smoked per day. If the result is less than 200 is said to be light smokers, if the result between 200 - 599 is said to be a smoker and if the result is more than 600 said heavy smokers. The longer a person smokes and the more cigarettes smoked per day, the degree of smoking will be more severe.

The destruction of the erythrocyte membrane can be determined by osmotic fragility test. In the erythrocyte fragility test in the laboratory the initial hemolysis is defined as the starting point of erythrocyte fragility, whereas if all erythrocyte cells undergo lysis (total hemolysis) is determined as total fragility. The erythrocyte resistance to lysis can be measured by increasing the concentration of NaCl solution or so-called fragility test. The presence of this erythrocyte membrane damage may cause a decrease in the amount of erythrocytes that can be detected by measuring hemoglobin (Hb) levels.

Based on the above description, the following problems can be formulated: Are there any differences in the erythrocyte fragility and Hb levels on the subject of Diponegoro University students who are light smokers, moderate-heavy smokers, and non-smokers? The purpose of this study was to prove the difference of erythrocyte fragility and Hb levels in non-smokers, light smokers, and moderate-heavy smokers.

**METHOD**

The design of this research is descriptive analytic research with cross sectional approach. This research was conducted at Diponegoro University, Semarang. Laboratory examination was conducted at the Laboratory of the Faculty of Medicine, Diponegoro University, Semarang. The study was conducted from May 2017 to September 2017.
The target population of this study were young adult smokers, light smokers, and moderate-heavy smokers. The number of samples used is 27 people per group so that the total sample obtained is 81 people.

RESULTS AND DISCUSSION

Subjects who participated in the study were 81 subjects divided into 3 groups based on smoking intensity according to Brinkman Index, with one group being a control group containing non-smoker subjects. The subdivision of the subject group was performed according to the number of cigarettes consumed per day as evidenced by the questionnaire filling. There were three groups in this study, the non-smoker subjects group, the group of light smoker subjects, as well as the group of heavy-smoker subjects. The degree of smoking according to the Brinkman Index is the result of multiplication between smoking duration and the average number of cigarettes smoked per day. If the result is less than 200 is said to be light smokers, if the result between 200 - 599 is said to be a smoker and if the result is more than 600 said heavy smokers. In this research, the average Brinkman Index in the light smokers category was 61.77 and in medium-heavy smokers category was 298.22. The mean Body Mass Index in all groups was $24.875 \pm 8.68$ kg/m².

The types of cigarettes consumed by the subjects in the group of light smokers and moderate-heavy smokers vary with the majority of subjects consuming white cigarettes. Percentage of serum erythrocyte fragility was obtained by osmotic fragility test. Blood specimens were obtained from median cubital gravida sampling subjects which were then immediately incorporated into the K3EDTA vacuum tube. A mixture of 10 microliters of blood specimens and 2 milliliters of NaCl solution with different NaCl concentrations (0%, 0.2%, 0.3%, 0.35%, 0.4%, 0.45%, 0.5%, 0.9%) then incubated for 30 minutes at 37 ° C. After incubation, the solution was centrifuged for 10 minutes at a rate of 3000 RPM (rotation per minute). The supernatant of the mixture was then examined for absorbance by using a Stat Fax 3300 spectrophotometer at a wavelength of 545 nanometers. The average of absorbance data is then converted to percentage of erythrocyte fragility with the following formula:

\[
\% \text{ Fragility Erythrocytes} = \frac{\text{OD Sample}}{\text{OD NaCl 0%}} \times 100%
\]

Descriptive analysis is done on the data to know the description of the results of research in general. Description of data used is the average percentage value of each erythrocyte fragility tube and deviation standard if the data is normal and median distribution and min-max value if not normally distributed.

The mean value of the total percentage of total erythrocyte total fragility in all NaCl concentrations was found to be the lowest percentage of red cell erytrosites in the non-smokers group with an average of 32.61%. While the light smoker average is higher than nonsmokers that is 40.74%. The highest percentage value of erythrocyte fragility was in the medium-heavy smokers group, ie 45.69%.

![Graph of average percentage of erythrocyte fragility in all three groups](image)

The result of the analysis test using Mann-Whitney and Pos Hoc was found that there was a significant difference of percentage of erythrocyte fragility (p <0.05) between nonsmokers group and light smoker on tube with 0.35%, 0.4%, 0.45%, 0.5%, and 0.9%. Then there was a significant difference in the percentage of erythrocyte fragility (p <0.05) between the nonsmokers group and the moderate to severe smokers in all tubes. While between the light smoker group and the moderate-heavy smoker, there was significant difference (p <0.05) on tube with NaCl concentration 0.2%, 0.3%, 0.35%, and 0.4%.
Table 1. The results of the analysis of the differences between categories of smokers

<table>
<thead>
<tr>
<th>Variable</th>
<th>non – light smokers</th>
<th>Non – Moderate-heavy smokers</th>
<th>Light – Moderate-heavy smokers</th>
</tr>
</thead>
<tbody>
<tr>
<td>%Fragilitas Eritrosit</td>
<td>0,505&lt;sup&gt;¥&lt;/sup&gt;</td>
<td>0,023&lt;sup&gt;¥&lt;/sup&gt;</td>
<td>0,032&lt;sup&gt;¥&lt;/sup&gt;</td>
</tr>
<tr>
<td>Tab. 0,2</td>
<td>0,772&lt;sup&gt;¥&lt;/sup&gt;</td>
<td>0,001&lt;sup&gt;¥&lt;/sup&gt;</td>
<td>0,001&lt;sup&gt;¥&lt;/sup&gt;</td>
</tr>
<tr>
<td>Tab. 0,35</td>
<td>0,002&lt;sup&gt;¥&lt;/sup&gt;</td>
<td>0,000&lt;sup&gt;¥&lt;/sup&gt;</td>
<td>0,012&lt;sup&gt;¥&lt;/sup&gt;</td>
</tr>
<tr>
<td>Tab. 0,4</td>
<td>0,000&lt;sup&gt;¥&lt;/sup&gt;</td>
<td>0,000&lt;sup&gt;¥&lt;/sup&gt;</td>
<td>0,000&lt;sup&gt;¥&lt;/sup&gt;</td>
</tr>
<tr>
<td>Tab. 0,45</td>
<td>0,003&lt;sup&gt;¥&lt;/sup&gt;</td>
<td>0,000&lt;sup&gt;¥&lt;/sup&gt;</td>
<td>0,539&lt;sup&gt;¥&lt;/sup&gt;</td>
</tr>
<tr>
<td>Tab. 0,5</td>
<td>0,017&lt;sup&gt;¥&lt;/sup&gt;</td>
<td>0,001&lt;sup&gt;¥&lt;/sup&gt;</td>
<td>0,115&lt;sup&gt;¥&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Note: * Signifikan (p<0,05); <sup>¥</sup> Mann Whitney; <sup>£</sup> Post Hoc

Haemoglobin Level.
The mean Hb levels in the non-smokers group, the light smokers, and the moderate-severe smokers were respectively 17,12±3,262 g/dL; 17,70±2,88 g/dL; dan 18,70±2,69 g/dL (p=0,144)

<table>
<thead>
<tr>
<th>Table 2. Nilai kadar Hemoglobin</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
</tr>
<tr>
<td>non smokers</td>
</tr>
<tr>
<td>Light smokers</td>
</tr>
<tr>
<td>Moderate - severe Smokers</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

DISCUSSION
Fragility Erythrocytes
The light smoker group had higher mean percentage of erythrocyte fragility in each tube compared with the non-smoker group respectively 100; 92,34 ± 8,33; 78,54 ± 14,77; 66,58 ± 17,47; 47,71 ± 17,58; 26,97 ± 15,29; 10,66 ± 7,22; and 3,09 ± 3,22. The moderate-heavy smokers had the highest percentage of erythrocyte fragility compared to the two groups, respectively 100; 97,15 ± 3,92; 90,55 ± 6,73; 78,66 ± 10,85; 55,26 ± 13,90; 28,81 ± 11,25; 11,09 ± 5,67; and 4,01 ± 2,62.

These results are consistent with the results of previous studies conducted by Padmavati et al 2010 that showed that there was an increase in erythrocyte fragility in smokers compared with non-smokers. In Padmavati et al's study it is said that chronic smoking can cause changes in biological molecules, metabolic malfunctions, and macromolecular damage including lipid membrane composition in high-dose erythrocytes from ROS. The results of this study also fit with previous research by Li et al 2014 who reported that H50 (50% hemolysis value) increased in smokers than non-smokers due to increased oxidative stress and AGEs, and vitamin C levels that play a role as antioxidants reported lower in smokers than nonsmokers. Similar results conducted by Masilamani et al in 2016 suggest that the erythrocyte morphological form of the smokers group seen in atomic force microscopic (AFM) has a more Mexican hat shape and surface area of erythrocytes than the smokers. In the study also showed that the form is more susceptible to the occurrence of rupture and facilitate access of entry of toxins. This was evidenced by a blood plasma synchronous emission spectra (SES) test showing metabolites such as NADH, FAD, and hematoporphyrin twice in the smokers group than in the control group indicating rupture of hemoglobin in the erythrocytes and the metabolites flooding the blood plasma.

Hemoglobin Level
Tobacco smoking has an increasing effect on haemoglobin concentrations in both genders, which is proportional to the amount of tobacco smoked. This could indicate a higher sensitivity to the CO-induced hypoxaemic stimulus and consequently a greater erythropoietic response. Tobacco smoking increases the blood levels of CO, which binds to haemoglobin to form carboxyhaemoglobin, which is unable to bind oxygen. The blood concentration of carboxyhaemoglobin increases in proportion with the amount of smoked tobacco and whether the smoke is inhaled. The higher the carboxyhaemoglobin levels, the lower the oxygen transporting capacity of the haemoglobin mass, a scenario corresponding to functional anaemia.
which can reduce exercise tolerance and maximal aerobic capacity.

Presumably, the reduced oxyhaemoglobin levels in smokers stimulate the production of erythropoietin, which increases the haemoglobin concentrations. Men smoking >10 cigarettes/day had a 1.4% increase in haemoglobin compared to non-smokers, whereas in women, the increase was on the average 3.5%, which is in accordance with the carboxyhaemoglobin levels of 3–6% reported in smokers. However, besides carboxyhaemoglobin, we should also consider that other yet unidentified compounds in the complex chemistry of tobacco smoke may have direct or indirect influence on erythropoiesis.\(^{72,73}\)

**Limitations of Research**

The weakness of this study is the population of the subject studied, where this research is only done in the scope of Diponegoro University only. There is a possibility of differences in subject characteristics between Diponegoro University and other universities, so the results of this study can not be generalized to all students and adolescents in Indonesia. The method used for incubation still used a 30-minute time such as the research conducted by Li et al and Padmavathi et al, which probably H50 has not occurred at the median point of NaCl concentration of 0.4% in the normal group.

This study considers cigarette smoke exposure as a major factor affecting erythrocyte fragility in the study subjects. Other factors such as psychic stressors, dehydration, and physical activity are not exclusion criteria.

**CONCLUSION**

Based on the presentation of data and discussion in the previous chapters, the following conclusions can be drawn: There is an increase of insignificant Hb levels and a significant increase in the percentage of erythrocyte fragility at 0.4% NaCl concentrations in medium-heavy smokers and mild smokers compared with the not a smoker.

**REFERENCES**


16. **Padmavathi P, Damodara Reddy V, Narendra M, Varadacharyulu N.** Bidis —


32. WN Frihartine. Faktor-faktor yang mempengaruhi perilaku merokok pada siswa laki-laki di sekolah menengah atas negeri 1 Stikes U'budiyah Banda Aceh; 2013. 8-17.


52. Yunitasari NME. Korelasi antara jumlah leukosit total, neutrofil, limfosit dan monosit dengan aktivitas Superoxide Dismutase (SOD) serum pada perokok berat. Diponegoro University; 2013. 7-18.


64. Sacher RA, Richard A, Brahm U Pendit DW. Tinjaun Klinis Hasil Pemeriksaan


73. Milman N, Pedersen AN. Blood haemoglobin concentrations are higher in smokers and heavy alcohol consumers than in non-smokers and abstainers—should we adjust the reference range? Ann Hematol (2009) 88:687–694
Relationship Waist Circumference, Thick of Skinfolds and Genes Polymorphism of Angiotensin-Converting Enzyme Insertion/Deletion with Hypertension in Coastal Community

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ABSTRACT

Introduction: One third of the world’s total deaths caused by cardiovascular diseases in which one is the cardiovascular complications of hypertension. One of the risk factors of hypertension is obesity, central obesity was described by waist circumference is more sensitive in predicting metabolic disorders and cardiovascular risk. Skinfolds of the most accurate indicators between anthropometric parameters that reflect the type of body fat reserves. Angiotensin-converting enzyme (ACE) was reported as an enzyme that plays a role in hypertension patogenesis. The purpose of this research to determine the relationship waist circumference, thick of skinfolds and Angiotensin Converting Enzyme Insertion/Deletion (ACE I/D) genes polymorphism with hypertension in coastal community of Kendari City.

Method: This research was an analytical research using case control studied approach. The population were a coastal community in working area of public health centre. DNA isolation, PCR analysis performed in the Laboratory of Medicine Faculty, University of Halu Oleo. The sample were 70 people chosen with using purposive sampling method. The results of this studied were analyzed using chi-square test and Odd Ratio (OR).

Results: The result of analyzed were waist circumference with hypertension (p=0.001; OR=5.333, 95% CI=1.839-15.471). Thick of skinfold with hypertension (p=0.550; OR=0.698, 95% CI=0.241-2.275), ACE I/D gene polymorphism with hypertension (p=0.631; OR=0.794, 95% CI=0.310-2.037).

Conclusion: There was relationship between waist circumference with hypertension. There weren't relationships between thick of skinfold and Angiotensin Converting Enzyme Insertion/Deletion genes polymorphism with hypertension in coastal communities.

Keywords: Waist circumference, Thick of Skinfold, Genes Polymorphisms, Angiotensin Converting Enzyme, Hypertension

INTRODUCTION

According to WHO report, about 74.5 million, aged 20 years and over, had hypertension, in the American population, which the cause was unknown (90-95%). The highest prevalence of hypertension was in the African region (46%) and lowest in the Americas (35%), while the Southeast Asian region was 36% of hypertensive adults.1 Hypertension incidence in Indonesia aged 18 years and over in men was 24.3% and in women 23.1%.2

One of the risk factors of hypertension is obesity. Obesity is a condition with abnormal or excessive fat accumulation in the adipose tissue, which can interfere with health. Central obesity is described by more sensitive waist circumference in predicting metabolic disorders and cardiovascular risk. The thickness of the skin of the indicator is accurate between the anthropometric parameters, reflecting the body fat reserves.3

Angiotensin-Converting Enzyme (ACE) is reported as an enzyme that plays a role in the pathogenesis of hypertension. Rigat et al. reported that insertion/deletion polymorphism of the ACE gene affects the concentration of ACE in the blood and affects blood pressure.4 Gene polymorphism Angiotensin Converting Enzyme Insertion/Deletion (ACE I / D) is a risk factor for the incidence of hypertensive heart disease in the Bahteramas General Hospital of Southeast Sulawesi Province year 2013.5
Based on data from Health Department of Southeast Sulawesi Province, hypertension in 2014 is 24,419 people and in 2015 is 19,743 cases.\(^5\) Geographical data of Kendari City showed there were three public health centres, whose working area in coastal area: Nambo, Abeli and Mata, which hypertension, was reported to reach the top 5 cases of the 20 most diseases.\(^6\)

The purpose of this study was to analyze the relationship between waist circumference, thickness of skin fold and Angiotensin-Converting Enzyme Insertion/Deletion (ACE I/D) gene polymorphism with incidence of hypertension in coastal communities of Kendari.

**METHODE**

Research was analytic observational, through molecular biology approach with Case control design. Locations in the coastal area of Kendari City, namely the working area of Public Health Center, Mata, Nambo and Abeli, while Deoxyribo Nucleic Acid (DNA) isolation, laboratory analysis and polymorphism chain reaction (PCR) were done in Integrated Research Laboratory of Medical Faculty of Halu Oleo University. The data were collected from January-April 2017, with samples the inclusion and exclusion criteria of 70 people, respectively

**RESULTS**

Based on the results of research conducted in the coastal area of Kendari City, showing the distribution of sample characteristics based on age, gender, ethnicity, occupation, and ACE I/D gene polymorphism can be seen in Table 1. Data in table 1, shows the most age characteristics in the 36-55 years group (62.9%). Most of the female sex was 68.6%, the largest was from outside of Southeast Sulawesi (51.4%), while the most domestic work was 51.4%.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Case</th>
<th>%</th>
<th>Control</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17-35</td>
<td>8</td>
<td>22,9</td>
<td>13</td>
<td>37,1</td>
</tr>
<tr>
<td>36-55</td>
<td>27</td>
<td>77,2</td>
<td>22</td>
<td>62,9</td>
</tr>
<tr>
<td>Gender</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>12</td>
<td>34,3</td>
<td>11</td>
<td>31,4</td>
</tr>
<tr>
<td>Female</td>
<td>23</td>
<td>65,7</td>
<td>24</td>
<td>68,6</td>
</tr>
<tr>
<td>Ethnicity</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southeast Sulawesi</td>
<td>14</td>
<td>40,0</td>
<td>17</td>
<td>49,6</td>
</tr>
<tr>
<td>Outsides</td>
<td>21</td>
<td>60,0</td>
<td>18</td>
<td>51,4</td>
</tr>
<tr>
<td>Polymorphism gene ACE I/D</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>20</td>
<td>57,1</td>
<td>18</td>
<td>51,4</td>
</tr>
<tr>
<td>DD</td>
<td>3</td>
<td>8,6</td>
<td>4</td>
<td>11,4</td>
</tr>
<tr>
<td>ID</td>
<td>12</td>
<td>34,3</td>
<td>13</td>
<td>37,1</td>
</tr>
<tr>
<td>Occupation</td>
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<tr>
<td>Housewives</td>
<td>18</td>
<td>51,4</td>
<td>18</td>
<td>51,4</td>
</tr>
<tr>
<td>Employees</td>
<td>11</td>
<td>21,4</td>
<td>12</td>
<td>34,3</td>
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<tr>
<td>Entrepreneur</td>
<td>6</td>
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<td>5</td>
<td>14,3</td>
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<tr>
<td>Total</td>
<td>70</td>
<td>100,0</td>
<td>70</td>
<td>100,0</td>
</tr>
</tbody>
</table>

The data in Table 2 shows the waist circumference, abnormally abnormal (61.4%), with statistical results obtained \(p=0.001\), so it can be concluded that there was a relationship between waist circumference with the incidence of hypertension. While thickness of skin fold (\(p=0.550\)) and polymorphism of ACE I/D gene (\(p=0.631\)), showed no significant correlation with incidence of hypertension in coastal community of Kendari City.
Table 2. Relations of waist circumference, thickness of skin fold, polymorphism of ACE I/D gene with Hypertension occurrences in coastal community, Kendari City

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sample</th>
<th></th>
<th></th>
<th></th>
<th>p value</th>
<th>OR</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Case</td>
<td>Control</td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Waist Circumference</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abnormal</td>
<td>28</td>
<td>80,0</td>
<td>15</td>
<td>21,5</td>
<td>43</td>
<td>61,4</td>
</tr>
<tr>
<td>Normal</td>
<td>7</td>
<td>20,0</td>
<td>20</td>
<td>57,1</td>
<td>27</td>
<td>38,6</td>
</tr>
<tr>
<td>Thickness of Skin fold</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risky</td>
<td>6</td>
<td>17,7</td>
<td>8</td>
<td>22,9</td>
<td>14</td>
<td>20,0</td>
</tr>
<tr>
<td>Not Risky</td>
<td>29</td>
<td>82,9</td>
<td>27</td>
<td>77,1</td>
<td>56</td>
<td>80,0</td>
</tr>
<tr>
<td>Polymorphism of ACE I/D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gene</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risky</td>
<td>15</td>
<td>42,9</td>
<td>17</td>
<td>48,6</td>
<td>33</td>
<td>47,1</td>
</tr>
<tr>
<td>Not Risky</td>
<td>20</td>
<td>57,1</td>
<td>18</td>
<td>51,4</td>
<td>37</td>
<td>52,9</td>
</tr>
<tr>
<td>Jumlah</td>
<td>35</td>
<td>100</td>
<td>35</td>
<td>100</td>
<td>70</td>
<td>100</td>
</tr>
</tbody>
</table>

DISCUSSION

Based on the results of data analysis, showed there was a relationship of waist circumference with the incidence of hypertension. This study was in line with Syarifuddin and Nurmala (2015), which had an association of waist circumference with hypertension (p=0.025).7

Based on the result of data analysis showed, there was no relationship, between thickness of skin fold with the occurrence of hypertension in coastal society. This study, in line with Setyawati and Wirawanni (2011), states that there was no thick relationship of skin folds with the incidence of hypertension, (p = 0.923).8 The results of this study differ from Yuana et al (2016) which found no significant relationship between thickness of fat under the skin with systolic pressure (p = 0.002) and diastolic (p = 0.004).9

Based on the results of data analysis shows, there was no relationship between polymorphism of ACE I / D gene with the incidence of hypertension in coastal communities. This study, in line with Rashid et al (2012), states that there was no significant difference in genotype distribution and allele frequencies between genotype groups of DD, genotype ID and genotype II (p = 0.903).10 Different results were found in the study of Aziza et al (2010) which showed a significant association between ACE I/D gene polymorphism with hypertension (p=0.042).4 The result of PCR gene ACE I / D at position 490 bp and 190 bp, as in figure 1.

CONCLUSION

There is a waist circumference relationship with the incidence of hypertension. There is no thick relationship of skin fold and gene polymorphism Angiotensin-Converting Enzyme Insertion / Delesi with incidence of hypertension in coastal community of Kendari City.

SUGGESTION

Better to check serum ACE levels in the blood before conducting ACE gene polymorphism examination and use the number of samples on a large scale, so it can determine a population.

REFERENCES
Erectile Dysfunction Insidensi Prostatectomy Resection With Transurethral Following The Operation The Patient With Prostate Prostatectomy Transvesical Prostat Enlargement in the Kariadi Hospital, Semarang

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1Medical Faculty, Diponegoro University / Sub-division Urology, Surgery Departement of Surgery, Dr.Kariadi Hospital, Semarang, Indonesia
*Corresponding Author : antonius_pulonggana@yahoo.com

ABSTRACT

Purpose: to compare the erectil dysfunction insiden prostatectomy with transurethral following the operation the patient with transvesikal prostat enlargement

Material and methods: From July 2012 to July 2013 60 benign prostatic hyperplasia patient with 30 patients post prostatectomy reseksi with transuretral and 30 patients post prostatectomy reseksi with transvesikal. We initially measured from age, residency, profession, education, IPSS score, IIEF-5.

Result: there were significant difference in statistic from IIEF-5 prostatectomy with transurethral and transvesical (TUR-P 22.70±3.27 and TVP 21.27±3.28 p=0.08) but there were no significant difference from clinical (TUR-P 22.30 and TVP 23.40 ) as well as another variable age, residency, profession, education, IPSS score.

Conclusions: Prostatectomy reseksi with transurethral or transvesical, there were not showed any big differences about erectil dysfunction insidensi although the trend toward it has no.

Keywords: erectile dysfunction, BPH, TURP

INTRODUCTION

Prostat gland is the male organ most often have an enlarged, it can be benign and malignant. Benign prostat enlargement is the second most frequent diseases in urology after urinary tract stones1,2. So also in Indonesia, Benign prostat enlargement is the second most frequent diseases after urinary tract stones and expected to be found in 50 % of men 50 years old. Benign prostate enlargement is 80% of the prostate after prostate cancer 18 % and prostatitis 2%. the volunteers aged 60-69 yr were obtained examined the incidence of 51%. Increase in the incidence of benign prostat enlargement is consistent with age, namely the age of 40 years is about 14 %, the age of 50 years 24 %, the age of 60 – 73 years 50 % dan get reach of 80% over the age of 80 years1,3.

Treatment of prostate enlargement in Indonesia is still very dependent on the facilities, resources to human and costs. until now it prostatectomy surgery suprapubic transvesikal and retropubic infravesikal is still the standard therapy, except hospitals that already have facilities TURP is gold gold standard treatmean beside treatment with drugs, fitofarmaka, laser visual, termoterapi, etc1,2,3,4,5.

Surgery treatment either with Prostatectomy Transurethral (TUR-P) nor Transvesikal prostatectomy TVP, has advantages and side effects. Side effects from closed prostatectomy surgery such as trauma to the urethra, long operation time and limited, the possibility of remaining larger adenomas, electric current and heat can affect the tissue on the inside as the ureter epithelium and nerves, because the inhibition process underway which may result in erectile dysfunction, and corrupt sphincter muscles, causing incontinence6,8,9,10,11,12,13.

Erectile Dysfunction is the inability of a man to have an erection that is sufficient tension to perform satisfactory sexual intercourse, it can persist or recur at intervals closest 3 months (Consensus Guideline panel. Doc, 1997).

The inability of a man to have an erection that is sufficient tension to perform satisfactory
sexual intercourse, it can persist or recur at intervals closest 3 months.

On the basis of the alleged existence of differences in the incidence of postoperative erectile dysfunction TVP and TURP and there has been no similar studies in hospital Kariadi the research on it I do

MATERIAL AND METHODS
Medical record of patients presenting with Benign Prostat Enlargement who underwent TURP surgery and TVP during the period July 2012 to July 2013 there were 60 patients consisted of 30 patients who underwent surgery prostatektomy with TURP and 30 patients who underwent surgery TVP. Men aged 50 to 70 years, do not have erectile dysfunction before surgery, is sexually active, do not suffer from chronic diseases such as diabetes mellitus, hypertension, chronic heart disease, or chronic obstructive pulmonary disease, prostate malignancy and patients who do not want to do surgery were excluded.

We initially measured IIEF-5 (International Index of Erectile Function-5, IPSS (International Prostate Symptom Score).

After routine baseline studies, these patients were classified into a

The data is taken from a survey by research subjects when a patient has been diagnosed with benign prostate enlargement and will be prostatektomi operation. Interview with research subjects before surgery in urology surgical ward which aims to obtain basic data such as identity, set the value of IPSS and IIEF-5 pre surgery. Where the questionnaire was tested on patients and patients understand the contents of the questionnaire. Once the operation is done we ensure anatomic pathology results, if the results indicate malignancy then the subject is declared out of research, research Subject later asked to fill out a questionnaire IIEF-5 3 months postoperatively. Data - data is then collected, tabulated, and be processed. The research results will be tabulated using SPSS 13:00. Analyzed using Chi-square to compare the proportion of the incidence of erectile dysfunction in patients with benign prostatic hyperplasia postoperative TURP and postoperative TVP, while the characteristics of each subject of study will be analyzed by independent t-test for continuous data and chi-square or Fisher’s exact test for dichotomous data

RESULT
During the period July 2012 to June 2013 be obtained the total sample of 60 patients consisted of 30 patients with postoperative TURP and 30 patients with postoperative TVP.

Table 2 through Table 5 shows the frequency distribution of subject-subject research in each group based on age, education level employment and residence. these data is beyond the descriptive data variables will be an analyzed in the following tables.

<table>
<thead>
<tr>
<th>Types of surgery</th>
<th>Number</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prostatectomy resection transurethral</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>Prostatectomy transurethral</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age ( year )</th>
<th>TURP</th>
<th>TVP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>&lt; 60</td>
<td>8</td>
<td>26.7</td>
</tr>
<tr>
<td>≥ 60</td>
<td>22</td>
<td>73.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>30</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2 shows the distribution of data descriptive study subjects. Most subjects at intervals of ≥ 60 years in this study

<table>
<thead>
<tr>
<th>Level of education</th>
<th>Number</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary school</td>
<td>22</td>
<td>36.67</td>
</tr>
<tr>
<td>Junior high school</td>
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<td>25.00</td>
</tr>
<tr>
<td>Senior high school</td>
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<td>28.33</td>
</tr>
<tr>
<td>Diploma</td>
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<td>5.00</td>
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<tr>
<td>Bachelor</td>
<td>3</td>
<td>5.00</td>
</tr>
<tr>
<td>Residence</td>
<td>Number</td>
<td>Percentage</td>
</tr>
<tr>
<td>-----------</td>
<td>--------</td>
<td>------------</td>
</tr>
<tr>
<td>Rural</td>
<td>25</td>
<td>41.67</td>
</tr>
<tr>
<td>Urban</td>
<td>35</td>
<td>58.33</td>
</tr>
<tr>
<td>Total</td>
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<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmer</td>
<td>22</td>
<td>36.7</td>
</tr>
<tr>
<td>Workers</td>
<td>6</td>
<td>10.0</td>
</tr>
<tr>
<td>Civil servants</td>
<td>20</td>
<td>33.3</td>
</tr>
<tr>
<td>Private sector</td>
<td>12</td>
<td>20.0</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
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<table>
<thead>
<tr>
<th>Characteristics</th>
<th>TURP</th>
<th>TVP</th>
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</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 60</td>
<td>22</td>
<td>23.4</td>
<td>0.56</td>
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<tr>
<td>&lt; 60</td>
<td>8</td>
<td>76.6</td>
<td>0.77</td>
</tr>
<tr>
<td>Nilai IPSS</td>
<td>22.70±3.27</td>
<td>21.17±3.28</td>
<td>0.08</td>
</tr>
<tr>
<td>IIEF-5</td>
<td>23.4±0.56</td>
<td>23.4±0.56</td>
<td>0.00</td>
</tr>
<tr>
<td>preprostatctomy</td>
<td>22.30±0.60</td>
<td>22.30±0.60</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
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<tr>
<td>BASIC</td>
<td>16</td>
<td>43.24</td>
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</tr>
<tr>
<td>ADVANCED</td>
<td>14</td>
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<td></td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
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<tr>
<td>Rural</td>
<td>10</td>
<td>33.33</td>
<td>0.19</td>
</tr>
<tr>
<td>Urban</td>
<td>20</td>
<td>66.67</td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farmer and worker</td>
<td>11</td>
<td>39.29</td>
<td></td>
</tr>
<tr>
<td>Civil servants and private sector</td>
<td>19</td>
<td>59.38</td>
<td>0.47</td>
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<table>
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<tr>
<th>Types of surgery</th>
<th>the incidence of erectile dysfunction</th>
<th>p</th>
<th>RR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>TURP</td>
<td>11 % exist</td>
<td>19 % doesn’t exist</td>
<td>0.08</td>
<td>2.89</td>
</tr>
<tr>
<td></td>
<td>36.67 %</td>
<td>63.33 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TVP</td>
<td>5 %</td>
<td>25 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16.70 %</td>
<td>83.30 %</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DISCUSSION**

Prostate enlargement is part of the process so that with increasing age, the life expectancy increased prevalence of benign prostate enlargement also. Therapy in patients with prostate enlargement there are several ways and the goal is the same, namely to improve and restore the quality of life of patients. Surgery is still considered to be capable of providing improved IPSS scores and objectively increase the rate of emission of urine. Two types of surgery is often performed in patients with prostate enlargement is TURP and TVP. These two type of surgery has advantages and disadvantages of each, one of the complications that can occur is erectile dysfunction.
The study was conducted at the hospital Kariadi followed by 60 patients with prostate enlargement (30 patients with post-TURP and 30 patients with post-TVP). Descriptive data of each group shows the distribution of patients in both groups according to age more at intervals of 60-69 years of age, by level of education more at primary school age, by dwelling more in urban areas, and more work is based on farmers and civil servants.

Statistical analysis for the characteristics of the two groups of studies done in two ways, continuous data and test data test proportions. The average age of patients who suffer from an enlarged prostate TURP group (64.03 years) and TVP group (63.23 years) did not differ significantly, so does the value of IPSS both groups prior to surgery (TURP + 22.70 + 3.27 and TVP 21.27 + 3.28 p=0.08 ). While the value of IIEF-5 TURP group was 22,30 and TVP group was 23,40 did not show significant differences for both value IIEF-5 is still at the value that does not indicate a diagnosis of erectile dysfunction.

Other variables such as age, place of residence, and employment also showed no significant differences in the two groups. So that it can be concluded prior to the study both groups had similar characteristics so that there are no variables that can interfere with the study.

The results of this study can be viewed from two sides, namely the interpretation of the IIEF-5 score postoperatively as erectile dysfunction or erectile dysfunction, or by comparing the average value of the IIEF-5 post operation in both groups. Other variables such as age, place of residence, and employment also showed no significant differences in the two groups. So that it can be concluded prior to the study both groups had similar characteristics so that there are no variables that can interfere with the study.

The results of this study can be viewed from two sides, namely the interpretation of the IIEF-5 score postoperatively as erectile dysfunction or erectile dysfunction, or by comparing the average value of the IIEF-5 post operation in both groups. As understood in the TURP surgery, performed with a mass approach resektoskop through the urethra and mass resection with cutting loop using thermal energy (electrocautery) so that the possibility of the occurrence of the pudendal nerve damage including around the larger mass. Growing number of resected tissue, the more long the procedure of doing, so that the heat energy derived from resektoskop tool can cause damage to the pudendal nerve tissues including that of erectile dysfunction is greater. While TVP is operating principle only take into hyperplasia of the prostate gland, because not all parts undergo hyperplasia of the manipulation is not performed on all parts of the prostate. More research is needed with larger samples and better research methods to show whether this trend can be statistically significant.

CONCLUSIONS
Based on the above findings can not be concluded incidence of erectile dysfunction is more common in TURP surgery although the trend toward the remains. Both types of operations can still be performed in patients with benign prostate enlargement and should be well informed consent regarding the advantages and disadvantages of each type of operation.

REFERENCES
1. Connel Ms.JD., Epidemiology, Etiology, Pathophysiology and diagnosis of Benign Prostatic Hyperplasia, Cambells Urology 7th Ed.WB Sounders Company, Philadelphia 1998; 1429-50
12. Lewis D.C.N.A Burgess, C Hudd and P.N Matthwes. Open or Tran Urethral Surgery


23. RaharjoD. Pembesaran Prostat jinak; Beberapa cara pengobatan , Jakarta: Kuliah staf subbagian Urologi Bagian Bedah FK UI R.S. Dr. Cipto Mangunkusumo, 1993
Correlation Between PSA Levels With Gleason Score of Adenocarcinoma Prostate: Study in Dr Kariadi Hospital Semarang

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ABSTRACT

Introduction: Study has shown that every gram of prostate cancer tissue will increase the average PSA levels of 2.3 ng / ml. The PSA value increase is determined by histological characteristics of epithelial cells. In neoplastic processes the increase of serum PSA depends on differentiation of tumor cells. The less differentiated prostate tumors can cause lower PSA concentrations in comparison to those well differentiated. Gleason Grading System (GGS) is one of the histologic grading system that is widely used to assess the prognosis of prostate cancer. This study aims to prove the correlation between levels of PSA with grading histologist Gleason score on prostate cancer.

Method: This retrospective study included 63 patients with prostate cancer were taken from the medical records from 2012 until 2016, which examined PSA levels and gleason Score of adenocarcinoma prostate.

Results: There was no significant association between PSA levels with Gleason score of adenocarcinoma prostate, the results of Spearman's rho correlation test p value = 0.489.

Conclusion: There was no significant correlation between levels of PSA with grading histologist Gleason score of adenocarcinoma prostate.

Keywords: Prostate Specific Antigen, Gleason score, Adenocarcinoma prostate

INTRODUCTION

The incidence of prostate cancer is still quite high in the world and the second most that causes death in men in the United States.1 Research has shown that every gram of prostate cancer tissue will increase the average PSA levels of 2.3 ng / ml,2 while the Gleason System (GGS) is one of the grading system histologic are widely used to assess the prognosis of cancer prostate.3

In the early stages (early stage) who had prostate cancer generally do not show clinical symptoms or are asymptomatic so it is difficult to diagnose. Enforcement of prostate cancer diagnosis may be made on suspicion when an abnormal digital rectal examination or elevated Prostate Specific Antigen (PSA). The sensitivity of digital rectal inadequate to detect prostate cancer but high specificity, but when found on digital rectal malignant mark then almost all cases of prostate cancer because it proved predictive value of 80%.2 Prostate Specific Antigen (PSA) is known as a glycoprotein produced by the acini and ductal epithelial cells of the prostate gland. PSA concentrated in prostate tissue and is normally very low in the serum. Damage to normal prostate tissue architecture as in prostatic disease (benign prostatic hyperplasia, prostatitis, and prostate cancer), inflammation or trauma, will cause a large number of PSA in circulation.1 The First was introduced in 1986, measurements of PSA is a revolution in detecting prostate cancer and playing important role decreasing the incidence of prostate cancer in the United States beginning in 1990.5 Study of 103 patients with all stages of prostate cancer showed 44% had PSA levels over 10 ng / mL.7 prostate biopsy is already a "gold standard" in diagnosing cancer prostat.8 in predominantly adenocarcinoma with different degrees of differentiation.

System Gleason score is the score most commonly used in prostate cancer in determining grading.11 Gleason Total score was obtained from primary and secondary score with a range of values where in sequentially are 1-5 and 2-10. When the total Gleason score 2-4, grouped well differentiated category, Gleason score 5-6
grouped moderate Gleason score 8-10 differentiated and grouped poor differentiated.

Elevated PSA levels assessed by histological characteristics of epithelial cells. In the process of neoplastic increase serum PSA depends on the differentiation of tumor cells. With less differentiated prostate tumor can cause lower PSA concentrations compared with well differentiated. So this study aimed to explore the relationship between serum PSA levels in prostate cancer differentiate degree by Gleason score.

MATERIALS AND METHODS
This study uses data from the medical records of dr. Kariadi Semarang hospital since January 2012 until December 2016 using analytical methods Retrospective. The population is all patients diagnosed histopathologically with prostate cancer were 63 people. There were 31 people sample who had met the inclusion criteria including patients with a histopathologic Adenocarcinoma of the prostate has been done PSA and histological analysis was based on the Gleason score. Then performed statistical analysis to find the relationship between serum PSA levels increase with Gleason score, using Spearman’s rho test. Statistical analysis considered significant when P <0.05.

RESULTS
Distribution of patients with prostate adenocarcinoma most in PSA values 91-100 ng / ml 53.3% (15pasien) with an average value of PSA 119.49 ± 194.09 ng / ml. Mean while, according to the most widely histopathological grading on Gleason score of score of 9 (33.3%), while at least 5,6,8,10 Gleason score (each of them were 10%).

![Figure 1. Distribution of PSA level](image1)

![Figure 2. Distribution of Gleason score Adenocarcinoma Prostate](image2)

DISCUSSION
Characteristics of PSA levels in prostate patience in this study found that prostate cancer has the highest value of PSA levels 91-100 ng / ml 53.3% (15pasien) with an average value of PSA 119.49 ± 194.09 ng / ml. Mean while, according to the most widely histopathological grading on Gleason score of score of 9 (33.3%), while at least 5,6,8,10 Gleason score (each of them were 10%).

Table 1. Spearman Correlation Test

<table>
<thead>
<tr>
<th>Variable</th>
<th>Median (Range)</th>
<th>p</th>
<th>r</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSA</td>
<td>100 (0,21 – 1000)</td>
<td>0.489</td>
<td>0.131</td>
<td>Not significant</td>
</tr>
<tr>
<td>Gleason</td>
<td>8 (5 – 10)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

On variable normality test against Gleason Score and PSA levels did not show normal distribution, and continued by Spearman correlation test. The results of the data analysis found that the PSA relationship to the value of Gleason score showed no significant relationship (p value 0.489)
cancer that less differentiated with Higher PSA levels showed the bigger and advanced stage. This results is consistent with study by the Gleason score Basso et al, found no correlation with the value PSA.

ACKNOWLEDGEMENTS
The authors would like to say thank you to management board and staffs of Department of Surgery, Medical Faculty, Diponegoro University, Dr. Kariadi Hospital, for the support during the research.

REFERENCES
9. Kanthilatha Pai et al. Diagnostic Correlation between Serum PSA, Gleason Score and Bone Scan Results in Prostatic Cancer Patients with Bone Metastasis. BBB 2015: 001-007
Relationship of Prostate Volume With Age Levels in Patients With BPH in Dr Kariadi Semarang in period of January 2012 – December 2014

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ABSTRACT

Introduction: Prostate volume and age are two things that are related with the diagnosis and therapy planning in BPH. This study aims to prove that there is a relationship between prostate volume with preoperative age at early diagnosis is made.

Methods: This retrospective study included 80 patients with BPH that taken from the medical records from January 2012 until December 2014, which examined with TRUS and age

Result: It is found a significant correlation between prostate volume with age, the results of Spearman's rho correlation test p value = 0.000 and r = 0.798.

Conclusion: There is a significant correlation between the volume of the prostate with age in patients with BPH.

Keywords: prostate volume, age level, BPH

INTRODUCTION

Benign enlargement of the prostate gland or also called Benign Prostate Hyperplasia (BPH) is most common in older men. This disease is the second most common disease in urology clinics in Indonesia.

The cause of BPH itself is not certainty known yet, but until now it is associated with aging that lead to decreased levels of male hormones, especially testosterone. Testosterone in the prostate gland will be converted into dehidrotestosteron (DHT). DHT is then going to chronically stimulate the prostate gland to be enlarged.

Enlarged prostate nodule formation was already apparent at the age of 25 years old at about 25%. At the age of 60 years old, prostate enlargement seen in approximately 60% but the symptoms complained at around 30-40%, while at the age of 80 years will be seen 90% which is about 50% already begun to show symptoms.

The prevalence of BPH by age based on the autopsy, at the age of 41-50 years by 20%, 50% at the age of 50-59 years old, at the age of 60-69 years increased by 70%, and at 70-79 years by 90%.

In patients with BPH there is an increase of the specific prostate serum antigen that consistent with increasing age.

MATERIALS AND METHODS

This study is using a retrospective analytic model. The population of this study was patients who were treated at the RSUP Dr. Kariadi Semarang, the diagnosis is based on International Classification of Disease code-9 (ICD-9) for BPH. Independent variable in this study is prostate volume and the dependent variable is patient age.

Samples were taken with total sampling of BPH patients over a period of 24 months in the period of January 2012 - December 2014. The research location is on Medical Record Installation of RSUP Dr. Kariadi Semarang during January 2012- December 2014.

Prostate volume is the volume of the prostate that is assessed on ultrasound examination. Age is the age of patients examined when the initial inspection before action is taken.

The data collected are prepared in tabular form. Each variable was documented by the prostate volume and age. The data were analyzed and the results are presented in tables and boxplot, then to determine the normality of data, normality test is used with the Kolmogorov-Smirnov test, then if the distribution is not normal followed by Spearman's rho test. Analysis is calculated with SPSS 17 for windows.
RESULTS
This research was conducted by taking a sample of BPH patients who came to RSUP Dr. Kariadi Semarang who has been diagnosed as BPH and then recording the patient's age and PSA levels, samples were then sent to the Central laboratory of RSUP Dr. Kariadi. A number of 80 patients examined PSA levels and recording the patient's age.

<table>
<thead>
<tr>
<th>Variabel</th>
<th>Mean ± SD</th>
<th>Median (min-maks)</th>
<th>Kolomogorov Smirnov test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prostate volume</td>
<td>65 ± 7,63</td>
<td>70 (50 – 80)</td>
<td>0,000</td>
</tr>
<tr>
<td>Age</td>
<td>5,83 ± 1,08</td>
<td>5,6 (4,2 – 8,5)</td>
<td>0,004</td>
</tr>
</tbody>
</table>

From the Kolmogorov Smirnov normality test, it found that p value <0.05 in prostate volume variables and age, so as to further test using Spearman's rho correlation test.

<table>
<thead>
<tr>
<th>Variabel</th>
<th>R</th>
<th>p</th>
<th>Keterangan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prostav volume</td>
<td>0,798</td>
<td>0,000</td>
<td>Significant, positive, strong</td>
</tr>
<tr>
<td>PSA</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

from the results of Spearman's rho correlation test it found that p value = 0.000 and r = 0.798. For a value of p <0.05, it can be concluded that there is a significant correlation between prostate volume with increase of age with character of that correlation is positive.

DISCUSSION
In our research, it is found that there is a significant correlation between prostate volume with increasing age (p = 0.000). The results of our research is similar with research conducted by Collin et al which included 472 patients with BPH, that taken digital rectal examination, TRUS examination (transrectal ultrasonography), and examination of pre operative PSA levels.5

On the Study, it showed that there is a relationship between prostate volume, age and PSA levels, the mean ratio of PSA per unit volume of the prostate was 0.072 ng/ml, and this ratio will increase as increasing age, with a significant value (0.001).

In the study conducted by Roehnborn et al showed that there is correlation between prostate volume with PSA levels depending on the age of patients with BPH with significant value (0.027), can be used as an aid to estimate the rate of prostate enlargement. PSA serum may predicts prostate enlargement which is good enough to be beneficial in therapeutic decision making in men with BPH.2

ACKNOWLEDGEMENTS
The author would like to say thank you to management board and staffs Department of Surgery, Medical Faculty, Diponegoro University, Dr. Kariadi Hospital, for the support during the research.

REFERENCES

7. Izawa JI, Dinney CPN. The role of angiogenesis in prostate and other urologic cancers: a review. CMAJ vol 164(5), March 2001

The Incidence of Comorbid Factors Geriatric and Non-Geriatric Patients with BPH Who Performed TVP Surgery in The Hospital Dr.Kariadi Semarang

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*Corresponding Author : mnafarin@yahoo.com

ABSTRACT

Purpose : To examine the incidence of hypertension and diabetic mellitus in patients geriatric and non-geriatric with BPH in TVP surgery in Dr Kariadi Hospital

Materials and methods : Retrospective descriptive study. By means of a medical examination Hospital remarks Dr. Kariadi for three years from January 2009 to December 2012. The study take place in medical records at Dr. Kariadi hospital

Results : Obtained 64 patients consisted of 55 (85.9%) geriatrics and 9 (14.1%) non-geriatrics. Results that most systemic disease in patients aged BPH ≥ 60 years (geriatrics) are hypertension 32 patients (50%) and diabetic mellitus 20 people (31%), whereas systemic disease in BPH aged < 60 years (non-geriatric), namely hypertension in 5 patients (7.8%) and diabetic mellitus 4 people (6%).

Of the results of Mann Whitney p value = 0.969, for p > 0.05 we can conclude there is no significant difference between groups in systolic geriatric and non-geriatric. The results of independent t test p value = 0.885, for p > 0.05 we can conclude there is no significant difference between groups diastolic geriatric and non-geriatric.

Of the results of Mann Whitney test p value = 0.885, for p > 0.05 we can conclude there is no significant difference in fasting blood sugar between geriatric and non-geriatric group of the Spearman correlation test results table for systolic against GDP obtained value p = 0.502 and r = 0.085, for p > 0.05, it can be concluded no significant correlation. Spearman correlation test results for diastolic against GDP obtained value p = 0.549 and r = 0.076, for p > 0.05, it can be concluded no significant correlation of table chi Squared for hypertension variables to age categories p value = 1.000 and for the variables DM against age categories p value = 0.718, because the value of p > 0.05, it can be concluded either hypertension or diabetic in geriatric insignificant.

Conclusion : This study showed that elderly hypertensive group 32 patients (50%) and diabetic, 20 people (31%), while the non-geriatric namely hypertension in 5 patients (7.8%), and diabetic 4 people (6%). Weaknesses in this study is the number of samples in this group is the number of samples in the non-geriatric group is too small, so that the results of the analysis are usually high.

Keywords : benign prostate hyperplasia, hypertension, diabetic mellitus, geriatrics, non-geriatrics, TVP

INTRODUCTION

Prostate gland is the male organ most frequently enlarged, either benign or malignant. Benign prostate enlargement (PPJ) or benign prostatic hyperplasia (BPH) is the second most common disease in the urology clinic after urinary tract stones in Indonesia. Benign prostatic hyperplasia is 80% of prostate disease besides prostate cancer 18% and 2% prostatitis. Indonesian population of 200 million, 100 million are men and has over 60 years of roughly 5 million people, it is estimated that 2.5 million people Indonesian men suffer benign prostate enlargement, approximately 30% of patients will come to ask for help, which is about approximately 800,000 people (Raharjo, 1997). Several authors reported that the frequency of symptomatic benign prostatic hyperplasia 14% in men aged 40 years, 24% aged 50 years, and 30% aged 60 years (Kirby et al 1995).

PPJ handling in Indonesia is still very dependent on the facilities, human resources available and also the cost. Until recently suprapubic prostatectomy surgical therapy in
transvesical and retropubic intravesical still the standard therapy, except in the existing hospital facility, the TUR - P urology (trans urethral resection prostatectomi) is a gold standard treatment in addition to treatment with drugs, fitofarmaka, visual laser, termoterapi, and others.1,2,3,4,5

Not all patients with PPJ comes to the doctor in case of premature sign or classification International Prostate Scoring System (IPSS) mild (score 0-7 ) and moderate (score 8-19).Especially in Indonesia, most of the PPJ comes seek medical help because of complaints of urinary retention due to disease of the Benign prostate enlargement.3,4

Similarly, not all patients who received medical treatment PPJ successful. Most of them (40-70 %) showed no improvement. In such patients, the surgical treatment is the most efisien.5,6

In the United States each year between 300,000-400,000 charged prostate surgery, urology section of Falkutas Medicine Airlangga University / RSUD.dr.soetomo, prostate surgery is the second largest operation after bladder stone disease surgery.6,7,8,9 Of the authors in Indonesia reported that approximately 70 % of patients with PPJ was done with open surgery techniques. Several authors have reported different figures, surveys for 5 years showed prostatectomy surgery transurethral resection is 94 % while prostatectomy transvesika reached 5.3 % -6 %.3

Comorbid factors in BPH include cardiovascular disease, hypertension, diabetic mellitus, and syndrome metabolic.10

Research conducted by Liaqat Ali et al in 146 patients with BPH who performed the operation Transvesika prostatectomy (TVP) obtained an average age of 67.8 years and 41 patients (28 %) are comorbid factors include hypertension 16 patients, 10 patients with diabetic mellitus, hypertension and diabetic 9 patients.11

This study was conducted to determine the prevalence of comorbid factors in patients with BPH include hypertension and diabetic mellitus transvesika prostatectomy surgery in RS.Dr.Kariadi Semarang.

MATERIALS AND METHODS

This study is a retrospective descriptive study By means of examination of medical records Dr. Kariadi for 3 years from January 2009 to December 2012. The research take place at the medical records of Dr. Kariadi Hospital.

RESULTS

Obtained 64 patients consisted of 55 (85.9 %) geriatrics and 9 (14.1 %) non-geriatrics. Results that most systemic disease in patients aged BPH ≥ 60 years (geriatrics) is hypertension 32 patients (50 %) and diabetic mellitus 20 people (31 %), whereas systemic disease in BPH aged < 60 years (non-geriatric), namely hypertension in 5 patients (7.8 %) and diabetic mellitus 4 people (6 %)

Mann Whitney test results table

<table>
<thead>
<tr>
<th>Group</th>
<th>Median (min – max)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geriatric</td>
<td>140 (90-190)</td>
<td>0.969</td>
</tr>
<tr>
<td>Non Geriatric</td>
<td>139 (110-170)</td>
<td></td>
</tr>
</tbody>
</table>

From the Mann Whitney test results of p value = 0.969, for p > 0.05 we can conclude there is no significant difference between groups in systolic geriatric and non-geriatric

Independent t test results table

<table>
<thead>
<tr>
<th>Group</th>
<th>Median (min – max)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geriatric</td>
<td>81,04 ± 12,509</td>
<td>0.885</td>
</tr>
<tr>
<td>Non Geriatric</td>
<td>81,67 ± 9.069</td>
<td></td>
</tr>
</tbody>
</table>

From the independent t test results of p value = 0.885, for p > 0.05 we can conclude there is no significant difference between groups diastolic geriatric and non-geriatric

Mann Whitney test results table

<table>
<thead>
<tr>
<th>Group</th>
<th>Median (min – max)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geriatric</td>
<td>115 (72 – 254)</td>
<td>0.885</td>
</tr>
<tr>
<td>Non Geriatric</td>
<td>124 (81 – 178)</td>
<td></td>
</tr>
</tbody>
</table>

From the Mann Whitney results test of p value = 0.885, for p > 0.05 we can conclude there is no significant difference in fasting blood sugar between geriatric and non-geriatric group
From the Spearman correlation test results for systolic against GDP obtained value 
$\text{p} = 0.502$ and $\text{r} = 0.085$, for $\text{p} > 0.05$, it can be concluded no significant correlation. Spearman

<table>
<thead>
<tr>
<th>Variable</th>
<th>Median (min – max)</th>
<th>P</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sistolic</td>
<td>140 (90-190)</td>
<td>0.502</td>
<td>0.085</td>
</tr>
<tr>
<td>GDP</td>
<td>117 (72 – 254)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diastolic</td>
<td>80 (50-120)</td>
<td>0.549</td>
<td>0.076</td>
</tr>
<tr>
<td>GDP</td>
<td>117 (72 – 254)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the Spearman correlation test results for diastolic against GDP obtained value $\text{p} = 0.549$ and $\text{r} = 0.076$, for $\text{p} > 0.05$, it can be concluded no significant correlation.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Age groups</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Geriatric</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Hypertension:</td>
<td></td>
<td>1,000</td>
</tr>
<tr>
<td>Yes</td>
<td>32</td>
<td>58,2</td>
</tr>
<tr>
<td>No</td>
<td>23</td>
<td>41,8</td>
</tr>
<tr>
<td>DM</td>
<td>20</td>
<td>36,4</td>
</tr>
<tr>
<td>No</td>
<td>35</td>
<td>63,6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Age groups</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non Geriatric</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Hypertension:</td>
<td></td>
<td>0,718</td>
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<tr>
<td>Yes</td>
<td>5</td>
<td>55,6</td>
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<td>No</td>
<td>4</td>
<td>44,4</td>
</tr>
<tr>
<td>DM</td>
<td>4</td>
<td>44,6</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
<td>55,6</td>
</tr>
</tbody>
</table>

Information:
°Fisher's Exact Test

From the table of chi square for hypertension variables to age categories $\text{p} = 1.000$ and for the variables DM against age categories $\text{p} = 0.718$. Because the value of $\text{p} > 0.05$, it can be concluded either hypertension or diabetic in geriatric insignificant.

**DISCUSSION**

Prostate enlargement is part of the process with increasing age so that the life expectancy has also increased the prevalence of benign prostate enlargement. Therapy of benign prostate enlargement had many ways and the goal is one that is improving or restoring the quality of life of patients. Surgery is still considered to be capable of improvement gives an objective score of IPPS and increase the rate of urinary stream.

Factors comorbidity in patients with BPH include cardiovascular disease and hypertension, diabetic, metabolic syndrome, and erectile dysfunction. The prevalence of hypertension increases with age appropriate. Kevin T. from the Feinberg School of Medicine, examined on 9800 patients with BPH found an increased risk of hypertension 5.3% each year of age. These findings are consistent with the possible pathophysiological relationship between BPH and hypertension, which is associated with increased sympathetic activity in old age. The prevalence of cardiovascular disease and hypertension in older age is also associated with an increased incidence of type 2 diabetes in this population. Prevalence of diabetes also increases with age as in BPH. JB Bourke et al. reported on 51 patients who performed BPH surgery 3 patients (5.9%) had diabetic.

Relationship between BPH and diabetic is not clear, but from various studies have suggested a relationship between BPH and diabetic through changes in male hormone mediated by IGF. This study showed that elderly hypertensive group 32 patients (50%) and diabetic, 20 people (31%), while the non-geriatric namely hypertension in 5 patients (7.8%), and diabetic 4 people (6%). Weaknesses in this study is the number of samples in this group, the number of samples in the non-geriatric group is too small, so that the results of the analysis are usually high.

**CONCLUSIONS**

This study showed that elderly hypertensive group 32 patients (50%) and diabetic, 20 people (31%), while the non-geriatric namely hypertension in 5 patients (7.8%), and diabetic 4 people (6%). Weaknesses in this study is the number of samples in this group, the number of samples in the non-geriatric group is too small, so that the results of the analysis are usually high.
REFERENCE

1. Connel, Ms. JD. Epidemiology, Etiology, Pathophysiology, and Diagnosis of Benign Prostatic Hyperplasia, Campbell’s Urology 7th Ed. WB Saunders Company. Philadelphia 1998; 1429-50


9. Kevin T, BPH: Epidemiology and Comorbidities, Northwestern University, Freiburg School of Medicine, Department of Urology, 2006


12. The Guidelines for BPH in Indonesia. Association of Urology Experts Indonesia


17. Priyanto J.E. Benigna Prostate Hyperlasia, Semarang: Urology Surgery Section FK UNDIP


The Benefits Of 1% Soy Isoflavones Cream As An Anti-Acne Vulgaris, A Randomized Controlled Trial

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Corresponding email: puguhungaran@gmail.com

ABSTRACT

Introduction: Acne vulgaris (AV) is a most common skin disorder, while soy isoflavones act as anti-inflammatory and anti-androgens. The aim of this study is to prove the benefits of soy isoflavones cream as anti-AV and the most effective dose as adjuvant regiment to reduce the quantity of AV lesions.

Method: This research was double blind, pre-test and post-test randomized controlled trial involving a hundred AV female patients who were randomized into 5 groups. Each group was treated with 0%, 0.25%, 0.5%, 0.75% and 1% soy isoflavones cream for four weeks as therapy for AV. The results of treatment were evaluated on 5th week for the reduction of total AV lesions.

Results: The mean number of AV lesions before treatment in all groups were not significantly different (p>0.05). The mean number after treatment in each 0%, 0.25%, 0.5% and 0.75% isoflavones cream groups were not significant (p>0.05), while in the 1 % isoflavones cream group was significantly lower (p<0.05)

Conclusion: Soy Isoflavones proved to be useful as an anti-AV and 1% soy isoflavones cream is the most effective dose to reduce the number of AV lesions.

Keywords: Acne vulgaris, Soy isoflavones cream

INTRODUCTION

Acne vulgaris (AV) is the most common inflammatory skin, nearly 80% of adolescents and young adults have suffered from AV.¹,²,³ AV patients in the United States each year around 17 million people or 78-95% ², while in Japan 59.5%, China around 36-38%⁴ In Indonesia AV incidence is approximately 15 million people.⁵ In General Hospital dr. Kariadi Semarang in 2008 the incidence was 15.3% among Dermatovenerology outpatient visit.⁶

AV therapy includes topical, systemic, skin surgery and combination.¹,²,³,⁷ Topical tretinoin is the first choice for AV therapy, while sunscreens are a formula that can reduce the photosensitive effects of tretinoin.¹ AV therapy is still a common concern and not yet satisfying; the drugs available are expensive, have some side effects, and its use requires special indications. The failure of AV therapy causes psychological effects such a low self-esteem and anxiety caused by scar tissue derived from acne that physically disturbing.¹,³,⁷,⁸ AV treatment becomes more expensive, for example in the United States about 100 million dollars per year and in the UK more than 30 million pounds.⁹ The ideal AV therapy is to overcome all the factors involved in AV pathophysiology, especially excessive sebum production and inflammation, therefore additional therapy is required until clinical cure occured. AV therapy can use fairly safe, effective and inexpensive natural substance, such as soy isoflavones.¹⁰,¹¹ Various studies have shown that oral soybean isoflavones proved as anti-inflammatory, anti-oxidant, and anti-androgen hormones. Riyanto et al has proven that oral soy isoflavones were useful as anti-acne, meanwhile the effect of topical soybean isoflavone to AV is not yet known. This study was conducted to see the effect of isoflavones in cream preparations derived from local soybean toward acne and to
test the most effective dose to diminish AV lesions.

METHODS

The research was conducted at Cosmetics Clinic of Dr. Kariadi Semarang Hospital Semarang. Isoflavones were extracted from local soybean at Mathematics and Natural Sciences Faculty Diponegoro University. The soy isoflavones cream was made at Pharmacy Laboratory of Medical Faculty Diponegoro University. The study was conducted in January-February 2017.

The research was a double blind, pre and post test clinical randomized trial.

The subjects were female patients with mild, moderate and severe AV over one month visiting Cosmetic Clinic of Dr Kariadi Hospital, age 13-40 years, not pregnant and not taking oral antibiotics, prednisone or other corticosteroids, antioxidants, oral retinoids, spironolactone, ciproterone acetate, and flutamide in the past 1 month. The subject were excluded if had allergy to isoflavones.

The sample size of each group was 20 people, in this study there were 5 groups. One hundred subjects were randomly divided into five groups of isoflavones concentration namely 0%, 0.25%, 0.5%, 0.75%, and 1% respectively. The subject selection was done by consecutive sampling. The standard drugs used are 0.025% cream tretinoin and SPF 15 sunscreen.

The dependent variable was the number of AV lesions, included a combination of the closed comedones, open comedones, papules, pustules, and nodules. Total AV lesions examined by two dermatovenereologists independently.

CONFIDING variables of age, body mass index (BMI), stress status according to Beck Depression Inventory (BDI) score, hyperandrogenism according to Ferriman and Gallwey scale were controlled. Confounding variables of genetic, race, pollutant, and chemicals exposure.

Inferential data analysis presented average total AV pre test with unpaired sample test One Way Anova, while post test with paired ample test Kruskal Wallis paired. Differences in total lesions of each group of soy isoflavone cream 0%, 0.25%, 0.75% and 1% were done by Paired t test, 0.5% isoflavone with Wilcoxon Signed Ranks Test. Sample test of delta of total AV lesions in 5 groups was done by Kruskal Wallis test and followed by Mann Whitney test. The defined degree of significance is p <0.05 with 95% confidence interval.

The ethics of this study has been approved by the Ethics Committee of Medical Faculty, Diponegoro University / Dr. Kariadi General Hospital Semarang.

RESULTS

a. Basic Data

During the study period, there were 128 women with AV, 100 patients selected based on the inclusion criteria and 28 patients excluded because the patient was in acne treatment at other beauty clinic. The average age of subjects was 20.4 ± 8.22 years with the youngest age was 19 years and the oldest was 23 years. The demography profiles of subject between group (education, occupation, marital status) were not significantly different (p> 0.05). (Table 1)
Table 1. Characteristics of study subjects based on age, education, occupation, and marital status among 5 study groups in female AV patients at the Central General Hospital, Dr. Kariadi Semarang, January-February 2017, with a sample size of 100 people.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Soy isoflavones cream groups</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0% (n=20)</td>
<td>0.25% (n=20)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
</tr>
<tr>
<td></td>
<td>21.56 ± 3.56</td>
<td>20.55 ± 2.66</td>
</tr>
<tr>
<td>Education</td>
<td>University</td>
<td>Senior high school</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Occupation</td>
<td>Government employee</td>
<td>Entrepreneur</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>Marital status</td>
<td>Married</td>
<td>Unmarried</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>17</td>
</tr>
</tbody>
</table>
| Description: aKruskall Wallis, bChi square, (p> 0.05) age, education, occupation and marital status characteristics were not significantly different among 5 groups.

The menarche age of the subject ranged from 12 to 14 years old. Regular menstrual cycle period was found 93%, while the irregular about 7%, with intervak period of 28 days (48%). The majority of women in the study did not use hormonal contraceptives (85%). Confounding factors in the study were menstrual status and hormonal contraceptives usage in each group of soy isoflavone cream 0%, 0.25%, 0.5%, 0.75%, 1% were not significantly different (p> 0.05). (Table 2)
Table 2. Menstrual status and use of hormonal contraceptive of study subjects between 5 study groups in female AV patients at the Central General Hospital Dr. Kariadi, Semarang, January - February 2017, with a sample size of 100 people.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Soy isoflavon cream groups</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0% (n=20)</td>
<td>0, 25% (n=20)</td>
</tr>
<tr>
<td>Menarche (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>12</td>
<td>13,0</td>
</tr>
<tr>
<td>27</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>28</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>29</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Menstrual cycle (days)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Menstrual periode (days)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular</td>
<td>19</td>
<td>18</td>
</tr>
<tr>
<td>Irregular</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Contraception (tablet, injection, implant)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>No</td>
<td>16</td>
<td>18</td>
</tr>
</tbody>
</table>

Description: aKruskall Wallis (p> 0.05): Menarche, bChi square, (p> 0.05): menstrual cycle, menstrual period, menstrual regulation, and KB are not significantly different among 5 groups.

The mean of BMI of all samples in this study was 20.2 ± 5.10 and no subjects had hirsutism. Most (95%) of the study samples had no psychological stress, while 5% had mild stress. Statistically, body mass index, hiperandrogen disorder in the form of hirsutism, and stress status of the five groups were not significantly different (p> 0.05) (Table 3)

Table 3. Body mass index, hirsutism, stress status of study subjects between 5 study groups in female AV patients at the Central General Hospital Dr. Kariadi, Semarang, January - February 2017, with a sample size of 100 people.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Soy isoflavon cream groups</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0% (n=20)</td>
<td>0, 25% (n=20)</td>
</tr>
<tr>
<td>BMI</td>
<td>20,4± 2,50</td>
<td>20,5± 1,60</td>
</tr>
<tr>
<td>Hirsutism (n=100)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>No</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Score of stress (BDI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>Mild</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Moderate</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Severe</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Description: aKruskall Wallis (p> 0.05): BMI, bChi square, (p> 0.05): Hirsutism, stress status is not significantly different among the 5 groups.
b. Pre and post treatment data

Mean of total pre treatment were shown in Table 4. The result of paired sample test was mean of total pre test – post test AV lesions in each group of 0% isoflavone cream, 0.25%, 0.5%, 0.75% and 0.75% decreased significantly (p > 0.05) while the 1% cream group decreased significantly (p < 0.05) (Table 4).

Table 4. The test of mean of Total AV lesions Pre, Post, Pre-Post between 5 study groups in female AV patients at the Central General Hospital of Dr. Kariadi, Semarang, January - February 2017, with a sample size of 100 people.

<table>
<thead>
<tr>
<th>Soy Isoflavone Cream Groups</th>
<th>N</th>
<th>Mean±SD Total AV Lesions Pre</th>
<th>Post</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>20</td>
<td>90.4 ± 54.46</td>
<td>89.8 ± 69.72</td>
<td>0.145c</td>
</tr>
<tr>
<td>0.25%</td>
<td>20</td>
<td>85.5 ± 60.71</td>
<td>74.4 ± 69.84</td>
<td>0.080c</td>
</tr>
<tr>
<td>0.5%</td>
<td>20</td>
<td>91.6 ± 23.17</td>
<td>72.3 ± 26.28</td>
<td>0.056d</td>
</tr>
<tr>
<td>0.75%</td>
<td>20</td>
<td>89.0 ± 29.68</td>
<td>63.4 ± 72.30</td>
<td>0.051c</td>
</tr>
<tr>
<td>1%</td>
<td>20</td>
<td>90.3 ± 40.22</td>
<td>54.9 ± 62.34</td>
<td>*0.049c</td>
</tr>
</tbody>
</table>

Description: aPre test with unpaired sample test One Way Anova (p > 0.05) did not differ significantly. bPost test with unpaired sample test Kruskal Wallis was significantly different (p < 0.05). Paired sample t test of 0%, 0.25%, 0.75% and 1% isoflavone cream groups. dWilcoxon Signed Ranks Test for 0.5% isoflavone group. The soy isoflavone cream group 1% pre-test-post lesions were significantly different (p < 0.05), whereas the other group 0%, 0.25% 0.05% were not significantly different (p > 0.05).

The result of unpaired sample test Kruskal Wallis on delta of AV lesions among the 5 groups obtained value (p = 0.014) or significant difference (p < 0.05). (Table 5).

Table 5. Sample Tests of Delta of Total Pre - Post AV lesions on Isoflavone Soy Cream Group 0%, 0.25%, 0.5%, 0.75% and 1% in female AV patients at the Central General Hospital Dr. Kariadi, Semarang, January - February 2017, with a size sample of 100 people.

<table>
<thead>
<tr>
<th>Soy Isoflavone Cream Groups</th>
<th>n</th>
<th>Delta of Total AV Lesions Mean±SD p</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>20</td>
<td>-1.4 ± 15.28</td>
</tr>
<tr>
<td>0.25%</td>
<td>20</td>
<td>-10.9 ± 09.13</td>
</tr>
<tr>
<td>0.5%</td>
<td>20</td>
<td>-36.9 ± 03.11</td>
</tr>
<tr>
<td>0.75%</td>
<td>20</td>
<td>-43.4 ± 43.58</td>
</tr>
<tr>
<td>1%</td>
<td>20</td>
<td>-36.2 ± 22.212</td>
</tr>
</tbody>
</table>

Description: * Kruskal Wallis, p < 0.05 or significantly different

DISCUSSION

Characteristics of age, education, occupation and marital status in 5 groups of soy isoflavone cream 0%, 0.25%, 0.5%, 0.75%, and 1% statistically were not significantly different (p > 0.05). Characteristics of the study include age, education level, occupation, marital status, family planning participation, menstrual status, stress status, BMI, history of AV-related disease, are directly or indirectly factors associated with AV.12,13,14,15

The mean age in the entire sample study was 20.4 ± 8.22 years with the youngest age of 19 and the oldest 23 years, this result is similar to
Riyanto et al research, the mean age was 24.4 ± 5.01 with the youngest age is 17 years and the oldest age is 34 years old, it is also similar to AV research in China found the mean AV patient age 21 years and research in Italy with AV patient age is 20-24 years.16,17 The androgen hormones in women will begin to rise before puberty and peak in adults, then decrease in menopause.18 The highest level of education is senior high school. The type of work of most subjects is 75% of labor. The marital status of unmarried AV patients was 79%, this is similar to Riyanto, et al research obtained unmarried as much as 76.0%. Research in Saudi Arabia, 94.4% of unmarried samples, while marital status relation with AV is not known.19

Confounding factors in the study were menstrual status and hormonal contraceptives usage in each group of soy isoflavone cream 0%, 0.25%, 0.5%, 0.75%, 1% statistically not significantly different (p > 0.05). Hormonal status such as estrogen, progesterone, and androgen levels affect AV incidence, which increases hypersecretion of sebaceous glands and comedo formation.18

Body mass index, hyperandrogen disorder like hirsutism, and stress status among five groups were not significantly different (p > 0.05). Mean of BMI of all samples in this study was 20.2 ± 5.10. BMI assessment using WHO standard (2006). The body mass index is a factor that affects AV, and correlates with severity degree of AV, patients with high BMI scores will experience severe AV.17,20 Most of study sample did not experience stress 95%, while those with mild stress were 5%, this is almost as same as Riyanto’s research et al got normal score 20 (80.0%) and mild score 5 (20.0%).12,13 Some studies of stress or depression relation with AV, using stress evaluation parameters with BDI scores 21,22, stress associated with AV because it can increase the activity of sebaceous glands either directly or indirectly through stimulation of pituitary gland.1,23 The function of the sebaceous glands is also affected by corticotrophin-releasing hormone (CRH), whose its release regulated by pituitary may change in response to stress.1,3 All samples were not found to have a history of hyperandrogenism with hirsutism.

The application of soy isoflavone cream in this study used various doses with 4 weeks duration. Some studies related to AV therapy also use 4 weeks periode, this is adjusted with skin regeneration ranged around 28 days hence will be seen early clinical changes of AV lesions.24 This study used various doses of soy isoflavone cream, in order to see the dose response and determine the most effective dose of soy isoflavone cream that had an effect on total AV lesions, the results of this study found pre test total lesion of all groups were not significantly different (p > 0.05), whereas post test was significantly different (p <0.05). Differences between groups were found mean of 1% soy isoflavone cream group (p <0.05) toward soy isoflavone group 0%, 0.25%, 0.05%, 0.75%, while the other groups did not significantly different (p > 0.05). This study proved an effective dose for AV treatment was 1% soy isoflavone cream compared to 0%, 0.25%, 0.05%, 0.75%, this is similar to Riyanto, et al study using soy isoflavones with various doses that isoflavones by oral 160 mg / day administered for 4 weeks were shown to decrease total AV lesions and obtained oral dose of isoflavone 160 mg / day as the most effective dose. Acne vulgaris is a dynamic process and increase in sebum production, hypercornification of the pilosebaseus duct, and blackheads due to influence of androgen hormones and inflammation contributes to AV lesions development.18,25 Research about the effects of soy isoflavones on AV lesions in previous cream preparations has not been widely used, but some studies using soy isoflavones have been shown to be an anti-AV. Soy isoflavone dose 160 mg / day administered for 4 weeks effectively decreases the number of AV lesions.13 Isoflavone by oral dose of 160 mg / day administered for 12 weeks was able to decrease AV degree by reducing DHT levels in AV patients.13 Soy isoflavones by oral dose of 160 mg / day for 12 weeks can also decrease AV lesions through lowering inflammatory mediators IL-8 and TLR-2.14,15 This study used topical soy isoflavones in cream, with the aim to improve the effectiveness of therapy, cheaper and avoiding some side effects of oral form usage.
Several studies have shown that soy isoflavones affect the androgens and the role of androgen hormones in AV especially in women, there is a correlation between DHT and total AV lesions in women, whereas the effects of isoflavones as anti-inflammatory can be found in several studies proved that isoflavones may decrease proinflammatory cytokines. The effect of soy isoflavones on AV lesions is due to decreased DHT levels that will improve pilosebaceous ducts condition, decrease sebaceous gland secretion, improve pilosebaceous duct infundulum keratinization, corneocyte cohesion and prevent formation of micro comedo, resulting in decreased total AV lesions. The role of soy isoflavones in androgen metabolism is to inhibit 3β-hydroxysteroid dehydrogenase (3β-HSD), 17β-hydroxysteroid dehydrogenase (17β-HSD) and 5α-reductase enzymes. The effect of soy isoflavones in inhibiting inflammation on AV, leading to reduced papules, pustules, and nodules, will also decrease total lesions.

Soy isoflavone dose 160 mg / day in Riyanto et al study as an oral anti acne replacing available therapy, such effective oral isotretinoin and used for AV, but have some side effects including teratogenic, affect abnormalities on liver enzyme, and dyslipidemia. The standard drug used in this study is 0.025% tretinoin cream is one of topical retinoids derived from vitamin A, which serves to normalize proliferation process and comedolytic, has been used for AV therapy since 30 years ago. Tretinoin is an effective topical retinoid as monotherapy and becomes the first choice in mild non-inflammatory AV or mild or moderate inflammation. These topical preparations have potential depending on their purity and concentration, available in the form of creams, gels or liquids of 0.025%, 0.5%, and 0.1% concentrations. Topical tretinoin has an effect on increasing turnover of follicle epithelial cells, comedolytics and normalizing corneocyte cells to inhibit comedo formation. The research of Riyanto et al proved 0.025% tretinoin cream as a standard drug in a single preparation is not effective for AV, this can be seen in placebo group given only standard drug 0.025% tretinoin cream, decreased total AV lesions was not significant, with some studies proved tretinoid cream 0.025% administered for 12 weeks will decrease the number of mild AV lesions 40% and 10% moderate AV lesion. Tretinoin has side effects that can occur like skin irritation, and photosensitivity. This 1% soy isoflavone cream research is an effective, safe and inexpensive AV topical therapy that can replace existing standard therapies.

CONCLUSION
The application of 1% isoflavone cream for 4 weeks in AV patients can reduce total AV lesions and 1% dose is the most effective dose compared to isoflavone soy cream 0%, 0.25%, 0.5%, 0.75%.

BIBLIOGRAPHY
male volunteers, Prostate Cancer and Prostatic Disease, Vol 12, pp 247-52.


31. TEfficacy and tolerability of once-daily tazarotene 0.1% gel versus once-daily tretinoin 0.025% in the treatment of facial acne vulgaris: a randomized trial. Cutis, Vol 67(6), hanghetti W, 2012, pp 4-9.
The Difference Pre induction Hypnodonti Method towards Anxiety of Children age 4-8 years old (Case Study of Dental Hospital UMY and its Network)

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²Student in School of Dentistry Universitas Muhammadiyah Yogyakarta

ABSTRACT

Introduction: Children usually experience anxiety during dentist visit, it usually happens to those who made dental visit for the first time or specifically afraid of dental instrument. Approaching method was developed to cope this anxiety and hypnodonti is one of them. Hypnodonti is one of hypnosis type that used in dentistry for dental procedure. Stages of hypnodonti are pre induction, induction, deepening, depth of level, suggestion, termination and post hypnotic. Hypnodonti have used by medical staff to treat patient to be mentally anesthetized. Pre induction was used as the first stage that determined the succeeds of hypnodonti. The application of hypnodonti result relax, comfortable, and calm effect to the patient immediately so it can reduce effect of anxiety such as pain during dental treatment.

Purpose: This study was aimed to determine a difference hypnodonti induction towards anxiety between boys and girls age 4 – 8 years old in Dental Hospital UMY and its network.

Method: This study was quasy experimental study with one group pretest posttest design. Venham’s picture test was used as anxiety measurement. Samples were 28 children, 11 boys and 17 girls age 4-6 years old. Data was analyzed using Mann Whitney test. Result and Conclusion: Data analyzed using Mann Whitney test result p 0.267 for children group age 4-6 years old. Furthermore children group age 6-8 result p 0.846 (p>0.05). It conclude that there were a difference of anxiety level between boys and girls group age 4-6 and 6-8 years old but not statically significant.

Keywords: pre induction, hypnodonti, anxiety

INTRODUCTION

Common problem that patient mostly face when meet dentist was anxious, fear, tense, or even hostility. Many people refuse to find dental treatment or check up for long time until problem emerges and they finally look after dentist. The experience of previous dental visit may result anxiety, fear, and tense and these may elevate the pain threshold which not beneficial for dental treatment. A parent who has this experience has a chance to generate it to their children.

Anxiety is a signal of awareness and warning to any threat or danger that result someone to take an action to overcome it. However fear is a similar signal of awareness but it emerges as a result of certain danger or explicit threat not an inner conflict. In the other hand anxious is a response of uncertain threat, unspecified source, internal, or inner conflict. It appears because of a reaction through tenses inside or outside our body, which controlled by autonomy nerves. The characteristics of anxiety are increasing of heartbeat, short breath, dry mouth, and sweated palm. Someone who experience anxiety usually feels tense, scares, worry, nervous, confuse, and pain.

There is a report said gender affecting anxiety in children. Girls has shown more anxiety than boys when operator preparing tools for dental
As well as age, children age of 6 has experience the hardest anxiety to dental treatment than any other children group age. Management of this problem can be done by behavior therapy that may reduce habit or in cooperative attitude then replace it with new behavior pattern that is suitable and reduce the anxiety generally by relaxation training that expected to have physiologic effect such as slower heart beat, high periphery blood stream and neuromuscular stability. Relaxation training method was produce by relaxation through major muscles in specific order firstly a muscles in inferior to superior extremities or vice versa. Patient was shown to modeling participant where someone who are in the same age and gender perform less anxiety to face similar situation which these patients afraid of. This technic has reported success in dealing with children anxiety.

Furthermore hipnodonti has introduced in its implementation to dental treatment. Giving hypnotic suggestion has made to begin this method and plays an important role in dentist patient relationship. Hypnodonti performed to give better understanding so patient can feel more comfortable during dental treatment. As a result patient was expected to face medical or dental treatment without feeling anxious. Hypnodonti suggested in previous study to be performed to children to make them feel comfortable seating in dental chairs and receive tooth extraction treatment. Moreover for preparation of hypnodonti, one important key to make it success is pre induction. Patient is seated to conducive area with the hypnotherapist. It achieved by giving small talk that creates a good proximity between patient and dentist.

**MATERIALS AND METHOD**

This study was quasy experimental study with one group pre test post test design. It purposed to determine whether any differences on anxiety level between boys and girls age 4-8 years old after pre induction hypnodonti procedure in Dental Hospital UMY and its network. This study was performed October to January 2017.

Population of this study was entire patient in Dental Hospital UMY age 4-8 years old both boys and girls who experience anxiety during dental visit to clerkship student. Sample was entire population who meet inclusive criteria. Based on Frankel dan Wallen (1993) cit. Sigit (2003), number of sample for quasy experimental study was at least 30 sample children group age 6-8 years old and 28 sample for children in group age 4-6 years old.

This study was measured during pre induction process by giving therapeutic conversation and body language such as being relax, keeping an eye contact, open gesture, and good appearance. Anxiety levl was measured by Venham’s test which shown to the patient before and after treatment. Venham’s test scale consists of 8 pairs of picture each pair represent afraid and not afraid behavior. Children were asked to choose every pairs, which picture represents their feelings. Number of value start from 0-8.

Inclusion criteria for this study were children who has first or initial dental visit, able to communicate, and those who their parents agree for pre hypnotic induction action took. Exclusion criteria were mentally disable, hyperactive, and autistics children.

**RESULT AND DISCUSSION**

**Children group age 6-8 years old**

Sample characteristic was fifteen are girls and fifteen boys with fourteen of them are age 6-6.5 and other sixteen are age 7-7.5. Data distribution was attempted using Shapiro-Wilk for less fifty subjects with significance p>0.05. Data analysis for normality suggested irregular distribution of data with p <0.05.

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Average</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girls</td>
<td>15</td>
<td>15.80</td>
<td>237.00</td>
</tr>
<tr>
<td>Boys</td>
<td>15</td>
<td>15.20</td>
<td>228.00</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The difference of pre induction method of hipnodonti between boys and girls group age 6-8 years old was achieved by analyzing data using Man Whitney test. Data suggest the differences of anxiety level before and after pre induction hypnodonti to patient (table 1). Moreover this data was continue to analyze using Mann-Whitney test which result p 0.846 (p<0.05) that can be conclude that there no significant difference between anxiety level before and after pre induction hypnodoncic between boys and girls age 6 to 8 (table 2).

Table 3. Wilcoxon Signed Rank Test children age 4-6 years old

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
</tr>
</thead>
<tbody>
<tr>
<td>posttest - pretest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative Ranks</td>
<td>26(a)</td>
<td>13.67</td>
<td>355.50</td>
</tr>
<tr>
<td>Positive Ranks</td>
<td>1(b)</td>
<td>22.50</td>
<td>22.50</td>
</tr>
<tr>
<td>Ties</td>
<td>1(c)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a posttest < pretest
b posttest > pretest
c posttest = pretest

\[ Z = -4.032(a) \]
\[ \text{Asymp. Sig. (2-tailed)} = .000 \]
a Based on positive ranks.

Table 4. Mann whitney test for children age 4-6 years old

<table>
<thead>
<tr>
<th>Test Statistics(^b)</th>
<th>selisih</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mann-Whitney U</td>
<td>70.500</td>
</tr>
<tr>
<td>Wilcoxon W</td>
<td>223.500</td>
</tr>
<tr>
<td>Z</td>
<td>-1.110</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>.267</td>
</tr>
<tr>
<td>Exact Sig. [(2^a(1\text{-talled Sig.)})]</td>
<td>.285(^a)</td>
</tr>
</tbody>
</table>

a. Not corrected for ties.
b. Grouping Variable: jenis kelamin

Data were furthermore analyze to determined the difference of anxiety level between boys and girls age 4-6 years old using Mann Whitney Test (table 4). It shown that the significance p 0.267 (p<0.05) which means that there no any significance difference anxiety level reduction before and after pre induction hypnodonti between boys and girls age 4-6 years old.

DiSCUSSION

Psychologies of children are very unique and it is necessary to count on it during dental treatment because wrong handling to it may
result an anxiety and higher level of pain and reaction to any dental intervention. There are many ways to overcome children anxiety who make a dental visit, hypnodontics is one of them. It is a process of giving an suggestion to the patient to achieve relaxation, focus and comfort.

Subject of the study was children age 4-8 years old, school age children which has concrete ability to think better than pre school children has specific critical factor. It made physician easy to built a positive suggestion especially in pre induction stage. It is in line with study from Setio (2014) that suggestion may easier to children because of the critical factor that widely open in children age 0 to 8 years old.

This study was limited only in pre induction stage on lowering anxiety level without further damage. Being patient is crucial to this study since children has to understand on the treatment, repetition has to be made using positive suggestion to make children more confidence and cooperative to the treatment. Both girls and boys experience different lowered number of anxiety level even though it does not statistically significant. Alfiyanti (2007) reported that there is no any correspondence between ages, gender, treatment duration, and previous experience of dental treatment to level of anxiety of patient who being treated in the hospital.

However other analysis conducted by Liddel and Murrat (1998) present study where girls performed higher level of anxiety when meet dental treatment compared with boys. Similar result also reported by Trismiati (2006) who suggested that girls were more anxious through their inability compared to boys. The study also suggested that boys shown more explorative rather than girls who were more sensitive.

Ryanda (2016) has performed a study to assess the anxiety level of girls and boys before and after treatment. The result was girlas experience more anxiety before the treatment and it retain after the treatment. However, boys suggested lower level of anxiety before the treatment and after treatment.

Children’s behavior who will receive dental treatment may vary. It is important to dentist maintain it, because more anxiety has shown bad impact on their perception of pain. At the worse case it can affect undergoing dental treatment. It is necessary to talk to children about their feelings and experience on facing dental treatment. Strong motivation and suggestion becoming crucial to attempt success treatment with more relaxing and comfortable experience.

CONCLUSION
Dental treatment has result an anxiety to children age 4-8 years old. Pre induction hypnodonti that is performed before treatment has result in lowering anxiety to children. However there is no difference of lowered anxiety level between girls and boys age 4-6 toward pre induction hypnodonti intervention.

REFERENCES
Genetic factors associated with Primary Failure of Eruption: A Literature Review

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ABSTRACT
Primary Failure of Eruption (PFE), a rare autosomal, non-syndromic disorder in problem of teeth eruption, has become a concern to be highlighted in orthodontic and molecular studies. Studies confirm that genetic is the etiology that cause the occurrence of PFE. Genetic defect in PTH1R is mainly associated with PFE as the gene that cause PFE. Disruption occurs to this gene suspected to cause structural and functional changes of the expressed PTH1R. Therefore, genetic studies have been conducted to analyze the role of gene in the development of PFE. Epigenetic aspect also contributes in study of PFE. The role of the genetic and epigenetic aspect of PFE are reviewed in this article.

Keywords: Primary Failure of Eruption, Genetic, Epigenetic, PTH1R

INTRODUCTION
PFE is a rare autosomal, non-syndromic disorder with incomplete eruption of mainly posterior teeth and growth deficiency of the alveolar process in the affected region.1 Several reports have estimated the prevalence of PFE is around 1% of those who seek orthodontic treatment in North American population.2 The phenotypic form that arise in the affected patient shows bone resorption apparently proceeds normally, but the involved teeth do not follow the path that has been cleared. The teeth do not respond to orthodontic force and can not be moved into position.2 PFE is associated with several syndromes primarily affecting skeletal development, but it is also known as a nonsyndromic autosomal-dominant condition3 with variable phenotypic expression but almost complete penetrance.4 This condition can be caused by heterozygous mutations in parathyroid hormone receptor 1 gene commonly called as PTH1R. The mutants described so far shows that the mutation in PTH1R results exchange of amino acids or truncation of the protein that may result in structural changes of the expressed PTH1R.1 Patients with PFE due to PTH1R mutations, may have a failure of osteoclast formation cause eruption failure.5 Kano et al. conclude based on the long-term follow-up of these familial cases indicates that the primary etiology of PFE is intimately correlated with a disturbance in periodontal ligament metabolism with an increased tendency to genetically determined ankylosis.6

There are two types of PFE based on clinical appearance divided into type I and type II PFE. Type I shows a progressive open bite in the anterior to posterior region of dental arches. The second type (Type II) shows not only a progressive open bite from the anterior to the posterior region, but also a more varied expression of eruption failure in more than one quadrant. However, type II shows partial eruption of a second molar. Based on severity of posterior lateral open bite, type I shows a greater significant posterior lateral open bite than type II.2
2. Primary Failure of Eruption

2.1. Gene Expression associated with Primary Failure of Eruption

Eruption of teeth requires coordinated bone remodeling process at the right time and place. Bone remodeling process during tooth eruption occurs under the influence of some signalling molecules including PTH. Missing link in PTH will result in failure of tooth eruption and bone development. Several studies conducted found that this condition caused genetically by mutations in the parathyroid hormone receptor 1 (PTH1R) gene which results Primary Failure of Eruption. The location of this gene is 3p21.31 (Chromosome 3, short arm, region 2, band 1, sub-band 31.7

2.2. Mutation in Primary Failure of Eruption

Mutations in PTH1R have also been associated with Jansen chondrodysplasia (MIM: #156400), Blomstrand chondrodysplasia, Eiken, and Ollier disease.7 All five disorders including Primary Failure of Eruption are characterized by various defects in skeletal development.4 Genetic etiology underlying PFE were identified by genetic screening in affected families. Risom et al, reported six mutations in patients with PFE were predicted to generate loss-of-function proteins.4 Recent study have found more than 40 potentially pathogenic mutations.1 Studies shown the occurrence of sporadic cases of PTH1R mutations causing PFE have been identified by exome resequencing. PTH1R mutations identified so far are heterogeneous and may result in truncation of the PTH1R protein or single amino acid exchanges within the complex architecture of the receptor.4 In other study, these mutations are predicted to result in premature proteolytic degradation of the precursor protein or to impair correct mRNA maturation/translation. Risom et al, concluded that the likely cause of PFE is haploinsufficiency of PTH1R.4

![Figure 1. Functional studies of two putative PTH1R splice mutations shows exon skipping of exon 8 and exon 11 indicated by dotted lines](image)

Loss of function is the result of a mutation that reduces or abolishes a protein activity that affect the phenotype in organism. It is not commonly happen, as most of mutation will not change the phenotype of the organism significantly. This is happens because most eukaryotes are diploid, meaning that they have two copies of each chromosome and two copies of each gene, a loss-of-function mutation usually not result in a change of phenotype, as the second copy of the gene is still active and will compensate for the loss. The exception happened in one example being haploinsufficiency. Haploinsufficiency is type of loss-of-function mutations which neither dominant nor recessive.

![Figure 2. Haplosufficiency in PFE.](image)
Subramanian, et al, in a study that aim to analyze functional effects of PTH1R mutation that causes PFE, found that a single amino acid mutation in the intracellular tail of PTH1R interfere with cAMP signaling and cytosolic calcium transient. This study concludes that the mutation of one allele in PTH1R gene not only reduces the amount of functional receptors but also negatively affects proper signaling of the PTH1R from the healthy allele. Consequently, patients with heterozygous PTH1R mutations which results PFE suffer from impaired receptor signaling due to gene dosage as well as dominant negative effects.  

2.3 PTH1R signaling pathway

Bone homeostasis regulates by three main cell types involved in its process including the osteoblast, the osteocyte and the osteoclast. Osteoblasts are responsible for the production of the bone matrix and its mineralisation that needed in deposition of bone. Osteoblast also responsible for the recruitment and activation of osteoclasts through production of various cytokines. Osteocytes function in transducing the stimulant of mechanical stress into the expression and secretion of local regulatory factors that control features of bone remodelling. Activation of osteoclast will lead to bone resorption.

Bone remodeling process during tooth eruption occurs under the influence of some signalling molecules including Parathyroid hormone (PTH). Parathyroid hormone (PTH) is an 84-amino-acid peptide hormone which acts as a one of regulator of calcium homeostasis and mediator of bone remodeling. PTH is released by the parathyroid glands and synthesized as a prepropeptide in the chief cells of the parathyroid glands.

PTH and other component such as sex hormones, vitamin D and dietary of calcium intake have function that control the expression and secretion of receptor activator of nuclear factor kappa B ligand (RANKL) and osteoprotegerin (OPG). RANKL is a cytosine secreted by bone marrow cells, osteoblasts, and osteocytes, and it plays an important role in osteoclast generation. PTH is active when calcium falls below the set point to keep the plasma calcium homeostasis. Calcium sensing receptor determine the synthesis and release of PTH which can be found on the plasma membrane of gland cells. If there is even only a slight changes in calcium concentration, it may lead to large changes in PTH.

Bone resorption that induced by PTH required maturation of osteoclast by stimulation of PTH/PTH-rP Receptor or PTH1R. Along with PTH, Parathyroid hormone related protein (PTH-rP), a paracrine hormone that also regulates bone development, also play a role in activation of PTH1R. PTH and PTH-rP bind to and activate (PTH1R), a G-protein coupled receptor with seven transmembrane domains, is highly expressed in bone and kidney. PTH1R acts in stimulating multiple signaling pathway including the Gs-cAMP-PKA, Gq/11-PLC-PKC and mitogen-activated protein kinases (MAPKs) which results in various biological effects including anabolic and catabolic reaction in bone. PTH1R mainly signals by coupling with the Gs-cAMP-PKA pathway, but is also able to couple to Gq/11-PLC-PKC pathway.

PTH1R is PTH receptor signaling that acts as mediator of PTH to activate osteoblast by stimulation of adenylate cyclase (AC) and by increase of cytosolic calcium concentration. Activation of osteoblast will result in bone deposition. Stimulation of adenylate cyclase (AC) increases intracellular cAMP in osteoblasts. cAMP is one of the intracellular second messengers associated with signalling in bone remodeling. The action of cAMP is mediated through phosphorylation of specific proteins by its dependent protein kinases (PKA). Alterations in cAMP levels have been associated with synthesis of polyamines, nucleic acids, and proteins, and with secretion of cellular products. Davidovitch et al, in a study on the cellular localization of cAMP, found an increase number of cAMP-positive cells in areas of the PDL where bone resorption occurred. Thus, PTH may produce anabolic and catabolic effects on bone. Consequently, disruption in signalling pathway of PTH1R gene could result imbalance between bone resorption, to establish the passageway for an erupting
tooth, and bone formation, to rebuild bone through which the tooth has transited that results in Primary Failure of Eruption (PFE). 5,15

2.4 Epigenetic

PTH signaling use a particular aspect of the epigenetic work to obtain its desired effects. 11 There are some methods to modify genome such as miRNA binding and nucleosome positioning, DNA methylation and posttranslational modification of histones. 11 Epigenetic events occurring in formation of osteoblast including, DNA methylation and posttranslational modification of histones, and histone-modifying enzymes, histone deacetylating enzymes (HDACs). 16,17

DNA methylation in Bone Remodeling

Previous study shown that presumably there is association between PFE and osteoarthritis. 5,18 Recent evidence found the association of osteoarthritis and a decrease in PTH1R expression in rat chondrocytes. 19 DNA methylation in musculoskeletal diseases has been most studied in the context of osteoarthritis. Studies found that increased methylation at the MMP13 and iNOS promoters in human articular chondrocytes with the progression of arthritic disease. 16

DNA methylation at specific gene promoters significant as potential driver of osteoblast differentiation. In progressive methylation of gene promoters associated with stem cell genes, differentiation of human mesenchymal stem/stromal cells (MSCs) into the osteoblast lineage resulted occurs. Mechanical stimulation was observed as a change of methylation status of the osteoblast-related gene Bglap2 (osteocalcin) gene in cells undergoing osteogenic differentiation. 16

HDACs in PTH-Mediated Bone Remodeling

Depending on duration and periodicity of the administration of PTH, PTH may result anabolic and catabolic effects to the bone remodeling process. Catabolic effect on bone will result from administration of continuous treatment of PTH, while intermittent administration of PTH will produce anabolic effects to the bone which result bone formation. In clinical practice, the only FDA-approved osteoanabolic therapy is daily intermittent injections of PTH(1–34). 11

PTH signaling in the osteoblast lineage have been shown to regulate class IIa HDACs, HDAC4 and HDAC5, and class III HDAC, Sirtuin 1 which have significant role in the effects of PTH on bone. The role of HDACs in PTH induced gene regulation particularly with class II HDACs is significant in binding transcription factors and block recruitment of transcriptional activators. signaling pathway including the Gs-cAMP-PKA induced by PTH utilizes HDAC4 to control Mmp13 expression shown in study in the rat osteoblastic cell line, UMR 106–01. 20 Phosphorylation of HDAC4 causes the release of HDAC4 from Runx2 on the Mmp13 promoter. dephosphorylation of HDAC4 leads to its subsequent translocation out of the nucleus. Both conditions allow the recruitment of histone acetyltransferases (HATs) such as p300 and P/CAP to promote transcription.

The role of HDACs with class III HDACs, Sirt1 appears to induce bone development, as global deletion of SIRT1 in mice leads to delayed bone mineralization. 21 Sirt 1 plays a role in inhibiting a catabolic action of PTH on bone. In clinical practice, the role of SIRT1 may be a potential target in the treatment of osteoporosis. 11

Modification of histone, Histone deacetylase inhibitors (HDIs)

In a study on bone formation, found that HDIs inhibit osteoclasts in animal models of chronic inflammatory diseases, including rheumatoid arthritis and periodontal disease. 22 A variety of HDIs, suppress NF-κB or NFAT signaling in osteoclasts and reduce expression of inflammatory cytokines result decrease rate of disease progression. In clinical practice, the FDA-approved HDI, and perhaps other epigenetic drugs could be effectively used to develop bone in vitro. However, the direct effects of the drugs on precursor cells need further study for in vivo bone regeneration. 16, 23

3. Conclusion

Primary Failure of Eruption (PFE), a rare autosomal, non-syndromic disorder with incomplete eruption of mainly posterior teeth, is
caused genetically by mutation of PTH1R gene. PTH1R mutations are heterogeneous and may result in proteolytic degradation of the PTH1R precursor protein, truncation of the PTH1R protein or single amino acid exchanges within the complex architecture of the receptor which disrupt cAMP signaling and cytosolic calcium transient, thus causing PFE. Role of epigenetic regulatory mechanisms in controlling various developmental processes in bone remodeling process has an important impact on treatment of PFE, however further study is certainly necessary.

REFERENCES
21. Edwards JR, Perrien DS, Fleming N, Nyman JS, Ono K, Connelly L, et al. Silent information regulator (Sir)T1 inhibits NFkB signaling to maintain normal skeletal

Minimizing Waste in Comprehensive Emergency Obstetric And Newborn Care (CEMONC) with Lean Hospital at Brebes and Semarang City, Central Java

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ABSTRACT

Introduction: Brebes and Semarang are regions with the highest maternal death within Central Java in 2016. There are no hospital standards synchronization with quality of care to ensure efficiency and punctuality. Lean Hospital is expected to minimize waste in CEMONC flow.

Method: Qualitative study was done in type B hospital at Brebes Public Hospital and KRMT Wongsonegoro Hospital in Semarang. There were 15 samples from hospital staffs and 7 samples from postpartum patients taken from each hospital. Observation and in depth interview were done to assess waste in CEMONC flow.

Result: Length of Stay (LOS) in CEMONC at both hospitals was optimal during observation. Waste percentage during observation in Brebes Public Hospital and KRMT Wongsonegoro Hospital were 35.8% and 25 % respectively. Maximum value of waste in the process was 30% thus Brebes Public Hospital was not in lean condition. Waste in Brebes Public Hospital was motion, waiting, overprocessing, transport, defect, and human potential. Waste in KRMT Wongsonegoro hospital was motion, waiting, transport, defect, and human potential. Root Cause Analysis (RCA) in Brebes Public Hospital showed that human, standard operating procedure (SOP), hospital layout and facility factor were major factors affecting CEMONC flow. While RCA result in KMRT Wongsonegoro Hospital was found to be the same as Brebes Public Hospital, SOP however was not one of the affecting factors of CEMONC flow.

Conclusion: The common waste was waiting and RCA of waste waiting from both hospitals were facility and hospital layout factor.

Keywords: CEMONC flow, lean hospital, minimizing waste

INTRODUCTION

In 2016, Brebes is the highest region with maternal and neonatal death within Central Java with 54 maternal cases and 444 neonatal cases. Semarang is the third highest of maternal death with 32 cases and the sixth highest of neonatal death with 201 cases within Central Java.1 Ganle et al stated that high hospital burden to serve a delivery was causing error in hospital system, facility, and human which lead to substandard quality of care. High hospital burden is one of other causative factors of maternal death.2

Improvement in quality of delivery service has been done in Brebes Public Hospital and KRMT Wongsonegoro Public Hospital such as the establishment of Comprehensive Emergency Obstetric And Newborn Care (CEMONC) and being accredited by Hospital Accreditation Commission (KARS). Unfortunately, Brebes Public Hospital has not been accredited by KARS.3 Decrement of maternal mortality rate (MMR) and infant mortality rate (IMR) was insignificant as there was no synchronization of CEMONC and KARS standardization to ensure efficiency and punctuality of delivery service.

One of strategies to improve the quality and ensure the efficiency and punctuality is Lean Hospital.4 Lean Hospital is a method to eliminate waste and increase the value in a emergency department (ED) process.5 Waste is an activity that does not improve patient condition. Waste of lean hospital consists of waste waiting, overprocessing, motion, defect, overproduction, unnecessary transportation, and non-utilized talent.6 Waste waiting is a common waste that occured in emergency department.7 Value is an activity that
improves quality of care and patient condition. Guideline of value in health care is patient centered care, thus this could improving patients satisfaction and hospital staffs. \(^9\)

Lean Hospital is already been implemented in emergency department in many countries. It also contributed in improving the quality and punctuality of care. \(^9\) The study against waste identification of CEMONC in Indonesia is not available. Therefore, the researcher will identify waste to minimize CEMONC process in Brebes Public Hospital and KRMT Wongsonegoro Public Hospital. The aim of study is to (1) identify waste in CEMONC process at Brebes Public Hospital and KMRT Wongsonegoro Public Hospital, (2) analyze causative factor of waste and provide recommendation to improve in both CEMONC.

METHOD

Qualitative descriptive method was used in this study. The study was conducted in 2 hospitals which are Brebes Public Hospital in Brebes City and KMRT Wongsonegoro Public Hospital in Semarang city. Both were B type hospital.

Study Setting and Population

Observation and interview was done in 22 respondents for each hospital, divided into 30 respondents of hospital staffs including of pediatrician, anesthesiologist, obstetrician, midwives who work in ED, labor ward, neonatal unit, and postpartum room, nurses who worked in intensive care unit (ICU), operating room (OR), registration staff, laboratorium analyst, Central Sterile Supply Department (CSSD) staff. There were 7 postpartum respondents in Brebes Public Hospital with various condition, including post operative C-section with severe pre-eclampsia, miscarriage, normal delivery, post operative C-section with baby in breech position, post operative C-section with premature rupture of membrane, narrow pelvic outlet patient, and severe preeclampsia patient. There were 7 respondents of KMRT Wongsonegoro Hospital, including post vacuum–assisted vaginal delivery, post female sterilisation with placental previa, normal delivery, post operative C-section with baby in breech position, post operative C-section with obstructed labor, and emergency department gastroesophageal reflux disease (GERD) patient with 6 month pregnancy. Respondents were chosen by non probability sampling to be interviewed in postpartum room and purposive sampling was done for interview with hospital staff, who directly involved in CEMONC process. The observation respondent was chosen by accidental sampling in CEMONC patient from emergency department of Brebes Public Hospital and KRMT Wongsonegoro Public Hospital.

Study Protocol

Indepth interview was done to patients and hospital staffs to determine patient values, hospital staff values, current value stream mapping, waste elimination, and root causes analysis (RCA). The aim of observation was to describe CEMONC flow in Brebes Public Hospital and KRMT Wongsonegoro Public Hospital, including in current value stream mapping, waste elimination, and RCA. Fish bone method was used in RCA method. After RCA analysis was done, the recommendation of improvement will presented.

RESULT

Brebes Public Hospital and KRMT Wongsonegoro Hospital characteristics were simplified in table 1. Those characteristics were organized based on hospital classification (hospital type, KARS accredited, and availability of CEMONC), adjuvant facility of CEMONC (availability of ED-operating room, EMAS server, aerocom, ED pharmacist, and nurse call system), and the availability of temporary employees (such as obstetrics-gynaecology (ob-gyn) resident, and clerkship).

Current State Value Stream Mapping (CSVSM) In Both Hospitals

Current State Value Stream Mapping (CSVSM) is one of lean tools to eliminating waste and gain efficiency in a process. \(^10\) The observation of this study has measured and documented a CEMONC process time, since the patient entered ED until being transferred to labor ward. CSVSM in Brebes Public Hospital was simplified in figure 1 and CSVSM in KMRT Wongsonegoro Public Hospital was simplified in figure 2.
<table>
<thead>
<tr>
<th></th>
<th>Brebes Public Hospital</th>
<th>KRMT Wongsonegoro Public Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hospital Classification</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hospital type</strong></td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td><strong>KARS Accredited</strong></td>
<td>X</td>
<td>√</td>
</tr>
<tr>
<td><strong>CEMONC</strong></td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td><strong>Hospital Facility</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ED-Operating room</strong></td>
<td>√</td>
<td>Located in ED</td>
</tr>
<tr>
<td><strong>EMAS Server</strong></td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td><strong>Aerocom</strong></td>
<td></td>
<td>Located in ED</td>
</tr>
<tr>
<td><strong>ED</strong></td>
<td>√</td>
<td>Located outside CEMONC-ED room</td>
</tr>
<tr>
<td><strong>Post Partum ward</strong></td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td><strong>Labor ward</strong></td>
<td>√</td>
<td>X</td>
</tr>
<tr>
<td><strong>Neonatal unit, consist of intensive care nursery,</strong></td>
<td>√</td>
<td>X</td>
</tr>
<tr>
<td><strong>special care nursery, well newborn nursery.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ICU</strong></td>
<td>X</td>
<td>√</td>
</tr>
<tr>
<td><strong>Laboratory</strong></td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td><strong>ED-Pharmacist</strong></td>
<td>X</td>
<td>√</td>
</tr>
<tr>
<td><strong>Nurse Call System</strong></td>
<td>√</td>
<td>√</td>
</tr>
</tbody>
</table>

| **Temporary Employees**   |                        |                                   |
| **Ob-Gyn resident**      | X                      | √                                 |
| **Clerkship**            | X                      | √                                 |

**Notes:** CEMONC, Comprehensive Emergency Obstetric And Newborn Care; KARS, Hospital Accreditation Commission; ED, Emergency Department; ICU, Intensive Care Unit; EMAS, Expanding Maternal and Neonatal Survival; Ob-Gyn, Obstetric and Gynaecology.
Figure 1. CSVSM of CEMONC flow in ED and labor ward at Brebes Public Hospital. Notes: CEMONC, Comprehensive Emergency Obstetric And Newborn Care; PHC, Primary Health Care; ED, Emergency Department.
Figure 2. CSVSM of CEMONC flow in ED and labor ward at KRMT Wongsonegoro Public Hospital. Notes: CEMONC, Comprehensive Emergency Obstetric And Newborn Care; ED, Emergency Department; Ob-Gyn, Obstetric and Gynaecology.
Based on CSVSM on both figures, we assumed that ED-Length of Stay (ED-LOS) in Brebes Public Hospital and KMRT Wongsongoro Public Hospital were 36 minutes and 1 hour 39 minutes, respectively. Goal of ideal LOS in ED from Institute of Healthcare for Improvement (IHI) was 3 hours. Therefore, we concluded that ED-LOS of CEMONC in both hospitals is already accordance to the standard. CSVSM arrangement by in-depth interview was done to describe a CEMONC process, since the patient arrived from ED until receiving operative procedure. CSVSM of Brebes Public Hospital will be simplified in figure 3 and KRMT Wongsongoro Public Hospital in figure 4.

**Figure 4.** CSVSM from ED to OR in KMRT Wongsongoro Public Hospital. **Notes:** CEMONC, Comprehensive Emergency Obstetric And Newborn Care; PHC, Primary Health Care; ED, Emergency Department; OR, Operating Room; Ob-Gyn, Obstetric and Gynaecology.

**Value-added assessment (VAA) in CSVSM**

CSVSM is a method to describe a value-added activity and non-value-added activity, thus all process could be seen. After the mapping was done then Value Added Assessment (VAA) was used to classify CSVSM activities into 3 types, which are value added activities, non-value added activities and non-value added activities but necessary. The classification detail then calculated the amount of waste from CEMONC process. The calculation purpose was to describe a healthcare performance. VAA of CEMONC process in Brebes Public Hospital and KRMT Wongsongoro Public Hospital were done by observation from the patient arrived in ED until patient got an advice from obstetrician. VAA from both hospitals were simplified in table 2.
<table>
<thead>
<tr>
<th>No</th>
<th>CEMONC flow in ED of KRMT Wongsonegoro Public Hospital</th>
<th>VA</th>
<th>NVA</th>
<th>NVA-BN</th>
<th>Type of Waste</th>
<th>No</th>
<th>CEMONC flow in ED of Brebes Public Hospital</th>
<th>VA</th>
<th>NVA</th>
<th>NVA-BN</th>
<th>Type of Waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Security officer greeted a patient</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>Security officer greeted a patient</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Patient’s family was registered the patient in ED’s registration</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>Patient’s family was registered the patient in ED’s registration</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Patient was handed over and assessed by clerkship</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>Patient was handed over and assessed by ED-midwives</td>
<td>√</td>
<td></td>
<td></td>
<td>Motion</td>
</tr>
<tr>
<td>4</td>
<td>Midwives were came and done an obstetric assessment</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>Midwives was doing an infusion and blood sampling</td>
<td>√</td>
<td>Waiting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>The midwife was calling the ob-gyn resident</td>
<td>√</td>
<td>Waiting</td>
<td></td>
<td></td>
<td>5</td>
<td>The ED midwives were handed over a patient from PHC-midwife</td>
<td>√</td>
<td></td>
<td></td>
<td>Waiting</td>
</tr>
<tr>
<td>6</td>
<td>The obstetrician was came to ED</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td>The ED-midwife was calling a physician</td>
<td>√</td>
<td></td>
<td></td>
<td>Waiting</td>
</tr>
<tr>
<td>7</td>
<td>Midwife was completing inpatient files</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td>7</td>
<td>Waiting for physician to came</td>
<td>√</td>
<td></td>
<td></td>
<td>Waiting</td>
</tr>
<tr>
<td>8</td>
<td>Patient bracelet and medical records are submitted to the midwife by the registration staff</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td>8</td>
<td>Physician visitation to ED patient</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Patient’s family was taking a medication from ED-pharmacy</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td>9</td>
<td>Midwife and physician were completing inpatient files</td>
<td>√</td>
<td>Overprocessing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Infusion and medication was administered to patient Ob-gyn resident came to ED</td>
<td>√</td>
<td></td>
<td>waiting</td>
<td></td>
<td>10</td>
<td>Patient was transferred to labor ward</td>
<td>√</td>
<td></td>
<td></td>
<td>Transportation</td>
</tr>
<tr>
<td>11</td>
<td>Patient was transferred to labor ward</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td>11</td>
<td>Labor ward-midwife was handed over a patient with ED-midwife</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Labor ward-midwife was re-assessed a patient</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td>12</td>
<td>Labor ward-midwife was re-assessed a patient</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Labor ward-midwife was completing patient’s medical record</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td>13</td>
<td>Labor ward-midwife was completing patient’s medical record</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Labor ward-midwife called obstetrician</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td>14</td>
<td>Labor ward-midwife called obstetrician</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Labor ward-midwife was filling the advices from obstetrician</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td>15</td>
<td>Labor ward-midwife was filling the advices from obstetrician</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total activity:** 10 0 2

**Notes:** CEMONC, Comprehensive Emergency Obstetric And Newborn Care; PHC, Primary Health Care; ED, Emergency Department; OR, Operating Room; Ob-Gyn, Obstetric and Gynaecology; VAA, Value Added Assessment; VA, Value Added; NVA, Non Value Added; NVA-BN, Non Value Added But Necessary
VAA in table 2 showed that the composition of value added with non-value added activity and non-value added but necessary in Brebes Public Hospital and KMRT Wongsonegoro Public Hospital was 9 : 5 (35.8%) and 10 : 2 (25%), respectively. Therefore, CEMONC process in Brebes Public Hospital was not in lean condition but KMRT Wongsonegoro Public Hospital was in lean condition. Based on Gazpersz study, lean organization is achieved if a minimum ratio between waste with total activity is 30%. The researcher had limitations such as time and research staff, thus the overall process time was unmeasured. In this study it was assumed that waste percentage in both hospitals could be more than 30%.

Waste Identification and Root Causes Analysis (RCA) in CEMONC Process in Brebes and KMRT Wongsonegoro Public Hospital

Waste findings in observation were then explored more deeply by interview to hospital staffs and patients. Waste findings during observation and interview were simplified in table 3.
<table>
<thead>
<tr>
<th>No.</th>
<th>Waste During Observation</th>
<th>Brebes Public Hospital Findings</th>
<th>RCA Findings</th>
<th>KRMT Wongsonegoro Public Hospital Findings</th>
<th>RCA Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Waiting</td>
<td>1. Patient and midwife were waiting ED physician for CEMONC to answer a phone call and come to ED. 2. The referral was impeded because of detain connection in EMAS server</td>
<td><strong>Process Factor</strong>: A responsibility to finish the process sequentially.</td>
<td>1. Patient and midwife were waiting ob-gyn resident to answer a phone call and came to ED. 2. Midwives and clerkship were not working simultaneously. 3. Prolonged in completion of inpatient files.</td>
<td><strong>Process Factor</strong>: A responsibility to finish the process sequentially.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Human Resources Factor</strong>: Coordination among CEMONC staffs were deficient. <strong>Facility Factor</strong>: Uncomfortable nurse station</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Transportation</td>
<td>The distance from ED to labor ward and labor ward to OR were too far</td>
<td><strong>Layout Factor</strong>: The new building was located far from OR.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Overprocessing</td>
<td>1. Hospital staffs were writing patient identity repeatedly.</td>
<td><strong>Facility Factor</strong>: Label printing to print patient identity was not available.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Motion</td>
<td>1. Labor room layout impeded midwives in observing a patient. 2. ED physicians for CEMONC in weekend were also doing a visitation in ICU and patient ward.</td>
<td><strong>Layout Factor</strong>: Labor room was not designed for observation room. <strong>SOP Factor</strong>: There was no regulation which organized an administration procedure to prevent repetitive movement.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Transportation</td>
<td>1. Postpartum patient did not understand the usage of nurse call system.</td>
<td><strong>Human Resources Factor</strong>: Education from midwives to patient was deficient</td>
<td>Labor ward hallway was too narrow, thus there is difficulty in patient transport</td>
<td><strong>Layout Factor</strong>: Labor ward hallway was too narrow</td>
</tr>
<tr>
<td>3 Motion</td>
<td>Facility Factor: Aerocom was not facilitated in ICU, thus ICU nurses need to walk to pharmacy or laboratory.</td>
<td>Facility Factor: Aerocom and medical instrument labeling were not available in ICU.</td>
<td>Facility Factor: Aerocom was not facilitated in labor ward, postpartum ward, and neonatal unit, thus hospital staff need to walk to pharmacy or laboratory.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. There was no laboratory staff who worked in emergency section, thus those staffs should go back from ward to laboratory for emergency test.</td>
<td>Human Resources Factor: There was no laboratory staff, who worked in emergency section and ED physician for CEMONC also have rotation to ED, ward, and ICU.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4 Defect</th>
<th>Facility Factor: Faulty nurse call system made patient have to wait for a midwife to enter postpartum room.</th>
<th>Facility Factor: No monitoring program for nurse calls system.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Some of inpatient files were missing thus hospital staff needs to repeat in filling those files.</td>
<td>Faulty nurse call system made patient have to wait for a midwife to enter postpartum room.</td>
<td></td>
</tr>
<tr>
<td>2. Monitoring program for Central oxygen concentrator in ICU was not available.</td>
<td>Faulty nurse call system made patient have to wait for a midwife to enter postpartum room.</td>
<td></td>
</tr>
<tr>
<td>3. Drug placement in ICU was in disarray.</td>
<td>Faulty nurse call system made patient have to wait for a midwife to enter postpartum room.</td>
<td></td>
</tr>
<tr>
<td>4. The obedience of timeout in surgical procedure was minimal</td>
<td>Faulty nurse call system made patient have to wait for a midwife to enter postpartum room.</td>
<td></td>
</tr>
<tr>
<td>5. Faulty competence in ED and ICU staffs.</td>
<td>Faulty nurse call system made patient have to wait for a midwife to enter postpartum room.</td>
<td></td>
</tr>
</tbody>
</table>

| Human Resources Factor: Competency mapping was mandatory in CEMONC. | Faulty nurse call system made patient have to wait for a midwife to enter postpartum room. | |
|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
**Layout Factor:**
Labor room - midwives observe patients from outside labor room.

**SOP Factor:**
There was no regulation which organized an administration procedure to prevent repetitive movement.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5 Underutilized Abilities of</strong></td>
<td>Physicians and midwives were seldom in discussing how to improve their competence.</td>
</tr>
<tr>
<td>People</td>
<td>Time Factor: There was no commitment from hospital staff to do a training or routine discussion due to individual preoccupation.</td>
</tr>
<tr>
<td></td>
<td>Time Factor: There was no commitment from hospital staff to do a training or routine discussion due to individual preoccupation.</td>
</tr>
<tr>
<td></td>
<td>Human Resources Factor: Competency mapping was mandatory in CEMONC.</td>
</tr>
</tbody>
</table>

**Notes:** CEMONC, Comprehensive Emergency Obstetric And Newborn Care; PHC, Primary Health Care; ED, Emergency Department; OR, Operating Room; Ob-Gyn, Obstetric and Gynaecology; ICU, Intensive Care Unit; EMAS, Expanding Maternal and Neonatal Survival.
RCA of CEMONC Process in Brebes and KRMT Wongsonegoro Public Hospital

Fish bone analysis as one of RCA method was done in this study. The purpose of analysis was to simplified the clinician and researcher in CEMONC mapping process.14

RCA of CEMONC in Brebes Public Hospital found that facility, human resources, and layout factor contributed in the emergence of waste motion while in KRMT Wongsonegoro Public Hospital it was found that facility factor contributed in the emergence of waste motion.

RCA of CEMONC in Brebes Public Hospital found that process factor contributed in the emergence of waste waiting while in KRMT Wongsonegoro Public Hospital found that facility, human resources, and process factor contributed in the emergence of waste waiting.

RCA of CEMONC in Brebes Public Hospital found that human resources and layout factor contributed in the emergence of waste transportation while in KRMT Wongsonegoro Public Hospital found that layout factor contributed in the emergence of waste transportation.

RCA of CEMONC in Brebes Public Hospital found that facility factor contributed in the emergence of waste overprocessing. Waste overprocessing in KRMT Wongsonegoro Public Hospital was not found.

Other RCA in KRMT Wongsonegoro Public Hospital was emergency operating room utility, which found that facility and human resources factor contributed in implementation failure. Finding in facility factor was inadequate surgical instrument which caused obstetricians to prefer doing a surgery in central operation room. Findings in human resource were lack of ED nurses that has been trained for assisting in the OR and limited amount of nurses.

DISCUSSION

There was a characteristic difference in both hospitals, whereas Brebes Public Hospital has not been accredited by KARS and KRMT Wongsonegoro Public Hospital has been. Hospital Accreditation, which was done by KARS (Hospital Accreditation Commission) evaluate 5 hospital activities, including management and administration, medical care, emergency care, nursing, and medical record. Hospital accreditation is used to maintain healthcare quality.15 The role of accreditation affected the emergence of waste in CEMONC, which was simplified in table 2. Total of non-value added but necessary activity occurred in KRMT Wongsonegoro was 2 activities, whereas 3 activity of non-value added but necessary and 2 activity of non-value added occured in Brebes Public Hospital. Furthermore, waste findings in interview and observation were more dominant in Brebes Public Hospital rather than KRMT Wongsonegoro Public Hospital. This finding is similar with Alkenizan et al study, which stated that accreditation could improve a quality and patient outcome in hospital.16

CEMONC process in Brebes Public Hospital was not in lean condition but KMRT Wongsonegoro Public Hospital was in lean condition. Those statements were made from CVSM (Current State Value Mapping) then calculated in VAA (Value Added Assessment). The benefit of CVSM and VAA was also felt in study by Yusof et al. Yusof et al found a non-value activity in pre-anestesia process was contributing in prolonged process at Institut Jantung Negara, Malaysia.17

Waste findings in Brebes Public Hospital were waiting, transportation, overprocessing, motion, defect, and underutilized abilities of people. Waste findings in KRMT Wongsonegoro Public Hospital were waiting, transportation, motion, defect, and underutilized abilities of people. Waste findings in both hospitals were simplified in table 3. Waste waiting was also
found in Chan et al study, which stated that waste waiting is a common waste occurred in ED, then it inhibit early medical treatment and decision to patient.7

Facility factor occurred in RCA of waste motion and defect in both hospitals, waste waiting in KRMT Wongsonegoro hospital, waste overprocessing in Brebes Public Hospital, and other RCA in KMRT Wongsonegoro. Based on Quality of Care theory from Institute of Medicine, facility factor was a hospital tool, which could improve worker and patient safety.15 Dinesh et al stated that lacking support facility could inhibit a process to move faster and accurate.18

Human resources factor occurred in RCA of waste motion, transportation, defect, and underutilized abilities of people in Brebes Public Hospital. Human resources factor occurred in RCA of waste waiting, underutilized abilities of people, and other RCA in KRMT Wongsonegoro Public Hospital. Dinesh et al stated that a faulty coordination among department and ignorance of hospital regulation were an inhibiting factor in healthcare process.18 Bleetman also stated that staff competence in both clinical or non-clinical, including leadership and management were important in emergency care aspect.19

SOP factor occurred in RCA of waste defect in Brebes Public Hospital. Ishijima stated that work standardization by SOP could minimize human error20 Study in Singapore by Ho et al also stated that quality of care was not only focused on clinical competence aspect in physician and nurse but also work environment, work flow, and communication. A successful intervention thus depends on solutions that are being provided and incorporated into hospital regulation.21

Layout factor occurred in RCA of waste motion and transportation at both hospitals. Pati et al also stated that hospital architecture as medical instrument could provide innovative solutions for patient and worker safety.22

Process factor occurred in RCA of waste waiting at both hospitals. A study by Dinesh et al in India stated that procedure overload could impact in settlement time and time to start the sequential procedure. Overload procedure occurred because of minimal coordination among department and ignorance about regulation, which made staffs did not have any discussion in order to fasten the healthcare process.18 Obscurity in collaboration among EMAS server with referral hospitals made prolonged response in EMAS server because the government has not extended the contract by paying a contract around 1600 USD each year. Therefore, improving coordination from top to low management was mandatory.

Time factor occurred in RCA of underutilized abilities of people at both hospitals. There was no time being allocated to discuss among hospital staffs in reviewing severe patient cases thus no improvement is made to hospital quality. Betterment of quality of care could be achieved through leadership support, succinct plan, training, and effective hospital management.23

**Proposed Improvement**

Arcidiacono et al stated that while accreditation was an important method for quality improvement however lean hospital was twice more important than accreditation.24 Therefore, integration between lean hospital concept with KARS was mandatory to improve healthcare quality. Suggestions for proposed improvement in CEMONC are as follows:

**Proposed Improvement of CEMONC in Brebes Public Hospital:**

1. Develop labor ward to be closer from ED and OR.
2. Rearrange labor room layout in order to achieve proper observation.
3. Procurement of obstetric instrument, perinatology instrument, aerocom, and labeling printing.
4. Addition of CEMONC SOP, which organize a CEMONC patient flow, central oxygen concentrator monitoring, inventory system, restocking drug and consumable, equalization of competence on the midwife.
5. 5 S method implementation and visual management are mandatory in all inventory rooms.
6. Reassess workload analysis and adjusted with the number of patient.
7. Effective communication between hospital staff and patient.
8. Signature delegation by other ED physician in referral letter from PHC.
9. Training and development department commitment to improve CEMONC staffs competence.
10. Managerial commitment to achieve 30 minutes decision to incision
11. Brebes Health Department should extend the contract or Brebes Health Department should establish their own referral server independently in order to simplify referral process.

Proposed Improvement of CEMONC in KRMT Wongsonegoro Public Hospital:
1. Labor room for unstable patient should be placed near entrance or lengthen labor ward hallway.
2. Aerocom procurement in labor ward, postpartum ward, and neonatal unit.
3. Procurement of appropriate nurse station in the ED.
4. Procurement in surgical instrument and human resources training for emergency operating room.
5. STAT labeling should be noticeable on aerocom tube.
6. Training and development department commitment to improve CEMONC staffs competence.
7. Managerial commitment to achieve 30 minutes decision to incision.
8. Midwives should be eligible to contact obstetricians.
9. Coordination between clerkship and midwife should be simultaneously.
10. Semarang Health Department should extend the contract or Semarang Health Department should establish their own referral server independently in order to simplify referral process.

CONCLUSION
Waste waiting was a predominant waste in both hospitals and RCA found that facility and layout factors were contributing the emergence of waste waiting.

ACKNOWLEDGEMENT
Authors are grateful to The United Nations Children's Fund (UNICEF) and Lembaga Penelitian dan Pengabdian Kepada Masyarakat Universitas Diponegoro (LPPM UNDIP) for funding to carry out the study.

REFERENCES
8. Gabutti Irene, Daniele Mascia, Americo Cicchettiet. Exploring “patient-centered” hospitals: a systematic review to understand change. BMC Health Serv Res. Published Online First: 2017 May 11. DOI: https://doi.org/10.1186/s12913-017-2306-0


Impact of Acute-Stress on Innate Immune Response to Hepatitis B Vaccine in Vaccinated Wistar Albino Rats

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ABSTRACT

Background: Infection with Hepatitis B virus is a worldwide healthcare problem. Hepatitis B vaccine is the most efficient way to prevent Hepatitis B virus infection and its complications. Acute-stress may have a positive effect on innate immune response, especially to vaccination.

Objectives: To study the impact of acute-stress on the innate immune response to hepatitis B vaccinated rats.

Methods: A pre-and post-test design was conducted using twelve Wistar Albino male rats aged 8 to 10 weeks. Rats were allocated into two vaccine groups: acute-stress group and control group. Following a one-week adaptation period, rats were immunized with 4µg hepatitis B vaccine, two doses interval four weeks.

Results: Rats given two doses of vaccine with two periods of acute-stress had an increased macrophage number and macrophage phagocytosis index. The macrophage number was (0.51 ± 0.038) in control group and (0.90 ± 0.025) in intervention group, (p = 0.001). The macrophage phagocytosis index was (3.42 (3.21 – 3.90) in control group and (5.75 (5.57 – 6.81) in intervention group, (p = 0.004).

Conclusion: Acute-stress has immunoenhancing effects, particularly on macrophage cells.

Keywords: Acute-stress, Macrophage Phagocytosis Index. Hepatitis B vaccine.

INTRODUCTION

Hepatitis B Virus (HBV) infection is considered one of the most serious chronic viral infections worldwide.[1] In 2015, 257 million people were estimated to be chronically infected by HBV[2] from which approximately 600,000 died. [3-4] Therefore, administrating hepatitis B (hep-B) vaccine to people exposed to HBV is an essential preventative strategy. Before the introduction of the hep-B vaccine, other conventional prevention programs included screening of blood donors, preparation of plasma-derived products in a way that inactivates the HBV virus, implementation of infection-control measures, and administration of hepatitis B immune globulin following suspected exposure, especially for infants born to Hepatitis B Surface Antigen (HBsAg) positive women. These prevention models decreased the HBV transmission; however, the hep-B vaccine has been proven the most effective of all strategies. [5,6] Notably, HBV infection is now a vaccine-preventable disease, accordingly; vaccination is the most primary prevention of the infection, as hep-B vaccine is safe and effective. Moreover, the efficacy of the vaccine is high; however, approximately 5-10 % of healthy people are non responders and do not induce the anti-HB antibodies using the standard vaccination scheme and they are at risk for HBV
infection.[7,8,9] As a result, there is a desperate need to improve vaccination efficacy in non-
responders to protect them from HBV infection. Stress is a series of events comprising of a
stressor (stimulus) that precipitates a reaction in
the brain (stress perception) that in turn will
activate the physiological fight response in the
of stress can be classified from its period of
exposure; acute-stress, which lasts either for a
short time (minutes to hours) or chronic-stress,
which persists for several hours, a day, weeks, or
even years. [11] Various studies have found that
AS may act as an effective adjuvant to the rat’s
immune response, especially to vaccination.
Vaccine administration may play a role as a
behavioral adjuvant that enhances the immune
response in both animals and humans by the
introduction of physical or mental stress.[12,10]
Therefore, designing therapeutic interventions
involving behavioral manipulations, or
administering cocktails of physiological
mediators, might be possible to maximize the the
body army (immune system) in the fight against
disease.[12] This study used an animal model to
investigate whether AS has a positive impact to
the innate immune response to the hepatitis B
vaccine, at the time of vaccine administration.
Immune response was measured by using
macrophage cells and phagocyte index. This
study used the AS a paradigm previously
described and found to be effective in Wistar
Albino rats. This study is the first study
investigated the impact of acute stress on innate
immune response toward recombinant hepatitis
B vaccine at the time of vaccine administration,
and hypothesized acute-stress can increase
macrophage number and phagocytosis index in
vaccinated rats.

MATERIALS AND METHODS
Twelve Wistar Albino male rats 8-10 weeks
old with an average weight of 50.5 grams, were
inbred in the animal laboratory of Gadjah Mada
University. The rats were housed in stainless
steel cages in an air-conditioned house with the
temperature maintained at 18°C to 20°C and
12:12 hours light-dark cycle and fed with normal
pellets and tap water ad libitum, according to the
Guideline for the care and use of laboratory
animals in Faculty of Veterinary Medicine
Gadjah Mada University. The experiment was
conducted with prior approval from Ethical
Review Board Faculty of Medicine, Diponegoro
University. Rats were randomly allocated into
two vaccinated groups: a group of rats exposed to
AS two times and control group. All groups were
adapted one week before the experiment started.
Rats were immunized with intramuscularly 4µg
recombinant hepatitis-B vaccine, two doses
interval four weeks.

Vaccination Procedure:
All groups received intramuscular vaccination
with recombinant hepatitis-B vaccine; two
vaccination doses with interval of 4 weeks for
control group and intervention group. Each
vaccine dose contained 4µg.[14,15,16]

Acute- stress exposure:
Acute-stress was administered according to
the previous study.[17,13] acute-stress was created
by placing the subjects in wire mesh restrainers
for 3:00 hours, from 9:00 AM - 12:00 PM, in the
animal laboratory with the lights on (Figure 1).
To measure the AS response, the corticosterone
hormone response was assessed immediately
after 3 hours of AS exposure by drawing blood
and measuring the hormone using ELISA
assay.[18] The reason for choosing this procedure
was that such psychological stress mimics the
experience in nature, especially the perception of
confinement for rodents.[17,19] The psychological
component of restraint stress is thought to arise
from the mimicking a collapsed tunnel that is
stressful for burrow-dwelling animals like
rodents.[20] This stressor can activate the
autonomic nervous system[21] and the
hypothalamic-pituitary-axis, and would activate
adrenal steroid receptors in tissues throughout
the rodent’s body. [22,23,13,24] The appropriate wire
mesh size was determined before the start of the
experiment.

Serum collection
Blood samples were collected from the retro-
orbital sinus vein and kept in tubes without
heparin (10 ml of blood). After samples were
clotting at room temperature centrifuged for 5
min at 2,500 rpm to separate the serum from the
blood clott. The serum stored in an eppendorf tube at -80°C. All tubes were labeled accordingly and the ELISA procedure immediately undertaken. ELISA procedures were conducted according to manufacturers ELISA; kits insert (Rat corticosterone ELISA kit. Catalogue number:RC0073 (NeoScientific, USA).

Collection of macrophages and culture
Rats under anesthesia were placed on the dissecting table in a supine position, and the feet were fixed onto the board. Abdominal walls were disinfected with alcohol, and dissected aseptically using sterile instruments to expose the peritoneum. The peritoneum was disinfected with alcohol 70%, and then 20 ml cold RPMI solution was injected into the peritoneal cavity. And then massaged slowly to obtain more peritoneal macrophages. RPMI solution was aseptically aspirated with a pipette, and then put into a 15ml Falcon tube, centrifuged at 1,200 rpm at 4°C for 10 minutes. Erythrocyte contamination was rinsed out with PBS (Phosphate-Buffered Saline), 3% acetic acid was added (to hemolysis erythrocytes) several times to clean the solution. Supernatant was removed; 3mL complete RPMI medium was added, consisting of RPMI 1640, FBS 10% (Fetal Bovine Serum) and penicillin, to make a pellet. A suspension was made again from the pellet with complete RPMI medium, counted with hemocytometer then resuspended to obtain 2.5 x 10⁶ cells/mL. The cells were grown and cultured in complete medium in a covered 24 well micro-plate (flat base). Each well was filled with 200 uL with density 5 x 10⁵ cell/mL, incubated with CO₂ at 37°C for 30 minutes and then 1mL RPMI complete medium was added to each well and further incubated for 2 hours. Cells were washed twice with RPMI, 1ml of complete medium added to each well and incubated for 24 hours.[25,26]

![Figure 1. Wire-mesh restrainer. A= empty restrainer. B= rat inside the restrainer. The wire-mesh restrainer consists of a wooden base and stainless steel wire mesh restrainer hinged to the base. The dimensions are 13 cm long, 4 cm wide and 4 cm high. In addition, a door helped to secure the rat in the restrainer.](image)

Macrophage Phagocytic Index (Latex-Beads Method)
Macrophages were swill with RPMI two times, and cultured in 12 well micro-titre plate. Latex beads were made into suspension at a concentration of 2.5 x 10⁷ /mL. Each well was filled with 200 uL latex/well, incubated for 60 minutes, CO₂ 5% at 37°C. The cells were rinsed with PBS, to remove the un-phagocytized latex beads, a smear slide was made and fixed with absolute methanol. Slides were dried and stain with Giemsa 20% for about 30 minutes. Dyed smear slides were washed with distilled water and dried at room temperature. Object glass was put under the microscope. The phagocytosis activity was measured by counting the number of latex beads phagocytized by 100 macrophage cells, the average number of latex positive cells is stated as the Macrophage Phagocytic Index.[26,25]
Statistical analysis

Statistical analyses used Statistical Program for Social Science (SPSS) v.21 (IBM Corp, USA). Data analyses consisted of descriptive analysis and test of the hypothesis. Descriptive analyses of variables were by mean ± standard deviation if normally distributed or median and range if not normally distributed. Since the sample size was less than 50, data distribution was tested by the Shapiro-Wilk test.[27] For corticosterone hormone variables; the normality test results obtained with the Shapiro-Wilk test for baseline and post AS exposure showed a significance value which was greater than α (0.05), meaning that the pre and post AS data of corticosterone hormone level are normally distributed. One-way ANOVA was used to see the difference between baseline data and first AS exposure and second AS exposure. For macrophage variables; normality test results with Shapiro-Wilk test showed significance greater than α (0.05), meaning that the macrophage number data are normally distributed. The independent t test used to see the differences between intervention group and control group. For latex level analysis, normality test results with Shapiro-Wilk test showed a significance value lower than α (0.05), meaning that the data weren't normally distributed. The Mann-Whitney test used to see the differences between intervention and control group.

RESULTS

1. Acute-stress exposure
Corticosterone hormone was used as the AS biomarker in this study, and the results are presented in Table 1 and Figure 2. Corticosterone hormone levels significantly increased $P<0.05$ between the pre, first and second stress exposure in intervention group. $P=0.001$.

<table>
<thead>
<tr>
<th>Corticosterone hormone level (ng/mL)</th>
<th>N</th>
<th>Intervention group Mean ± SD</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-AS exposure</td>
<td>6</td>
<td>0.62 ± 0.060</td>
<td></td>
</tr>
<tr>
<td>Post- first AS exposure</td>
<td>6</td>
<td>0.72 ± 0.083</td>
<td>0.001*</td>
</tr>
<tr>
<td>Post-second AS exposure</td>
<td>6</td>
<td>0.77 ± 0.285</td>
<td></td>
</tr>
</tbody>
</table>

Note: * Significant; * Repeated ANOVA

Figure 2. Box plot of the mean corticosterone hormone levels in intervention group after AS exposure

2. Macrophage number and Latex level
Hypothesis AS can increase macrophage number and phagocyte index in vaccinated Wistar albino rats. Based on Table 2 and Figures 3 and 4, comparing control group with intervention group, there was a significant
A significant change in the macrophage number $p<0.05$. The mean was $0.51 \pm 0.038$ in control group. Meanwhile, the mean was $0.90 \pm 0.025$ in intervention group $p=0.001$. Furthermore, based on Figure 3, the highest macrophage number was 93% in intervention group, and the lowest number was 47% in the control group. In addition, based on Figure 4, comparing between control group and intervention group, there was a significant change in the latex level $p<0.05$. The median was $3.42 (3.21 – 3.90)$ in the control group. Meanwhile, the median was $5.75 (5.57 – 6.81)$ in the intervention group, $p=0.004$. The result of analysis of macrophage number and latex level showed a significant value, $p<0.05$. Therefore, hypothesis $H_1$ was accepted.

<table>
<thead>
<tr>
<th>Table 2. Macrophage number and phagocytosis of latex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macrophage number %</td>
</tr>
<tr>
<td>Mean ± SD</td>
</tr>
<tr>
<td>0.51 ± 0.038</td>
</tr>
<tr>
<td>Phagocytosis of latex %</td>
</tr>
<tr>
<td>3.42 (3.21 – 3.90)</td>
</tr>
</tbody>
</table>

Note: * Significant;<sup>a</sup> Independent t-test;<sup>b</sup> Mann-Whitney test

![Figure 3. Macrophage number in intervention and control groups](image)
DISCUSSION
This study was designed to investigate the impact of AS on innate immune response at the time of hep-B vaccine administration using macrophages numbers and macrophage phagocytosis as parameters. Serum corticosterone hormone was used as the AS biomarker. In this study, rats were exposed to AS (wire-mesh restrainer) for 3 hours as shown by Figure 1. Blood was immediately collected to determine the level of corticosterone hormone. The results indicate that rats appear to respond to AS exposure. As seen in Table 1 and Figure 2, corticosterone hormone concentrations are increased significantly \( p<0.05 \) compared with baseline conditions immediately after exposure \( p=0.001 \). The mean corticosterone hormone level increased from 0.62 ± 0.060 ng/mL in baseline data to 0.72 ± 0.083 ng/mL post-first AS exposure. As well as, The mean corticosterone hormone level increased post-second AS exposure, the mean increase from 0.62 ± 0.060 ng/mL in baseline data to 0.77 ± 0.285 post second AS exposure. This result indicates that rats are responded to AS and the corticosterone hormone is detectable after 3 hours of acute stress. As is known, there are two main neuroendocrine pathways activated in response to stress that control the immune system, namely the hypothalamic-pituitary-adrenal (HPA) axis which results in the release of corticosterone hormone in animals and cortisol hormone in human, and the sympathetic nervous system which results in the release of catecholamine, epinephrine, and norepinephrine. [28,29,30] Acute-stress is described as stress lasting over a period of minutes to hours. [11] In this context, restraint stress is thought to be largely psychological in nature, resulting from the perception of confinement on part of the animal.[17,19] This stressor can activate the autonomic nervous system, [21] and the HPA axis.[22,23] In this study; the rats were exposed to AS for three hours and collected blood immediately after AS to determine corticosterone levels.

Macrophages are cells produced by differentiation of monocytes in tissue.[32] Macrophages’ role is detecting, engulfing and destroying pathogens (phagocytosis). After ingesting a microbe, a macrophage presents a protein on its cell surface called an antigen, this antigen is displayed on MHC class II molecule, which acts as a signal to other white blood cells,
and then, T helper cells activate other cells of the immune system such as cytotoxic T cells to attack the infected cell. Macrophages also play a role in alerting the immune system to the presence of invaders and activate T helper cells; T helper cells start to stimulate the B cells (humoral response) to secrete antibodies. In our results, based on Table 2 and Figure 3, acutely stressed rats shows higher macrophage numbers than nonstressed rats \( p < 0.05 \). The mean was 0.51 ± 0.038 in control group, and 0.90 ± 0.025 in intervention group \( p = 0.001 \). Furthermore, as shown in Table 2 and Figure 4 acutely stressed rats demonstrated high latex level phagocytizes than non stressed rats \( p < 0.05 \). The median was 3.42 (3.21–3.90) in control group, and 5.75 (5.57–6.81) in intervention group, \( p = 0.004 \).

These results are in line with many studies, which indicate that AS can enhance the innate immune system. AS induces a reorganization of leukocytes from the barracks, through the boulevards, and potentially to battlefield enhancing immune function.\[^{12,33–36}\] Many studies that have focused on the alteration of lymphocyte functions and macrophage functions by AS, showed that acute cold-restraint stress increased phagocytic activity in peritoneal macrophages,\[^{37}\] and cold swim stress results in the activation of peritoneal macrophages.\[^{38}\]

Another study demonstrated that the phagocytic activity of rats, which had been exposed to restraint and fasting stress for 15 hours was increased.\[^{39}\] Similar results from another study showed that restraint stress increased phagocytic activity of blood cells after 6 h.\[^{40}\] A study conducted on mice showed that AS enhances the innate immunity by increasing the phagocytosis cell function.\[^{41}\]

In the present study, three hours of wire-mesh restraint AS on Wistar albino rats increased the number of macrophage and macrophage phagocytic index of peritoneal macrophages. Thus, our results are consistent with previous studies where restraint AS can enhance the innate immune response by activating the macrophage. In this study, a strong positive correlation was found between corticosterone hormone and macrophage cell number and macrophage phagocytosis. A high level of corticosterone hormone in intervention group \( (p=0.001) \) was related with high levels of macrophage numbers and macrophage phagocytosis index in intervention group, respectively, \( p = 0.001, p = 0.004 \). These positive changes which happened in the stressed rats are evidence to that acute stress has a good effect on innate immune response to hepatitis B vaccine. These results are in agreement with other studies that indicate AS doesn’t act as an immunosuppressant, and might act as immunoenhancement vaccine immune response. Regarding the study limitatitons: According to several studies, steroid hormones production in AS occurs within 20–30 minutes.\[^{42–43}\] However, our study took the sample for corticosterone hormone measurement at 3 hours; therefore, the blood hormone levels may already have decreased. In this regard, future studies should be designed to quantify AS effects at earlier time points and to examine the effects of different time points based on pilot study. In conclusion: Acute-stress significantly increased the macrophage number and macrophage phagocytosis index. Acute-stress act as vaccine immunoenancement on macrophage cells. Suggestions for further research on AS effects on vaccination are as follows: measurement of AS effects at earlier time points and to examine the effects of different time point.

**ACKNOWLEDGMENT**

I would like to express my full appreciation to the staff of the Department of Scholarship, Ministry of Higher Education of Libya, for their support, both monetary and moral.

**Declaration**

We declared no conflict of interests.

**REFERENCES**


3. Nelson NP, Easterbrook PJ, McMahon BJ. Epidemiology of Hepatitis B Virus


Effect of Tempuyung Leaf Ethanol Extract on Kidney Morphometric Parameters in Gentamicin Treated Rats

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ABSTRACT

Introduction: Tempuyung has been well known in our heritage folklore as traditional medicine. Its antioxidant property is believed can ameliorate the side effect caused by gentamicin. The purpose of this study was to obtain data of tempuyung leaf ethanol extract on kidney morphometric parameters on rats induced by gentamicin.

Method: The study design was true experimental, was conducted on four groups of rats (n=4): control group (C), gentamicin induced only (G) and 2 other groups treated with both gentamicin and tempuyung leaf ethanol extract with low dose (T1) and high dose (T2). Both gentamicin and tempuyung leaf ethanol extract were administered once daily for 10 days. On day 11, laparatomies were performed to preserve the kidneys. For evaluation, the parameters of the kidney morphometry were taken, including its length, width, thickness and volume of both kidneys of each rats. The data was statistically analyzed.

Results: The mean kidney length was 1.74±0.18 cm on the right side and 1.77±0.18 cm on the left side. The mean width of the right and left kidneys were 1.18±0.12 cm and 1.22±0.14 cm respectively. The mean thickness of the right and left kidneys were 0.78±0.14 cm and 0.79±0.07 cm respectively. The mean renal volume of the right and left kidneys were 1.62±0.33 cm³ and 1.74±0.47 cm³ respectively.

Conclusion: In conclusion, tempuyung leaf ethanol extract administration suggestively showed no significant differences between tempuyung treated groups and gentamicin group, viewed from kidney morphometric parameters.

Keywords: Tempuyung, Kidney, Morphometric, Gentamicin.

INTRODUCTION

Gentamicin is a potent bactericidal antibiotic in treating severe infections, caused either by aerobic gram-positive or gram-negative microorganisms. Nevertheless, its most common side effect, nephrotoxicity made the limitation on its therapeutic usage. Despite its thorough monitoring, the incidence of nephrotoxicity still occur in 10-25% of treated patients. The common understanding believes that gentamicin induced nephrotoxicity mainly due to tubular damage. The severity of its alteration can be divided as lethal and sub-lethal alterations. Nonetheless, either lethal or sub-lethal alteration in tubular cells may lead to an obstructed tubules, which can significantly reduced glomerular filtration. Its reduced filtration is a result of several alterations, which involve the breakdown and obstruction of the tubules. These conditions will end up with vasoconstriction of the kidney,
which will activate tubule-glomerular feedback mechanism and contraction of mesangial cells.\textsuperscript{1,2,3}

Gentamicin induced nephrotoxicity often correlated with its prominent histologic alterations. The accumulation of gentamicin in epithelial tubular cells will cause the loss of the brush border in epithelial cells, which lead to these pathological bio-mechanisms, including tubular necrosis, apoptosis activation and massive proteolysis. Aside from the above, gentamicin is also believed to cause cell death by its generation of free radicals, phospholipidosis, extracellular calcium-sensing receptor stimulation and energetic catastrophe, reduced renal blood flow and inflammation. Few other findings such as desquamation of epithelial cells, fibrosis of the tubules, edema of proximal tubules, edema of perivascular area, congestion of the glomerulus and inflammation. All of these histologic-pathological findings will end up to renal dysfunction.\textsuperscript{3-7}

Many efforts have been done to ameliorate gentamicin nephrotoxicity. Aside the norm of using drugs in reducing its side effect, antioxidant agents are so far the best alternatives, as its effectiveness and relative safety benefits. Antioxidants from green tea, saffron, grape seed extracts are few that has been investigated.\textsuperscript{4,8-10}

Tempuyung (Sonchus arvensis L.) is one of the Indonesian heritage folklore, used as traditional medicine. Its usage, are commonly applied in order to alleviate kidney problems. Its antioxidant property is believed can ameliorate the side effect caused by gentamicin-induced nephrotoxicity. Its phytochemical findings showed that tempuyung leaf contains of bioactive substances, such as phenols, flavonoids, alkaloid, saponin and tannin. These antioxidant agents are believed to be potent on free radical scavenging effects. Hence, it might be necessary to investigate its therapeutic potential in nephrotoxicity in associated with oxidative stress and cell death.\textsuperscript{11,12}

This study will focus on how does the tempuyung leaf ethanolic extract impact on gentamicin induced nephrotoxicity, viewed from its kidney morphometric parameters.

**MATERIALS AND METHODS**

The research design of this research is true experimental using Wistar rats. Sixteen rats were divided randomly into 4 groups (n=4), consist of negative control group (CMC 0.5%), induced group (gentamicin 80 mg/kg), 1\textsuperscript{st} treatment group (gentamicin and tempuyung ethanol extract/TEE 100 mg/kg), and 2\textsuperscript{nd} treatment group (gentamicin and TEE 200 mg/kg) for ten days consecutively. On day 11\textsuperscript{th}, blood were taken and the level of ureum were measured, using serum blood. The data was analyzed using the ANOVA statistical tests, continued with LSD test.

**RESULTS**

Measurement of the parameters on kidney morphometric, including its length, width, thickness and volume showed as follow:

<table>
<thead>
<tr>
<th>Table 1. Statistical Test ANOVA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Left Kidney</strong></td>
</tr>
<tr>
<td>Group</td>
</tr>
<tr>
<td>C</td>
</tr>
<tr>
<td>G</td>
</tr>
<tr>
<td>T1</td>
</tr>
<tr>
<td>T2</td>
</tr>
<tr>
<td>Sig.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Right Kidney</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
</tr>
<tr>
<td>C</td>
</tr>
<tr>
<td>G</td>
</tr>
<tr>
<td>T1</td>
</tr>
<tr>
<td>T2</td>
</tr>
<tr>
<td>Sig.</td>
</tr>
</tbody>
</table>
Table 1 showed result using statistical test ANOVA method with no significant difference ($p > 0.05$). From the result, it can be concluded that there was no significant difference between two treatment groups, viewed from kidney morphometric parameter in gentamicin treated rats.

<table>
<thead>
<tr>
<th>Table 2. Post hoc Test LSD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Left kidney: Volume</strong></td>
</tr>
<tr>
<td><strong>Group</strong></td>
</tr>
<tr>
<td>Control</td>
</tr>
<tr>
<td>Gentamicin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Left kidney: Length</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>Group</strong></td>
</tr>
<tr>
<td>Control</td>
</tr>
<tr>
<td>Gentamicin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Left kidney: Width</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group</strong></td>
</tr>
<tr>
<td>Control</td>
</tr>
<tr>
<td>Gentamicin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Left kidney: Thickness</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group</strong></td>
</tr>
<tr>
<td>Control</td>
</tr>
<tr>
<td>Gentamicin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Right kidney: Volume</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group</strong></td>
</tr>
<tr>
<td>Control</td>
</tr>
<tr>
<td>Gentamicin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Right kidney: Length</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group</strong></td>
</tr>
<tr>
<td>Control</td>
</tr>
<tr>
<td>Gentamicin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Right kidney: Width</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group</strong></td>
</tr>
<tr>
<td>Control</td>
</tr>
<tr>
<td>Gentamicin</td>
</tr>
</tbody>
</table>
Right kidney: Thickness

<table>
<thead>
<tr>
<th>Group</th>
<th>Gentamicin</th>
<th>1st Treatment</th>
<th>2nd Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>p = 0.809</td>
<td>p = 0.630</td>
<td>p = 0.472</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>p = 0.472</td>
<td>p = 0.630</td>
<td>p = 0.240</td>
</tr>
</tbody>
</table>

Table 2 showed result using post hoc test LSD with no significant difference between groups of treatment (p>0.005).

**DISCUSSION**

Gentamicin is widely used in clinical practice because of their efficacy against gram-negative bacterial infections, synergism with β-lactam antibiotics, low cost, and minimal bacterial resistance. Prolonged treatment of gentamicin more than seven days, statistically showed estimated one third of the patients developed symptoms of renal impairment.13-15

The most common cause for gentamicin-induced nephrotoxicity is believed due to oxidative stress. Reactive oxygen species (ROS), formed due to oxidative stress have a vital role in the pathway of renal tubular necrosis. ROS can trigger chronic inflammation. It has been known that reactive oxygen species has a role in the pathogenesis of gentamicin-induced nephrotoxicity. Gentamicin-induced kidney injury is characterized by apoptosis, epithelial tubular necrosis, oxidative stress, inflammatory responses, and vascular contraction.2,16,17,19

In this study, the main objective is to collate morphometric data and to investigate the effect of tempuyung leaf ethanol extract in gentamicin treated rats, viewed from kidney length, width, thickness and volume. The result from this study showed gentamicin control group shows no significant difference in kidney length, width, thickness and volume compared to other treated groups. Administration of tempuyung leaf ethanol extract concurrent with gentamicin in the treatment groups showed no significant difference in kidney length, width, thickness and volume.18-21

As histologic-pathological studies are often used to analyze the renal structural abnormalities of the kidney. This is the main reason to observe its morphometric parameter, whether there is any correlation or not. Previous study on gentamicin-induced nephrotoxicity revealed numerous histologic-pathological alterations in prolonged administration of gentamicin. The treatment period on this study was 10 consecutive days. From Varatharajn study, it was revealed that edaravone can remarkably prevent structural and functional abnormalities in nephrotoxicity rats. As edaravone also act as antioxidant, though the chemical ingredients is not exactly the same as tempuyung leaf, in that regards this study aim to collate baseline data on morphometric parameter in gentamicin-induced nephrotoxicity on wistar rats.22,23

By considering the oxidative stress in the pathophysiology of nephrotoxicity, antioxidants therapy is the alternative option in its management. Edaravone, is a synthetic-free radical scavenger and anti-necrotic effects in animal models of various diseases that can have nephro-protective property by promoting antioxidant enzyme system, thereby attenuating ROS generation and lipid peroxidation. Thus, with these understanding, tempuyung leaf which contains many bio-actives that act as antioxidant, such as phenols, flavonoids, alkaloid, saponin and tannin. These compounds all together were believed could ameliorate biochemical and morphologic pathology, tempuyung leaf ethanol extract is believed to have the ability to halt the gentamicin-induced nephrotoxicity by having rich antioxidant that act as metal chelator and free radical scavenger.24-27

From the measurement of all morphometric parameters that were taken, including its length, width, thickness and volume of both kidneys of each rats, the data was statistically analyzed. Though based on another on going study on effect of tempuyung leaf ethanol extract on gentamicin treated rats looked promising, but as
for the morphometric parameter of kidney itself showed no significant difference. This result suggestively showed that microscopic alterations not necessarily be significantly different in macroscopic view (morphometric parameter). From the result, it can be firmly emphasized that based on these 4 morphometric datas, the size of the kidney does not significantly different between each treatment groups.

CONCLUSION
Administration of tempuyung leaf ethanol extract suggestively showed no significant differences in gentamicin treated rats, viewed from kidney morphometric parameters.

REFERENCES
Holistic Nursing Practice In Complementary Therapy

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ABSTRACT

Background: The development of complementary therapies increase prevalently in many countries. This condition requires an increasing of nurse skills on holistic care. The concept of holistic nursing care had been widely applied in hospitals, but in the complementary therapy had not been maximized. The objective was to determine the level of nurse knowledge related to holistic nursing care in the complementary therapy practice.

Methodology: 13 nurses became the inclusion criteria in this study. Respondent inclusion criteria were nursing and had experience at least one years in dr. Anton Primary Clinic of Surakarta.

Results: 13 respondents consist of 7 (54%) were under 30 years old, 5 (38%) were between 30 to 60 years old, and 1 (7%) were over 60 years old. Holistic care includes four aspects: physical, social, emotional and spiritual. Physical aspect: high knowledge 11 (86%) respondents, medium knowledge 2 (14%) of respondents. Social aspect: high knowledge 4 (30%) respondents, medium knowledge 8 (62%) and low knowledge 1 (7%) respondents. Emotional aspect: high knowledge 4 (30%) respondents, medium knowledge 8 (62%) and low knowledge 1 (7%) respondents. Spiritual aspect: high knowledge 3 (23%) respondents, medium knowledge 9 (69%) and low knowledge 1 (7%) respondents.

Conclusion: The nurse’s knowledge about the holistic nursing concept in complementary therapy is not well understood by nurses. Priority care is still about physical complaints, in the other hand, The social aspect, emotional and spiritual are still poorly understood by nurses.

Keywords: Complementary Therapy, Holistic Nursing, Knowledge

INTRODUCTION

The development of complementary therapies of late has become the focus of many countries. Complementary medicine is an important part of health care in the United States and other countries1. Other data suggest an increase in the number of users of complementary therapies in the United States from 33% in 1991 to 42% in 19971. Countries in Africa, Asia, and Latin America use herbal remedies as a complement to the primary treatment they receive. WHO recommends the use of traditional medicines including herbs in public health maintenance, prevention, and treatment of diseases, especially for chronic diseases, degenerative diseases, and cancer2. The frequency of utilization of complementary alternative therapies is increasing rapidly throughout the world. These developments are well documented in Africa and the global population of between 20% and 80%. The interesting thing about this complementary alternative therapy is based on the underlying assumptions and principles of the operating system3. Nursing practice in Indonesia continues to grow from year to year. Similarly, complementary nursing practice. The reason clients use complementary therapies because of the long recovery, ineffective treatment, and because of the high cost of medical care. Another factor to be considered in choosing alternative
complementary therapies is the assumption that alternative therapies are cheaper, natural, ease of access and patient belief\(^4\).

The city of Surakarta has many complementary treatments and includes private medical treatment facilities. The reason people choose to use complementary therapies in Surakarta is one of cultural and trust factors. The practice of complementary therapies desperately requires the role of nurses, where in the conduct of nursing therapists should view the client as a holistic individual covering biological, psychological, social and spiritual.

The objective of the study was to find out how much the level of nurse knowledge related to the concept of holistic care in Dr. Anton Primary Clinic of Surakarta.

**METHODOLOGY**

This descriptive study was conducted in Dr. Anton Primary Clinic of Surakarta from July to August 2017. The basis for site selection is that the clinic provides the type of complementary therapeutic services as the researcher wants, consisting of acupuncture therapy, reflexology, and herbal therapy. Total sampling was used in this study. The sample is a nurse in Dr. Anton Primary Clinic of Surakarta which amounted to 13 people. The number of samples is limited because nurses working in the therapy clinic as desired by the researcher are rare, where a clinic provides three alternative therapies. Inclusion criteria are respondents who are nurses in Dr. Anton Primary Clinic of Surakarta, has a working experience of at least one year, willing to be a respondent by filling informed consent. Exclusion criteria are nurses who are on leave and work without work.

Respondents fill out a questionnaire consisting of two parts, namely the characteristics of respondents covering age, gender, educational status and work experience and questionnaire knowledge of respondents. The knowledge questionnaire contained 34 statements accompanied by alternatives of correct or false answers. Each statement gets a value of 1 for the correct answer and value 0 for the wrong answer. Assessment is done by comparing the total score of answers with the highest score then multiplied 100% which results in percentage. Furthermore, all scores are scored, if the total score is more than 80% of the knowledge level is categorized high, if the total score between 60% to 80% of knowledge level is categorized as being, and if the total score is less than 60% the knowledge level is categorized low. The nursing knowledge questionnaire about holistic care consists of four sub-variables. Physical aspects are listed in numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10. The social / environmental statements are listed in number 11, 12, 13, 14, 15, 16, 17 and 18. Statements of aspects of emotional well-being are listed in 19, 20, 21, 22, 23, 24, 25, 26, and 27. The spiritual aspect statements are 28, 29, 30, 31, 32, 33 and 34. the validity of the questionnaire using product moment correlation techniques. When the data is analyzed by SPSS by defining and then encoding the variables in the variable view and the code data is analyzed for the frequency and percentage of the selected variables.

**RESULT**

In Dr. Anton Primary Clinic of Surakarta, the average patient came with joint pain complaints. Of the 13 respondents, 7 (54%) were under 30 years old, 5 (38%) respondents were between 30 and 60 years old, and 1 (7%) respondents were over 60 years old. As many as 9 (70%) respondents are female and 4 (30%) male. Holistic care includes four aspects that are assessed are physical, social, emotional and spiritual. The results of the first analysis showed that 11 (86%) of respondents had a high level of knowledge about holistic care on the physical aspect, and 2 (14%) had medium knowledge level. Secondly, on the social aspect, there are 4 (30%) of the respondents have the high knowledge level, 8 (62%) respondents with medium knowledge level and 1 (7%) respondents with low knowledge. Third, the emotional well-being aspect obtained result 4 (30%) respondents have high knowledge level, 8 (62%) respondents with medium knowledge and 1 (7%) respondents with low knowledge. Fourth, spiritual aspect was obtained result 3 (23%) respondents with high knowledge level, 9 (69%) respondents with medium knowledge level and 1 (7%) respondents with low knowledge.
DISCUSSION
Respondent's characteristic
The result of the analysis of the respondents' distribution was 9 (70%) female respondents. The dominance of female nurses is in line with the assertion that in women's nursing history emerged as a traditional care-taking role in families and communities. Based on the age of respondents, most are in the age group less than 30 years in 7 (54%) respondents, followed by the age group 30 to 60 years were 5 (38%) of respondents, and the least age more than 60 years was 1 (7%) respondents. Interviews with clinical managers, productive age nurses have better performance and skills than other age group nurses. The results of this study are in accordance with the actual situation, in 60% of nurses implementing age in the product range as ranged from 20 to 40 years.

Results of interviews with the manager found that there is an increase in public interest to switch to alternative therapies, marked an increase in the number of patient visits to Dr. Anton Primary Clinic of Surakarta. This is consistent with the statement that the factors that influence decision making in selecting complementary alternative therapies are the desire (personal values, goals), beliefs (expectations of processes and outcomes, knowledge and other factors such as accessibility). Call it holistic medicine, this opinion is based on a form of therapy that affects individuals as a whole, an individual harmony to integrate mind, body, and soul in a unified function. One reason why cheap alternative medicine is often said to be a natural reason. Alternative / traditional medicine that comes from plants is quite a lot compared to chemical drugs, so the availability of plant materials can be more easily obtained anywhere. The price is also cheaper than chemical drugs that can only be obtained from pharmacies.

Level of Knowledge About Holistic Nursing Care
The result of knowledge analysis of the nurse related to the concept of holistic care including medium category. This is in accordance with the study of 13 nurses at Indonesian Holistic Tourist Hospital Purwakarta West Java showed that the knowledge and skills of nurses in holistic nursing services are in enough categories. It can be influenced by the characteristics of respondents, including age, education/training, work experience and workplace room. Knowledge is an important aspect that is vital in nursing. Every thing the nurse does must be based on the knowledge embodied in nursing practice. Knowledge is the result of "know" and this occurs after a person performs sensing of a particular object. This knowledge is a dominant thing that is very important for the formation of a person's actions, from the experience of some research, turned out that actions that are not based on good knowledge, will not produce good results. In this case, the nurse must also open up for change in achieving the goal of integrative care.

Complemetherapy is the development of traditional therapies and some are integrated with modern therapies that affect the harmony of individuals from biological, psychological, and spiritual aspects.

Nursing Knowledge Level About Holistic Nursing Care On Physical Aspects
The results showed that respondents who have a high level of knowledge on the physical aspects of holistic care are 11 (86%) of respondents. This suggests that the nurse's performance in the management of the patient is still about the concern of the physical problem, where the nurse is more focused on handling the patient than the complaint alone. This result differs from the research of nurse knowledge which states that the highest scoring knowledge is aesthetic knowledge and the lowest is personal knowledge, ethics, and ignorance. This condition is likely due to time constraints and high workload of nurses. If the excess workload will affect its performance, which is related to the level of one's fatigue. This is in accordance with research that states that the more additional tasks a nurse will have to work on will increase the workload and vice versa. If this is still maintained, it will lead to the excessive workload on nurses. Another influencing factor is dual role conflict. There is a significant relationship between dual role conflict and social support with workplace stress on nurses. Eratnya relations motivation work on employee
performance should get special attention for the management. Because good employee performance can also be one factor in overall clinical performance improvement\textsuperscript{17}.

**Nursing Knowledge Level About Holistic Nursing Care On Social / Environmental Aspects**

In the second sub-variable about social/environmental aspects in holistic care as many as 8 (61\%) of respondents have medium knowledge level. These data indicate that not all nurses know very well the importance of studying the social/environmental aspects of the patient. This is probably caused by a lack of understanding of each individual. The holistic nurse needs to provide a holistic environment in the client's healing efforts. The holistic environment is divided into two, namely internal and external. Internal skills derived from within the nurse and external skills that come from the environment around the nurse (hospital). Florence Nightingale has demonstrated the dedication and focus of work as a nurse for 50 years which now spawned the global mission of health and healing for humanity. The mission is depicted in the theory of integral and holistic nursing which includes total healing environment\textsuperscript{18}.

**Nursing Knowledge Levels About Holistic Nursing Care On The Emotional Welfare Aspects**

In the third sub variable about the emotional welfare aspect in holistic care obtained data as much as 8 (61\%) of respondents have medium knowledge. This shows that not all nurses understand the importance of the patient's emotional needs is met other than physical needs. This result is in accordance with other research indicating that most of the nurses who work in RSUD Banjarbaru have moderate emotional intelligence that is equal to 25 (42,37\%) \textsuperscript{19}. Nurses who have the ability to understand and support the emotions of others have 2,567 times perceived more caring by patients than nurses who have low ability in terms of understanding and supporting the emotions of others \textsuperscript{20}.

**Nursing Knowledge Level About Holistic Nursing Care On Spiritual Aspects**

The fourth sub-variable about spiritual aspect in holistic care obtained data as much as 9 (69\%) of respondents have medium knowledge level. This shows that the nurse is still less than optimal in exploring the patient's spiritual needs. This result is contrary to the Widaryati study which shows that the nurse of the implementer understands spirituality well\textsuperscript{23}. Spirituality can be used as one source of coping in addition spirituality has a positive impact on health and can be used as a source of healing \textsuperscript{21}. This is reinforced by the results of research that most cancer patients require spirituality or religiosity as a source of coping to deal with the condition, so a good knowledge of the patient's spiritual needs by nurses becomes important to possess\textsuperscript{22}. The nurse as the first person to consistently for 24 hours in contact with the client, has a role in helping to meet the spiritual needs of the client\textsuperscript{24}. Holistic nursing care integrates the interventions that support client spirituality\textsuperscript{25}.

**CONCLUSION**

In conclusion, the nurse's knowledge of the concept of holistic care in complementary therapies is not fully understood by nurses. Fulfillment of the patient's needs on the physical aspect is still a priority, while other aspects of social, emotional and spiritual are still poorly understood by nurses.

**ACKNOWLEDGMENTS**

The authors would like to thank Dr. Anton, as head of the outpatient clinic team for assistance in this study and a team of nurses who have given their time to participate in this study as respondents.

**REFERENCES**


23. Widaryati, Moetraarsi, Rahmat, I. Persepsi Perawat Pelaksana terhadap Aspek Spiritual dalam Asuhan Keperawatan di RSUD Bantul. 2006; II(2).


Variant Method of Age Estimation Based on Dental Examination

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Abstract

Age estimation method from dental are one of many age estimation methods in forensic identification process which can be done to mass disaster victim, both alive and death victim, and in law case which need individual age estimation. As the hardest material from body, dental are the best media in estimating individual age. Age estimation from dental can be done since a person is 5 months intra uterine. Various age estimation method from dental have been developed. The target of this essay is to define age estimation method from dental which are most precise to be applied to required identification cases. The success of age estimation from dental selection will lead to the accurate individual age estimation on forensic identification process.

Keywords: age estimation, dental examination, forensic identification

INTRODUCTION

The identification process can be done on the individual's life or death. The process of human identification begins with racial identification, gender identification, then age identification. Age is an important factor for determining the identity of an individual. Estimated age can be done through teeth and skeletal.¹

The estimated benefit of age in an identification is a legal investigation and identification of unknown individuals. Legal investigations as an example in a person's criminal offense may be subject to law for children or the law for adulthood, as well as the determination of an athlete's age.

Teeth have an advantage as the media forecasts of age because they are the hardest structures of the body and resistant to external influences such as mechanical, chemical, and temperature, so they are at least easily destroyed, either on the individual's life or death. Teeth are natural structures that have the least amount of biological changes. So the tooth can survive for thousands of years despite decomposition. Teeth also have special features that can provide information about a person's identity.¹ ²

Various methods of age estimation based on dental x-ray examination

1. Bengston Methods, year 1935.
   Bengston divides the stage of teeth eruption into 4 stages of the position of the tooth against the alveolar bone, ie position in the bone, position on the occlusal surface or incisal through the alveolar bone, the occlusal surface position or incisal between the alveolar bone with the occlusal plane, and position on the occlusal or incisal surface at Occlusal field.³
   Moorrees divide the root resorption stage of the deciduous tooth into 4 stages, i.e., when the root apical is still closed, then the resorption stage at ¼ apical roots, then the resorption ½ root stage, and the resorption stage ¾ root.3

3. SCHOUR & MASSELER Atlas Methods, 1941
   Atlas SCHOUR & MASSELER represents 22 stages of dental calcification from 5 months intrauterine up to age 35 years. Then this atlas saw the comparison of upper and lower jaw radiography with diagrams depicting the developmental stages of teeth according to age.

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<table>
<thead>
<tr>
<th>Position</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Occlusal and incisal surface inside alveolar bone</td>
</tr>
<tr>
<td>2</td>
<td>Occlusal or incisal surface through the alveolar bone crest</td>
</tr>
<tr>
<td>3</td>
<td>Occlusal and incisal surface between the alveolar bone with the occlusal plane</td>
</tr>
<tr>
<td>4</td>
<td>Occlusal or incisal surface at occlusal field</td>
</tr>
</tbody>
</table>

Figure 1: Description of teeth eruption stages based on Bengston method.

<table>
<thead>
<tr>
<th>Position</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>Closing root apical with normal PDL width</td>
</tr>
<tr>
<td>Res ¼</td>
<td>Resorption stage at ¼ apical roots</td>
</tr>
<tr>
<td>Res ½</td>
<td>Resorption ½ root stage</td>
</tr>
<tr>
<td>Res ¾</td>
<td>Resorption stage ¾ root</td>
</tr>
</tbody>
</table>

Figure 2: Moorrees Atlas teeth root resorption method.3

Atlas SCHOUR & MASSELER is the most used atlas, fast, simple, just need radiography as a tool. But the lack of this atlas is not to distinguish between men and women, and many samples of sick children that may affect the stage of growth and development of teeth.4
Figure 3: Original Atlas Teeth Development Stages by Schour and Masseler.⁴


Atlas DEMERJIAN, GOLDSTEIN, TANNER divides 4 stages of crown calcification and 4 stages of root calcification. This atlas assesses the mandibular permanent teeth in the order of M2, M1, P2, P1, C, I2, I1 on AH scale, then compares the teeth in the diagram with radiographic images, then the classified stage which has been assessed converted to scores using a customized table for both men and women. The scores of all seven teeth are summed up entirely to obtain a maturity score. Maturity scores can be converted directly to dental ages on a horizontal scale by age, whereby the 50th percentile achieves a maturity score or by using a table that has been created according to the way (adapt for male or female).

Description of teeth calcification stages on Demerjian et al. system are:

1. If no sign of calcification is given value 0, the formation of crypt is not considered
2. A: In uniradicular and multiradicular teeth, initial calcification is seen in the superior crypt in inverted cone shape. There is no fusion of calcification points.
3. B: The fusion of the calcification points forming one or more unified cusps provides a calculated outline of the occlusal surface or calcined cusp, so that coronal morphology is well established.
4. C: a) Formation of complete enamel on the surface of the crown. Visible extension and convergence toward the cervical. b) Seen the beginning of dentin deposition. c) The outline of the pulp room is curved at the occlusal boundary.

5. D: a) The formation of a complete crown up to the cemento-enamel junction. B) The superior edge of the pulp chamber is curved into a concave cervical in the uniradicular tooth. The projection of the pulp horn has a shape like the top of the umbrella. In molar teeth, the pulp chamber is trapezoidal. C) Sees the beginning of root formation.

6. E: In a uniradicular tooth, a) The wall of the pulp chamber of the root canal is straight-line to the pulp horn wider than the previous stage. B) the root length is less than the crown height. In molar teeth, a) The initial formation of radicular bifurcation seen in the form of a semi-lunar calcification point, b) The root length is still less than the crown height.

7. F: In uniradicular teeth, a) The walls of the pulp chamber are $\pm 1/3$ equilateral triangles, the apical tip is funnel-shaped, b) the root length is equal to or greater than the crown height. In the molar tooth, a) the calcification region of the bifurcation develops further downward from the semi-lunar stage to a more distinct root form and a funnel-shaped apical outline, b) the root length equals more than the crown height.

8. G: Parallel root canal wall and apical end are still partially open.


The advantages of the Demerjian et.al atlas method are the simpler calcification stages, differentiating between males and females, the detail for each stage of dental calcification. While the drawback is that it can not directly distribute radiographic images with diagrams, the seven lower teeth must be all for scoring, excluding 3 molar calcifications. 

Figure 4: Original Atlas Eight Teeth Calcification stages on Demerjian et.al system.
Atlas Ubelaker divides 21 stages of eruption and dental maturation process starting from 5 months intrauterine to 35 years of age. Ubelaker also stated that there is no stage of development of the tooth at 6 months and 8 months of intrauterine and there is addition of calcification stage at the time of the 18 month old individual in the form of root root and first eruption of first molar teeth.

This Ubelaker atlas method is quite simple, fast, does not need special skills and equipment (except radiography) to determine the stage of dental development, but there are no separate surveys for men and women.

6. ALQAHTANI Atlas Method, 2010
The AlQahtani Atlas is the latest atlas age tooth estimate that is widely used today. Alqahtani divides the stage of calcification and alveolar eruption for 28-week-old intrauterine individuals up to 23 years of age. This atlas as a gradual developmental diagram of age without any distance or overlap. Al Qahtani using right lateral panoramic radiographs and eruption of the teeth in the right region were identified by the viewer and the magnifying glass, then each of the developing teeth (crown and root) was assessed by the Moorrees, Fanning and Hunt method in 14 stages of calcification of the tooth starting from the formation Early cusp samoa closure apical roots. The eruption phase associated with alveolar bone level is determined from the modified Bengston eruption stage. AlQahtani atlas method is quite simple with an estimated age range is very large.

Figure 5 : Original Ubelaker Atlas

6
Figure 6: Original Atlas 21 teeth calcification stages on system AlQahtani.3

7. BLENKIN – TAYLOR Atlas Method, 2012
Blenkin-Taylor modified the Ubelaker atlas, with a population of modern Australians. They separate the sex populations of women and men. Then all the teeth in the right region of the lower jaw, other than the third molar teeth, are assessed and calculated on the basis of the Demerjian et.al system.

The advantages of the Blenkin-Taylor atlas are that each diagram is used for each year, so the results are more accurate. The Atlas also distinguishes the male and female populations. But the only drawback is to explain one stage of prenatal teeth and not to elaborate the teeth above the age of 15 years more clearly.7
Figure 7: Atlas Teeth Development for Women by Blenkin – Taylor

Figure 8: Teeth Development Atlas for Men by Blenkin – Taylor
8. **KVAAL ET AL Methods**

Kvall et al. uses the teeth of the maxillary and mandibular teeth (I1, I2 RA, P2 RA, i2 RB, C RB, P1, then divides the pulp-root (R) length, pulp-tooth length (T), pulp width -root in CEJ (A), pulp-root width at the midpoint of the root (C), and pulp-root width at the midpoint between C and A (B). Calculate method using inferential periapical radiography, calculate the mean of all ratios other than T (M), the average value of the ratio of B and C (W) and the average length of the ratio of P and R (L) are included in the formula: Age = 129.8 – (316.4 x M) (6.8 x (X-L)).

Figure 9: Diagram Teeth Measuring Kvall et al.

9. **HARRIS DAN NORTJE Method**

Harris and Nortje used the developmental phase of the mandibular 3rd molars, by measuring the length of the lower teeth and the lower 3 molar roots. Then the length of the teeth and roots is divided into 5 stages associated with the age of the individual, ie:

- Phase 1 = 15.8 +/- 1.4 year, 5.3 +/- 2.1mm
- Phase 2 = 17.2 +/- 1.2 year, 8.6 +/- 1.5mm
- Phase 3 = 17.8 +/- 1.2 year, 12.9 +/- 1.2mm
- Phase 4 = 18.5 +/- 1.1 year, 15.4 +/- 1.9mm
- Phase 5 = 19.2 +/- 1.2 year, 16.1 +/- 2.1mm

Age ranges in Harris and Nortje methods range from 15.8 +/- 1.4 years to 19.2 +/- 1.2 years.

With a variety of age estimation methods above, if the application is adapted to the case found and usually also combining some method in its use in the field.

3. **Age Estimation On pre-natal, neo-natal, dan post-natal period**

In the pre-natal, neo-natal, and postnatal cases, the approximate age method was performed using dental x-ray images then compared with the intra-uterine tooth growth stage atlas. Here is one example of growth and stage of intrauterine calcification.

At week 16 of untrauterine visible formation of deciduous deciduous incisor gear. Before mineralization occurs from dental seeds, the area around where the seeds grow is more radiolucent. Radiographic features of the mandibular will be seen in the mineralization stage.

At the 26th week of intrauterine, radiograph images of the fetal mandible seen the development of the mineralized process of the anterior teeth, then an outline of molar 1 milk, and a cusp of the milk 2 molar and the crypt of the permanent 1st molars.

On the 30th week of Intratrauterine a 3/5 view of anterior crown measurement has begun to complete, the outer layer of molar cusp 1 milk is formed, 5 molar cusps 2 milk, and crypt of the permanent M1 begin to clear but no mineralization process yet.

Figure 10: 5 Phases of Lower M3 Teeth Root Development with method Harris & Nortje.

Figure 11: Diagrammatic of radiograph of the mandible of a fetus in 26th week IU

Figure 12: Diagrammatic of radiograph of the mandible of fetus in 30th week IU
In newborns, radiographs show the formation of the outer layer of cusp from molar 1 and 2 milk, with the formation of a permanent 1 molar crypt and begin to form 1 cusp.

Figure 13: Diagrammatic of radiograph of the mandible of a new born fetus

In the newborn, there is a process of calcification of permanent 1st molars. Kraus and Jordan: Divide the developmental stage Permanent molar in 10 stages written with Roman numerals.8

Figure 14: Atlas of Kraus and Jordan, the developmental stages of lower deciduous first molar, and its divided into 10 stages, the denoted by Roman number I to X.


The mixed dentition period can be used by London Atlas method by AlQahtani and atlas ubelaker to investigate individual age estimates. In 2014, AlQahtani et.al conducted a study comparing Ubelaker, Schour & Massler, and London Atlas methods. The individual samples used were 3-24 years old, with 1323 samples of ronsen panoramic photographs, a total sample of 649 male men and a sample of 674 women.

AlQahtani et.al compares the dental chart with the chronological age of the individual by using Ubelaker atlas, Schour & Massler, and London Atlas. Then the end result obtained data accuracy using atlas Ubelaker by 405m Atlas Schou & Massler by 39% and London Atlas by 53%.9 Then performed a comparison with the dental chart by excluding the absence of Molar 3 teeth, the accuracy of Ubelaker atlas by 43%, atlas Schour & Massler by 42%, and London Atlas by 59%.9

5. Age estimation on adult individual based on tooth attrition

In adult individuals, estimates of age through tooth, have been conducted in India with 100 patients aged between 21 years to 60 years. Then the individual is divided into 4 age groups, namely group 1 between the ages of 21-30 years, group 2 between the ages of 31-40 years, group 3 between the ages of 41-50 years, and group 4 between the ages of 51-60 years.11,12

The assessment and approximate age of the four groups used 3 methods, the modified Gustafson method with Johanson’s, the Gustafson method modified with Kahsyap and Koteswar Rao and the ASA method (Avarage Stage of Attrition).

The Gustafson method was modified with Johanson’s using the Johanson chart to measure gingival recession. Attrition, secondary dentine, cementum apposition, root resorption, and tooth root transparency are seen using a microscope. Then given a score or grade from Johansons standard. Then the formula is included and calculated statistically using SPSS. The approximate formula of age Linear Regression = 18.34 + 3.39X, with standard deviasai SD = + 5.9. The approximate formula Age Multiple Regression = 19.61 + 3.01S + 1A + 2.97C + 5.65P + 1.71R + 4.94, with standard deviation SD = + 5.5. Where A is the score of Attrition, S is the Secondary Dentin score, P is the Gingival Recession score, C is the Aposition Selumor score, and R is the resorption score.

The Gustafson method was modified by Kahsyap & Koteswar Rao using a microscope with an accuracy of 10μm. Each criterion is divided into constant parameters by measuring the width of the dental crown, the length of the root canal, the width of the root and the length of the tooth. Estimated Age using multiple regression equations = 21.57 + 0.08 [A} + 0.18 [C} + 0.33 [D] + 0.5 [T]. Where A is the value of the attrition index, D is the secondary index value of dentin, C is the value of the cementum seepage index, and T is the root index of transparency index. The standard deviation of this method is SD = ± 5.4.

The ASA method is the Avarage Stage of Attrition, a method that uses the average attrition stage of each cusp of a molar 1 and a molar 2 and merging the two molar. The ASA method separates the age calculation of the teeth in the maxilla and mandible. The ASA approximation method that separates the maxillary and mandibular molar calculations is intended so that if identification is found only one of the jaws of an individual will be identified. The ASA formula for estimated age is as follows:
Age estimation from teeth M RA:
M1 : Age = 36.39 + 1.93M1
M1 & M2 : Age = 25.99 + 2.09M1 + 1.39M2

Age estimation from teeth giga M RB:
M1 : Age = 24.58 + 3.78M1
M2 : Age = 22.16 + 4.26M2
M1 & M2 : Age = 20.08 + 2.46M1 + 2.15M2

The ASA method has an estimated age error of 0, while Johanson's method is 3, and Kashyap 10. The standard deviation on the regression equation in the ASA method ranges from +2.8 to +3.9 years smaller than Johanson and Kashyap.¹¹

DISCUSSION
Estimated age is one of the forensic examinations that can assist in the process of identifying individuals in various forensic cases.¹³ Increased age is characterized by growth and developmental stages, including the teeth as part of the body structure. The increase in age is associated with constant changes in physical conditions, so that each stage of the characteristic process can be related to a person's age.¹⁴

Estimates of the age of individuals in the forensic field are performed on live and off individuals in the case of proof of age for the purposes of legal investigation and identification of unrecognized individuals. The age of an individual is important in determining legal or judicial processes.¹⁵,¹⁶

There are several parameters of growth and development measurement, one of which is formulated by Krogman, namely chronological age and biological age. Chronological age is the human age calculated since the human is born, according to the date, month, year in the calendar. While the biological age can be seen from the dental age, it is a specific measure based on the stage of growth and development of deciduous and permanent teeth. In addition to the teeth, a person's biological age can be seen through the growth and development of cranium.¹⁵

Body parts that are generally used to estimate age are skeletal and teeth. Skeletal maturity as a medium of age estimation has its limitations because it can only estimate age over a certain age range with a large standard deviation of age. While the teeth as the media age estimates have an advantage by estimating prenatal age to adulthood.⁴

The accuracy of individual age estimates through the teeth should be adjusted to individual conditions when examined. This can be observed through the individual being alive or dead, the left-over of healthy tissue, the availability of tools for examination, the location of the disaster, the number of disaster victims, and the ability of a forensic odontologist in applying the knowledge they possess. The use of various methods of estimating the age of individuals through teeth can be varied from one method to another. Physical examination through the degree of dental attrition can be combined with radiological methods by being matched with the atlas or through other measurement methods. It takes knowledge and experience from a forensic odontologist to estimate the accuracy of an individual's age. In principle the method used should be easy for examiners and individuals who are examined, quickly, and accurately in estimating the age of the individual.⁴,¹⁵

CONCLUSION
Estimated age is one of the forensic examinations that can assist in the process of identifying individuals in various forensic cases. Increased age is characterized by tooth changes in the oral cavity from the teeth of children to permanent teeth.

There are various age estimation methods through tooth. An ondontology forensic should be able to choose appropriate age estimation methods through the teeth in forensic identification cases.

Age identification can be performed on the individual's life or death. For live individuals, the choice of age estimation method through the teeth is adjusted to the approximate age approximation of whether the individual is in mixed dentition or adulthood. In case of mass disaster, it is necessary to use the age estimation method which is easy and quick to use.

REFERENCE:


The differences of Peak Expiratory Flow Rate Before and After Vertical Run and Jogging Exercise

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ABSTRACT

Background: Running or jogging is the most popular sports in Indonesia. One of the variants is vertical run, which uses stairs as a running track. Recently in Indonesia, many skyscrapers with lift and escalator existence are constructed and causes less people using stairs. This study aimed to compare peak expiratory flow rate before and after vertical run and jogging exercise within 8 weeks.

Aims: Knowing the differences of peak expiratory flow rate between before and after vertical run and jogging exercise.

Method: This study design is a Quasi Experimental with pre-test and post-test unequal group. Fifteen people joined vertical run exercise and 14 people joined jogging exercise within 8 weeks. Peak expiratory flow rate before and after exercise were measured using mini-wright peak flow meter. Data is analyzed by dependent t-test and independent t-test.

Results: Peak expiratory flow rate before vertical run and jogging exercise are 567.56 ±61.79 L/minute and 534.76 ±72.78 L/minute, respectively. While, peak expiratory flow rate after vertical run and jogging are 592.44±53.77 L/minute and 552.14±70.75 L/minute, respectively. The difference between peak flow rate before and after on both vertical run and jogging exercise are significantly increase (p=0.001 and p=0.002). However, peak expiratory flow rate in vertical run exercise is higher than jogging (p=0.094).

Conclusion: Peak expiratory flow rate is significantly increased either after both vertical run or jogging exercise. However, the magnitude of peak expiratory flow rate after vertical run exercise is higher than jogging.

Keywords: Peak expiratory flow rate, vertical run, jogging

INTRODUCTION

Sport is a physical activity that can strengthen and make body healthier. Physical activities can increase and maintain body health and immune system. Doing exercise regularly can increase respiratory capacity than resting period.¹⁻³

Exercise have been regularly done by 22% of Indonesian people and 21.78% by Central Java civil. Men and school-age groups tend to do exercise roytinly. About 63.9% of Indonesian people do exercise once a week. Twenty point two percent of them choose to do jogging as an exercise.⁴ Previous study has shown jogging in 5 sessions, 20 minutes each, per week can increase peak expiratory flow rate by 17%.⁵

One of running variation that recently developed is vertical run/ tower running/ stair climb. This variation use stairs in tower, skyscraper, or public stairs as running track.⁶

Many vertical run competitions have been held internationally and this sport has already had association such as Towerrunning World Association and Asian-Oceanian Vertical Marathon Association.

Recently, Indonesia has built many skyscrapers. The tallest building in Indonesia has 69 floors and it has been planed to construct 113 floors building. However, the existence of lift and escalator cause less people use stairs. People choose to use stairs or lifts depend on several factors, such as location, height, users, and other factors. Another study shows, people who use stairs will increase 95% if the distance between lift and escalator is increased by 100%.⁷

Previous studies about vertical run/ stair climb showed stairclimbing exercise in sedentary
office workers increase VO$_{2\text{max}}$ by 94%. While, climbing 125 bouts per week in 10 weeks can increase VO$_{2\text{max}}$ more than 10 % in adult-men. Climbing 1 step burns energy as much as 0.11 kcal. Vertical run can increase HDL within sedentary people. However, the effect of vertical run to peak expiratory flow rate has not been known. This study will measure peak expiratory flow rate in vertical run exercise.

**METHODS**

This study has been done using stairs in Faculty of Medicine Diponegoro University's B building and yard during April 2017 among 8 weeks using quasi experimental with pretest, posttest unequalivalent group design. Subjects in this study were males between 16-22 years old medical students Faculty of Medicine Diponegoro University which fulfilled inclusion criteria and do not have any exclusion criteria. Subjects had to signed an informed consent if agree to join in this study. There was no history of disease in cardiovascular, musculoskeletal, respiratory, and smoking in all subjects. Sampling had been done by purposive sampling with minimal 22 subjects, which divided into 2 groups (@11), jogging exercise and vertical run exercise groups. Jogging exercise group was asked to do 230 meters jogging in Faculty of Medicine Diponegoro University's yard. While, vertical run exercise group was asked to run upstairs from first to third floor of Faculty of Medicine Diponegoro University's B building twice, which interrupted by running downstairs between the climbs. Exercises were done within approximately 90 seconds twice a week within 8 weeks.

Before doing the exercise, subjects were asked to filled questionnaires. Heart rate was always measured in the end of exercise. Peak expiratory flow rate was measured before and after 8 weeks of exercise.

Normality of data was tested using Shapiro-Wilk test. Then, difference of peak expiratory flow rates between before and after exercise for each group was tested using dependent T-test. The difference between groups was tested using independent T-test. If p<0.05, it means the difference between groups is significant.

**RESULT**

Characteristics of each groups are showed by table below

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Mean ± Standard Deviation (minimum-maximum)</th>
<th>Vertical run exercise</th>
<th>Jogging exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body height</td>
<td>1,69±0,07 (1,57-1,81) meter</td>
<td>1,68±0,05 (1,62-1,76) meter</td>
<td></td>
</tr>
<tr>
<td>Body weight</td>
<td>66,20±7,44 (55,00-80,50) Kg</td>
<td>59,71±5,28 (55,00-69,00) Kg</td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>23,08±1,58 (19,82-24,62) Kg/m²</td>
<td>21,11±1,91 (18,61-24,68) Kg/m²</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>20,47±0,64 (19,00-21,00) years</td>
<td>20,07±0,91 (18,00-21,00) years</td>
<td></td>
</tr>
<tr>
<td>Heart rate</td>
<td>79,69±4,64 (68,27-85,93) per minutes</td>
<td>79,51±5,33 (66,00-85,14) beat minutes</td>
<td></td>
</tr>
<tr>
<td>before exercise</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart rate</td>
<td>163,10±10,29 (144,43-182,86) per minutes</td>
<td>158,50±11,30 (136,86-173,79) per minutes</td>
<td></td>
</tr>
<tr>
<td>after exercise</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>91,37±0,81 (90,49-93,08) seconds</td>
<td>93,53±1,46 (90,37-95,39) seconds</td>
<td></td>
</tr>
</tbody>
</table>
### Table 2. Mean Peak Expiratory Flow Rates for Each Groups

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Mean ± Standard Deviation (L/minute)</th>
<th>Normality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Vertical run exercise</strong></td>
<td><strong>Jogging Exercise</strong></td>
</tr>
<tr>
<td>Peak expiratory flow rate before exercise</td>
<td>567,56±61,79</td>
<td>534,76±72,78</td>
</tr>
<tr>
<td>Peak expiratory flow rate after exercise</td>
<td>592,44±53,77</td>
<td>552,14±70,75</td>
</tr>
</tbody>
</table>

Significant (p<0,05)

Vertical run exercise group’s peak expiratory flow rates before and after exercise are higher than jogging exercise group. Datas are normally distributed (p>0,05) after tested using Shapiro-Wilk test.

### Table 3. The difference of PEFR before and after exercise for each groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean ± Standard Deviation (L/minute)</th>
<th>p***</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Peak expiratory flow rate before exercise</strong></td>
<td><strong>Peak expiratory flow rate after exercise</strong></td>
</tr>
<tr>
<td>Vertical run exercise</td>
<td>567, 56 ±61,79</td>
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</tr>
<tr>
<td>Jogging exercise</td>
<td>534, 76 ±72,78</td>
<td>552,14±70,75</td>
</tr>
</tbody>
</table>

Significance (p<0,05)

Dependent T-test show the significant peak expiratory flow rate increment in both jogging (p=0,002) and vertical run (p=0,001) exercises.

### Table 4. The difference of PEFR between group

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Mean ± Standard Deviation (L/minute)</th>
<th>Normality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Vertical run exercise</strong></td>
<td><strong>Jogging Exercise</strong></td>
</tr>
<tr>
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<td>Peak expiratory flow rate after exercise</td>
<td>592,44±53,77</td>
<td>552,14±70,75</td>
</tr>
</tbody>
</table>

Significance (p<0,05)

Independent T-test show, vertical run exercise group’s peak expiratory flow rates both before and after exercise are higher than jogging group.

**DISCUSSION**

Jogging exercise can increase peak expiratory flow rate (PEFR) by making expiratory and inspiratory mechanism stronger and more efficient. Vertical run exercise, which is an anaerob exercise can increase VO$_{2_{max}}$ and FEV$_1$. Previous study reported that FEV$_1$ has a positive correlation with PEFR. Peak expiratory flow rate in vertical run exercise group is higher due to higher heart rate after exercise achieved. As mentioned in previous study, VO$_{2_{max}}$ during exercise is positively correlated with heart rate after exercise. Higher VO$_{2_{max}}$ within vertical run exercise group will have higher FEV$_1$ and higher PEFR. However, positive correlation between FEV$_1$ and
PEFR is not strong.\textsuperscript{18} It explains why the difference between groups are not significant.

Limitations to this study are the control of subjects' activities, fitness, and the frequency of the exercise which is only twice a week. Therefore, there may be different result.

CONCLUSION & SUGGESTION

Conclusion

Peak expiratory flow rate is significantly increased either after both vertical run or jogging exercise. However, the magnitude of peak expiratory flow rate after vertical run exercise is higher than jogging.

Suggestion

Further studies are needed to know other anaerob exercises effect on peak expiratory flow rate and vertical run effects on other parameters. The data of this study can be used by public to consider using stairs in daily activities.

REFERENCES

18. Uth N, Sorensen /EH, Overgaard /EK. Estimation VO 2max from the ratio between HR max and HR rest – the Heart Rate Ratio Method. 2004;111–5