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The Effectiveness Of Vernonia Amygdalina (African Bitter Leaf) Tea For Reducing Cholesterol Levels In Individuals With Hypercholesterolemia

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A B S T R A C T

Advances in technology and high activities at work cause a person to prefer fast food, increasing the risks of high cholesterol levels. Meanwhile, the healing of hypercholesterolemia requires a long treatment time. One of them is non-pharmacological treatment using Vernonia amygdalina (African bitter leaf) tea. This study analyzes V.amygdalina (African bitter leaf) effectiveness for reducing the cholesterol levels in individuals with hypercholesterolemia. The design of this study was a quasi-experimental design, with a non-equivalent control group design. The population involved individuals with hypercholesterolemia in the village of Kedensari RW 05 Tanggulangin, Sidoarjo. There were 40 respondents in this study using the purposive sampling technique – 20 respondents in the experimental group and 20 respondents in the control group. The independent variable was V.amygdalina tea, whereas the dependent variable was cholesterol levels. The data were analyzed using the Wilcoxon and Mann-Whitney tests. The p-value of the Wilcoxon test and Mann-Whitney signed-ranks test was (0.000)<α(0.005), which illustrated that V.amygdalina (African bitter leaf) tea was useful for the treatment of hypercholesterolemia.

INTRODUCTION

Technology and lifestyle alter habits in food consumption (Riansari, 2008). Nowadays, people prefer to consume fast food. The risk of fast food consumption contains high cholesterol levels, especially fried foods, due to increased heating (Tri, 2011). Maulida, Mayasari, and Rahmayani (2018) state that the primary cholesterol sources are meat, poultry, fish, and dairy products. Meanwhile, plant-based foods do not contain cholesterol. Serum cholesterol level less than 200 mg/dl is within the normal cholesterol levels. When it is more than 200 mg/dl, it is considered hypercholesterolemia (Waloya, Rimbawan, and Andarwulan, 2013).

Based on a report from the Ministry of Health of the Republic of Indonesia, in the book Profile of Non-Communicable Diseases in 2016, the number of high cholesterol cases based on the case visit to the community health post for non-communicable diseases prevention activities (from now on referred to as *Posbindu-PTM)* and the public health center (from now on referred to as *Puskesmas*) in East Java, Indonesia was shocking. There were 8225 case visits, and around 2967 cases were individuals with high cholesterol, as approximately 36.1%. The case rate of high cholesterol in 2015 was 58.5% and in 2016 was 52.3% – based on the Indonesian percentage of risk factors for non-communicable disease in

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Posbindu-PTM and *Puskesmas* between 2015 and 2016. The initial survey from the cadre records in Kedensari Village RW 05 showed that the number of individuals with high cholesterol cases in RT 17 was approximately 23.

Nowadays, the rise of the high cholesterol rate sprang by the diet and the lack of exercise. Rates individuals with High cholesterol or hypercholesterolemia continue to increase (Rahma, Natsir, and Kabo, 2014). When there is inadequate hypercholesterolemia treatment, it can lead to stroke because the blood flow to the brain is blocked. Additionally, it leads to atherosclerosis (Yani, 2015). Atherosclerosis is one of the causes of heart disease. Heart disease is the leading cause of death in the world (Hendra, 2016) (Ninaprilia, Z. and Kurniawaty, 2013). Based on the data obtained from WHO (2011), cardiovascular diseases were among the causes of death (30%). Ardiani (2017) reports that around 80% of deaths due to cardiovascular disease occurred in developing countries.

Hypercholesterolemia treatment takes an extended period. People with high cholesterol must be able to get used to change their diet and lifestyle. Hypercholesterolemic drugs such as HMG CoA inhibitors have side effects, including myoglobinuria, rhabdomyolysis, and myopathy. The continuous use of chemical medications will also harm the body. Recently, people tend to consider herbal medicines more. The treatment used to lower the cholesterol level is *V.amygdalina* (African bitter leaf) (Nuryani, 2018). The study conducted by Ardiani (2017) reported that *V.amygdalina* contained saponins, lactones, flavonoids, tannins, glycoside, and triterpenoids. The results showed that the ethanol extract of African bitter leaf at a dose of 100 mg/kg, 150 mg/kg, and 200 mg/kg of body weight significantly reduced total cholesterol level ($p<0.05$) compared to the negative control. It concluded that giving ethanol extract of African bitter leaf at 100 mg/kg, 150 mg/kg, and 200 mg/kg of body weight could reduce the total cholesterol levels. Based on previous studies, *V.amygdalina* can reduce blood lipids levels, so *V.amygdalina* is possibly a potential product to reduce hypercholesterolemia. Based on the background, the research aims to examine the effectiveness of *V.amygdalina* (African bitter leaf) tea for lowering cholesterol levels in individuals with hypercholesterolemia.

METHOD

The design of this study was a quasi-experimental design, with a non-equivalent control group design. Before the treatment (giving *V.amygdalina* tea), the authors examined cholesterol levels in both the experimental and control groups. *V.amygdalina* (bitter leaf) administration was given to the experimental group with a dose of 2 g/sachet three times a day for 15 days. The control group did not receive *V.amygdalina* tea – The researchers gave health education about cholesterol. We re-examined cholesterol levels again in both groups after treatment.

The study aims to investigate the effectiveness of *V.amygdalina* (African bitter leaves) tea to reduce cholesterol levels in individuals with hypercholesterolemia. The population in this study involved all individuals with hypercholesterolemia in the village of Kedensari RW 05 Sidoarjo. The sampling technique was purposive sampling – a sampling technique in which the researchers determine the sample according to the research objectives. The respondents in this study were 40 individuals with hypercholesterolemia. There were 20 people in the experimental group and 20 people in the control group. The experimental group was treated with *V.amygdalina* tea, while we gave health education about cholesterol in the control group.

The independent variable was *V.amygdalina* tea, whereas the dependent variable was cholesterol levels. The research instrument used an observation sheet and a tool for measuring cholesterol levels. In the experimental group, the researchers came to the respondents' home and gave *V.amygdalina* tea every day within 15 days. The interval between giving treatment and re-checking the cholesterol levels was 15 days. While in the control group, we gave health education about cholesterol at the cadre's house. Measurement of respondents' cholesterol levels was a post-test 15 days later.

Data analysis used univariate and bivariate analysis. The univariate analysis explained age, sex, education, occupation, income, and duration – individuals suffering from hypercholesterolemia. Determine the effectiveness of *V.amygdalina* tea on blood cholesterol levels used bivariate analysis. Moreover, this study used the Wilcoxon and Mann-Whitney tests.

RESULT

a. Univariate Analysis

The respondents' characteristics described age, gender, education, occupation, income, and duration of suffering from hypercholesterolemia in the experimental and control groups.

Table 1. Percent distribution of respondents by age, Sidoarjo 2020

Age	Experimental Group		Control Group	
	Frequency	Percent	Frequency	Percent
26-35	7	35	4	20
36-45	8	40	10	50
46-55	3	15	4	20
>55	2	10	2	10
Total	20	100	20	100

Table 1 describes the average age in the experimental and control group is 36-45 years – 40% in the experimental group and 50% in the control group.

Table 2. Percent distribution of respondents by gender, Sidoarjo 2020

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Gender	Experimental Group		Control Group	
	Frequency	Percent	Frequency	Percent
Male	2	10	4	20
Female	18	90	16	80
Total				

Table 2 explains that the respondents in the experimental group 18 (90%) were mostly female, while 16 respondents (80%) in the control group were female.

Table 3. Percent distribution of respondents by occupation, Sidoarjo 2020

Occupation	Experimental Group		Control Group	
	F	%	F	%
Civil Servants	2	10	0	0
Private Employees	5	25	**3**	15
Entrepreneur	8	40	10	50
Retired	0	0	0	0
Unemployed	5	25	7	35

Table 3 illustrates that most respondents in both groups were entrepreneurs (self-employed) in detail, eight people (40%) in the experimental group and ten people (50%) in the control group.

b. Bivariate Analysis

The bivariate analysis examined the effectiveness of treatment (African bitter leaf tea) in reducing cholesterol levels in respondents. The first analysis was the change of cholesterol levels in the experimental group between pre and post-test. Then the authors evaluated the gap in cholesterol levels in the control group between pre and post-test, followed by examining the difference (Δ) of cholesterol levels between both groups.

Table 4. The Wilcoxon test results on mean scores of cholesterol levels in the experimental and control group before and after the treatment.

Cholesterol Levels		N	Mean	Sum of Rank
Pre and Post Test Experiments	negative rank	20	10,50	210
	Positive Ranks	0	0	0
	Ties	0		
	Total	20		
Pre and Post Control Test	negative rank	20	10.50	210
	Positive Ranks	0	0	0
	Ties	0		
	Total	20		

a. cholesterol levels experiment and control post < pre-experimental cholesterol levels
b. cholesterol levels experiment and post control > pre-experimental cholesterol levels
c. cholesterol level experiment and control post = pre-experimental cholesterol level

The Wilcoxon test result in the post-test experimental group showed lower cholesterol levels than the pre-test (table 4). These results indicated that there were differences in cholesterol levels in the pre-test and post-test. The negative rank or the difference (negative) between the pre-test and post-test cholesterol

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levels were not 0 either on the N value, Mean Rank, or Sum Rank. These results indicated that there was a decrease in the results of the pre-test and post-test scores. While the Ties value was 0, illustrating that the pre-test and post-test scores were not the same

Table 5. The results of Wilcoxon test statistics

Test	Post test -pre test experiment	Post test -pre test control
Z	-6.046	-3.923
Asymp. Sig. (2-tailed)	.000	.000

Table 5 shows a difference in the pre and post values in the experimental and control groups ($p<0.05$).

Table 6. The Mann-Whitney test results in the experimental and the control group

Test	Experimental Group	Control Group
Mann-Whitney U	26.500	191.000
Wilcoxon W	236.500	401.000
Z	-4.726	-.250
Asymp. Sig. (2-tailed)	.000	.000
Exact Sig. [2*(1-tailed Sig.)]	.000[b]	.000[b]

Table 6 indicates a significant $p<0.05$, illustrating that giving *V.Amygdalina* tea reduces cholesterol levels in individuals with hypercholesterolemia.

DISCUSSION

Based on the study conducted by Ardiani (2017), African bitter leaf (*V.amygdalina*) contained flavonoids, saponins, and tannins found in EEDA (Tandi, Mariani, and Setiawati, 2020) (Pratiwi and Gunawan, 2018). Flavonoids can reduce cholesterol synthesis because they have the enzyme 3-hydroxy 3-methyl glutaryl (HMG CoA). Flavonoids can lower blood cholesterol levels by reducing cholesterol and bile acids' absorption in the small intestine. Then there is increased excretion of cholesterol through feces. Flavonoids cause liver cells to increase the formation of bile acids from cholesterol, which will reduce fat because it becomes energy (Adi Sucipto, 2008) (Tri, 2011). Tannins that react with mucosal proteins of intestinal epithelial cells can inhibit fat absorption. Saponins work in reducing the absorption of cholesterol in the intestines and reducing the absorption of bile sap. Saponins work by binding bile salts to form non-absorbable compounds. The second way of working is by making bile salts so that they can bind to polysaccharides in dietary fiber, then excreted with feces. Bile salts cannot bind to cholesterol, so the body cannot absorb cholesterol (Hasan, Subroto, and Puspasari, 2018).

African leaf has a bitter taste when consumed. *V.amygdalina* can detoxify the body because of its antioxidant properties (Faradisa, Marfu'ah, and Amal, 2018). There are so many beneficial effects and ingredients of the leaves besides reducing cholesterol levels. During this time, many people assume *V.amygdalina* as insulin leaves. Its use to decrease blood glucose levels. Pharmacological research on the leaf extract of *V.Amygdalina* can control blood glucose levels in diabetic patients. This leaf causes

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hypoglycemia and hypolipidemia. Dian (2015) states that *V.amygdalina* is safe for consumption both as medicines and food because of no harmful effects on the liver and kidneys.

Table 2 shows that most of the respondents were female. The research conducted by Hendra (2016) showed that women tend to have higher blood cholesterol levels during childhood than men during childhood. In fact, at the age of 20, men have a higher cholesterol level than women. But when reaching menopause, there is a reduction of estrogen levels in women.

Table 1 shows that the respondents' average age in the experimental group and the control group is between 36 and 45. The research conducted by Hendra (2016) on risk factors for increased cholesterol reported that in individuals over 30 years, age became the significant risk factor for increasing blood cholesterol levels. Listiana and Purbosari (2010), in their research, also said that total cholesterol levels also increased when people got older. The increase in cholesterol level triggers the risk of ischemic stroke. The increasing age will also be at risk for cerebral ischemia, regardless of ethnicity and gender. People aged over 55 years have the risk of developing cerebral ischemia twice as much as the lower age. The development is a transitional period for men and women to leave their physical characteristics and behaviors of adulthood and enter life with new physical characteristics and behaviors. The developmental tasks at this age take the form of further development and maturation in young adulthood. Concerning health, adults begin to accept and adapt to the physical changes that happen in them.

The control group did not receive Vernonia Amygdalina tea but received health education was showed a difference between the pre-test and post-test (Table 4). The respondents' age in the control group is between 36-45 years – classified into adulthood. When people enter emotional maturity and control their emotions, they can think carefully, well, and objectively (Chaplin, 2009). Therefore, they will accept knowledge and information from the surrounding environment easier. Many factors can cause high blood cholesterol levels. In addition to herbal medication, individuals must also control their diet, exercise, and avoid smoking and stress. Thus, they need to look at some of these factors to control cholesterol levels. When the cholesterol levels are well maintained, there is a reduced risk of stroke and heart attack.

CONCLUSION

This study concludes that consuming *V.amygdalina* as tea reduces blood cholesterol levels in individuals with hypercholesterolemia.

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Role Of Moringa Oleifera Leaf Extract In Increasing Hemoglobin Levels In Pregnant Rats With Anemia

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A B S T R A C T

Anemia is one of the epidemic health problems in society and the most common nutritional problem. The *Moringa oleifera* is rich in excellent dietary content and can complement the body's needs. This study aims to determine *Moringa oilefera* leaf extract's effectiveness in increasing hemoglobin levels in pregnant rats (*Ratus norvegicus*) with anemia. This paper used a true experimental research design with a pre-post test randomized control group design. This study utilized female rats (*Ratus norvegicus*), pregnant 8-12 weeks, weighing 200 grams. Experimental procedures were four treatments with three repetitions. Types of treatment were negative control and positive control (administration of *Moringa oilefera* leaf extract) at a dose of 0.18 g / head, 0.36 g / head, and 0.72 g/head. Analysis using one way ANOVA with an error rate of 0.05. The results showed $p<0.005$, which means a significant increase in hemoglobin levels in the group given the treatment of moringa leaf extract at a dose of 0.72 g/head/day. The conclusion and suggestion from this research are public could get information about using natural materials as economically valuable drugs (back to nature).

INTRODUCTION

Anemia is a condition in which red blood cells or oxygen intake are insufficient to meet the body's physiological needs, which can vary according to age, sex, and pregnancy status. In pregnancy, when the hemoglobin levels are less than 11 g/dl in the first and third trimesters or less than 10.5 g/dl in the second trimester, the pregnant woman is considered anemic. WHO reports that 18% of women from industrialized countries and 35% to 75% (56% on average) of pregnant women in developing countries are anemic. This anemia can disrupt the fetus and increase maternal mortality. Anemia in pregnancy can lead to pre-eclampsia and eclampsia and intrauterine growth restriction (IUGR), low birth weight, and an increased risk of postpartum hemorrhage. Pregnant women with anemia experience premature birth, low APGAR scores, and intrauterine fetal death more than non-anemic pregnant women. Mild anemia usually does not affect pregnancy unless the mother is anemic in subsequent pregnancies due to low iron stores. On the other hand, signs and symptoms of severe anemia – such as tachycardia, dyspnea, and high cardiac output failure – can be fatal. During pregnancy, the need for iron increases, which worsens the prevalence of anemia; there is also a disproportionate increase in plasma volume over red blood cell levels, resulting in a physiological decrease in hemoglobin (Hb) levels in the mid-trimester (Youssry, M. A., et al., 2018)

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Moringa plant contains high nutrients and is very useful for improving nutrition. Moringa oleifera has successfully prevented the epidemic of malnutrition in several countries in Africa and saved the lives of many children and pregnant women. Adding Moringa to the daily diet of children can quickly improve malnutrition because it contains 40 essential nutrients. Moringa leaf contains complete protein (nine essential amino acids), calcium, iron, potassium, magnesium, and vitamins A, C, E, and B, which have a significant role in the immune system. Research in Indonesia on the clinical effects of moringa leaves also has been done. Based on research on the antibacterial activity test of Moringa leaf extract against Streptococcus bacteria's growth, the results reported that the higher the concentration of Moringa leaf extract, the greater the bright zone formed (areas that were not overgrown with bacteria). Bright zone began to create at a concentration of 5% Moringa leaf extract powder (Luthfiyah, 2012).

Based on several studies' analysis, the Moringa oliefera leaf's nutritional content can complement the body's needs (Ahmad, 2015). Moringa leaf contains 25 times more iron than spinach, helping the body form hemoglobin and myoglobin, which carry oxygen in the blood and muscles (Madukwe E.U., Ugwuoke A.L., 2013).

One type of vegetable that has not been widely used but has a high nutritional content is Moringa leaf. Moringa leaf is a mother's best friend and the magic tree because it has high nutritional content and many benefits. Moringa leaf is a nutrition source; even WHO has introduced Moringa leaf since 1988 as an alternative food to overcome malnutrition. Moringa leaf contains many micronutrients needed by pregnant women, such as beta carotene, thiamine (B1), riboflavin (B2), niacin (B3), calcium, iron, phosphorus, magnesium, zinc, and vitamin C (Sitohang, P. C., et al., 2018)

Based on the previous study of anemia and the effect of Moringa oliefera leaf, the authors are interested in examining the effectiveness of Moringa oliefera leaf extract on increasing hemoglobin levels and the number of erythrocytes in pregnant rats (Ratus norvegicus). This research can be a reference in overcoming and treating anemia.

METHOD

The research was a true experimental. The study design used a pre-posttest randomized control group design – experimental procedures with four treatments and three repetitions. This study's sample was white rats (Ratus norvegicus), female, pregnant, 8-12 weeks, weighing 200 grams, obtained from the Pharmacology Laboratory of the Health Polytechnic of Dr. Soepraoen Hospital. The sample size was 24 tails.

The authors did pretreatment of pregnant rats for one week. There were four groups – control, experiment with doses of 0.18 g/head, 0.36 g/head, and 0.72 g/head – each group consisting of 6 pregnant rats.

Laboratory of Pharmacy, Dr. Soepraoen Hospital, Poltekkes, made Moringa leaf extract with maceration

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process. Hemoglobin levels were measured by the spectrophotometric method at a wavelength of 540 nm. Pathological treatment (anemia), namely by giving sodium nitrite (NaNO2) as much as 1 ml/head/day for treatment 2, 3, and 4 for 18 days.

Research at the Pharmacology Laboratory of the Health Polytechnic of Dr. Soepraoen Hospital to manufacture Moringa oliefera leaf extract. Laboratory of Pharmacology Health Polytechnic of Dr. Soepraoen Hospital for treatment and care of experimental animals and Laboratory of Clinical Pathology, Faculty of Medicine, Universitas Brawijaya for reading research results. After 24 days of passing the ethical test, the authors started the method described above.

RESULTS

Description of Hemoglobin Levels (g/dl) in Pregnant White Rats (Rattus norvegiccus)

Table 1 Data on Hemoglobin Levels (g/dl) before being given NaOH2 and Moringa leaf extract

Dosage	Group						Average
(g/head)	X1	X2	X3	X4	X5	X6	
Control	18	14	14	15	18	16	15.8
P1 0,18	14	12	18	14	13	18	14.8
P2 0,36	14	15	13	11	14	13	13.3
P3 0,72	18	15	15	12	18	12	15.0
Total	64	56	60	52	63	59	59.0

Table 1 shows that the average hemoglobin levels of pregnant rats before being given NaOH2 and Moringa leaf extract is 59.0 g / dl.

Table 2 Data on Hemoglobin Levels (g/dl) after being given NaOH2 and before being given Moringa leaf extract

Dosage	Group						Average
(g/head)	X1	X2	X3	X4	X5	X6	
Control	11	12	10	10	10	12	10.8
P1 0,18	9	7	11	11	10	13	10.2
P2 0,36	10	13	10	8	10	9	10.0
P3 0,72	11	14	10	10	9	10	10.7
Total	41	46	41	39	39	44	41.7

Table 2 describes that the average hemoglobin level of pregnant rats after being given NaOH2 and before being given Moringa leaf extract is 41.7 g/dl.

Table 3 Data on hemoglobin levels (g/dl) of anemic rats and after being given Moringa leaf extract

Dosage	Group						Average
(g/head)	X1	X2	X3	X4	X5	X6	
Control	13	13	12	12	12	13	12.5
P1 0,18	16	11	13	17	14	18	14.8
P2 0,36	17	18	14	16	14	13	15.3
P3 0,72	18	17	16	18	17	18	17.3
Total	64	59	55	63	57	62	60.0

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Table 3 explains that the average hemoglobin levels of anemic pregnant rats and after being given Moringa leaf extract is 60.0 g / dl.

Table 4 Data on Increased Hemoglobin Levels (g/dl) of anemic rats before and after being given Moringa leaf extract

Dosage (g/head)	Hemoglobin Levels (g/dl)	
	Average Before	Average After
Control	10.8	13
P1 0,18	10.2	15
P2 0,36	10.0	15
P3 0,72	10.7	17
Total	41.7	60

The highest hemoglobin levels of anemic pregnant rats after being given Moringa leaf extract for 14 days were an experimental group with a dose of 0.72 g/head/day, 17 gr/dl, while the lowest was at a dose of 0.18 g/head/day and 0.36 g/head/day, which was 15 g/dl. The average range of blood erythrocyte counts of pregnant rats after being given Moringa leaf extract was between 15 - 17 g/dl (Table 4).

Based on the data analysis results, the p-value was less than 0.05 ($p < 0.05$) in group 0.18, 0.36, 0.72 g/head/day. It indicated a significant increase in hemoglobin levels in the treatment group giving Moringa leaf extract at a dose of 0.72 g/head/day.

DISCUSSION

The mean hemoglobin levels in the treatment group of Moringa oleifera leaf extract at a dose of 0.18 g/head/day and 0.36 g/head/day did not differ significantly – because of the mean ± sd values of the P1 and P2 treatment groups containing the same numbers at the standard deviation, namely 15 ± 2.6 and 15 ± 2.0. In this study, the moringa leaf extract was considered the fastest to increase hemoglobin levels in anemic pregnant rats, which administered moringa leaf extract at a dose of 0.72 g/head/day.

This study showed that the administration of Moringa oliefera extract effectively increased the number of erythrocytes and hemoglobin levels of pregnant rats with anemia. Moringa leaves contain more vitamin A than carrots, more calcium from milk, more iron from spinach, more vitamin C from oranges, more potassium from bananas, and the protein quality of Moringa leaves rivals milk and eggs. On phytochemical examination, Moringa leaves contain sugar, rhamnose, glucosinolates, and isothiocyanates. The phytochemical components of Moringa leaves are known to have the ability to inhibit cancer cells, overcome hypotension, and have antibacterial properties (Fahey, 2005).

Many Moringa leaf properties are used in traditional medicine to treat metabolic diseases, inflammation, infections, parasites, cancer, and water purification. Several studies highlighted the fantastic nutritional qualities of Moringa leaves. Indeed, studies had shown the effectiveness of these leaves in preventing and correcting malnutrition and related diseases, even though they contain anti-nutritional factors such as

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phytate and oxalate. Therefore, this leaf can be a dietary supplement for people with malnutrition because it is rich in protein, vitamins (A, B, C, E), and mineral salts (Ca, K, Mg, P, Iron, Zn, Se, Cu, Mn, Na, Cl). Besides, moringa leaf is positioned as a tonic, strengthening, and stimulating the immune system for HIV / AIDS (Coulibaly, A., et al., 2020).

Moringa leaves are useful in treating moderate anemia, compared to cases of severe anemia. In Milman's (2006) research and Thomson's (2011), the reduction of anemia in the intervention group was three times more than in the control group. The decline in cases of severe anemia was not significantly different between the two groups. Children who have severe anemia may have other complications and deficiencies, which can hinder the rapid increase. However, at the end of the intervention, there were no severe anemia cases in the treatment group, which may indicate an increase in dietary knowledge and practice and the effects of strict Hb monitoring and continued provision of nutrition education. The depletion of the body's iron reserves and red blood cell production stimulates iron absorption (Shija, A. E., et al., 2019).

Moringa leaf is a neuroprotectant in cerebral ischemia caused by obstruction of blood flow to the brain. M. oleifera leaf causes reperfusion and lipid peroxidation, which in turn results in reactive oxygen species. Moringa, with its antioxidants, can reduce reactive oxygen species, thus protecting the brain. Moringa leaves are the treatment for dementia, as it is a promoter of spatial memory. Leaf extracts can decrease acetylcholine esterase activity, thereby improving cholinergic function and memory. A study conducted by Adeyemi et al. showed that Moringa in mice's diet could increase protein content and reduce urea and creatinine in the blood, preventing kidney dysfunction. Moringa leaves to reduce gastric ulcers' acidity – antiulcer agent – by a percentage of 86.15% and 85.13% at doses of 500 mg and 350 mg. Herbal practitioners prescribe Moringa for people with AIDS. The recommendation of giving Moringa in food can boost the immune system of HIV-positive people (Gopalakrishnan, L., et al., 2016).

In one study, breastfeeding women who were experiencing anemia were randomly selected and given weekly doses of 100 grams of Moringa leaf powder instead of iron and folic acid (120 mg and 0.5 mg) from the control group. After three months of therapy, there was a significant increase in hemoglobin levels ($p<0.001$), but iron stores did not change. The protein in Moringa leaves prevents weight loss in women. However, the study concluded that Moringa leaves as a locally available food should be utilized more effectively than supplements and fortified foods for essential nutrients (Sindhu, S., Mangala, S., & Sherry, 2013).

CONCLUSIONS

Moringa oleifera leaf extract administration can increase hemoglobin levels in anemic pregnant rats (Rattus norvegicus). There is the effectiveness of Moringa oleifera leaf extract to increase hemoglobin

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levels in the blood of anemic pregnant rats (Rattus norvegicus) at a dose of 0.72 g/head/day. The conclusion and suggestion from this research are that the public could get information about using natural ingredients as economically valuable drugs (back to nature).

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Combination of Storytelling and Music Therapy to Reduce Stress in Children with HIV/AIDS and Discrimination in Surabaya

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A B S T R A C T

Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) in Indonesia are deadly infectious diseases. This disease will always be a problem at the national and global levels. The impact that often occurs, especially in children with HIV/AIDS, is psychological changes, namely stress. Efforts to overcome its disturbance are storytelling and music therapy. This research aims to apply storytelling and music therapy to reduce stress in children with HIV/AIDS. This research method was a quasi-experiment with a research design involving 1 group (one group pre-posttest), containing 30 respondents aged 6-10 years with HIV/AIDS by purposive sampling. The independent variable was storytelling and music therapy, while the dependent variable was stress levels. The instrument used Hamilton Anxiety Questionaire (HAM-A). The results of the study showed that 26 samples (86.7%) experienced decreased stress levels. Analysis of Wilcoxon sign rank test obtained α=0.009, which means there was a difference before and after therapy. The combination of music therapy and storytelling can be a better alternative in reducing stress in children – by considering age, environment, and children's emotions to have an optimal effect).

INTRODUCTION

Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) in Indonesia are infectious and deadly diseases. This disease cannot be cured and is a challenge for problems at the national and global levels. AIDS is a collection of symptoms that results in a decrease in the immune system. HIV causes a decline in the immune system, then making them susceptible to infection with various other diseases (Depkes, 2009).

East Java in 2014-2016 occupied the second position of HIV/AIDS cases, 4,508 patients in 2014, 4,155 sufferers in 2015, then increased to 6,513 sufferers in 2016. Data from East Java Kominfo, the number of children with HIV/AIDS in Surabaya in 2015 was 466 patients, 330 were 0-4 years old (Kemenkes, 2017).

Indonesian society is currently very sensitive to HIV/AIDS, which results in high stigma and discrimination in the community related to HIV / AIDS. Prejudice in society associated with HIV/AIDS is very unpleasant for people with HIV/AIDS because they feel the consequences of this discrimination directly. The response to unpleasant feelings arises due to disturbances from internal and external

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environmental conditions. These changes in feelings lead to psychological and physiological changes. The main impact is stress (Nursalam, 2007). People who experience distress can cause physical illness and failure to adapt. Stress occurs anytime, anywhere, and anyone, including children (Hidayanti, 2013). Until now, parents, families, and society have not understood the stress on children. Distress in children occurs due to conflict, pressure, frustration, or social discrimination. Stress can suppress their immune system. Children with HIV/AIDS tend to get social discrimination from the environment, including from their families. Social discrimination causes Children with HIV/AIDS always to be ostracized, given negative stereotypes, and sometimes even neglected (Fog, Budtz, and Yakaboylu, 2005).

Stress in children makes them easily fearful, withdraws from social interactions, emerges negative behavior, has sleeping difficulty, etc. In general, children cannot understand and express their feeling. Therefore, we need an effort to overcome these problems. Ways to deal with it are through storytelling methods and music therapy (Amelia, 2017). Based on the research results, storytelling can distract children and reduce feelings of anxiety and hopelessness (Ulfa and Urifah, 2017). Music therapy allows children to release hidden emotions and unpleasant memories and is very useful in making the body, emotions, and soul feel relieved (Petra Kern *et al.*, 2013). The application of these two methods to Children with HIV/AIDS hopefully can reduce stress problems due to discrimination.

METHOD

The research method used a quasi-experiment with a one-group pre-posttest design research design at the Abdi Asih NGO. The length of time for the whole study was three months. The study population was children aged 6-10 years who have HIV/AIDS in the area of the Non-Governmental Organization (NGO) Abdi Asih. The sampling technique used was purposive sampling. These study's inclusion criteria consisted of 1) Children who have been diagnosed with HIV / AIDS, 2) HIV / AIDS children aged 6-10 years, 3) HIV / AIDS children who experience stress.

In contrast, the exclusion criteria consisted of 1) HIV / AIDS children who were unwilling to be involved, 2) Children with HIV / AIDS Stage 3 and 4. The researcher conducted this study three times a week. The duration of each therapy meeting is 60 minutes. There were 20 minutes of storytelling therapy, continued with discussions, continued with 20 minutes of music therapy, and finally closed with a discussion session. Fable (animal picture book), online video, and comics were the media of storytelling. Music therapy utilized online music media from YouTube. The types of music provided consist of classical music and children's pop music. Measuring the child's stress level used the Hamilton Anxiety Questionnaire. The results were compared between pre and post-intervention and analyzed using the Wilcoxon sign rank test.

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RESULTS

Univariate Analysis

The respondents' characteristics described age, gender, education, family status, and discrimination level of children with HIV/AIDS and discrimination levels

Table 1 Percent distribution of respondents by age, gender, education, family status, and discrimination levels

Characteristics of respondents	Quantity	Percentage (%)
Age		
Six years old	12	40
Seven years old	7	23
Eight years old	6	20
Nine years old	2	7
Ten years old	3	10
Total	30	100
Gender		
Male	21	70
Female	9	30
Total	30	100
Education		
School	17	56.7
Not in School	13	43.3
Total	30	100
Family Status		
biological	7	23.3
Step/Adopted	23	76.7
Total	30	100
Discrimination levels		
Mild	8	26.7
Medium	12	40
Severe	10	33.3
Total	30	100

Based on the data collection above, most children were six years old (40%), male (70%), education level at the primary school and schools with special needs (56.7%). Most of them lived with non-biological families (76.7%) consisting of stepfamilies and NGOs. Children with HIV AIDS experienced moderate (40%) and severe (33.3%) discrimination. There were still many children who experience discrimination due to the public's view of HIV (Table 1).

Bivariate Analysis

The bivariate analysis examined the effectiveness of music therapy and storytelling in reducing stress in respondents.

Table 2 The Wilcoxon test results on stress levels before and after an intervention

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Data Category	Pre		Post	
	Quantity	Percentage (%)	Quantity	Percentage (%)
Mild Stress	4	13.3	15	50
Medium Stress	14	46.7	11	36.7
Severe Stress	12	40	4	13.3
Total	30	100	30	100
Negative Rank		26		
Ties		3		
Positif Rank		1		
Sign 2 Tail		0,009		

The changes in stress levels based on the Wilcoxon test results showed a significance $p<0.05$, which means there were changes in stress levels before and after treatment. There were decreased stress levels in respondents after music therapy and storytelling – the difference is negative as many as 23 samples. However, one child had a positive value because of a lack of ability and desire during an intervention, so the process did not run optimally.

DISCUSSION

Description of Stress Levels in Children with HIV AIDS before the combination therapy of storytelling and music therapy

The initial data collection of 30 samples showed a high level of stress experienced by children. Before therapy, the majority were at a high-stress level. According to research by (Hidayanti, 2013), people with HIV/AIDS during the first six months to two years showed the most severe problem. The main problem was prolonged stress to depression. Pressure in people with HIV occurs due to various factors, in this case, due to the stigma of society, which creates discrimination. People living with HIV feel more difficult to accept their health conditions. Besides, HIV affects their daily social activities due to psychological, physical, and social pressure. Individuals with HIV must minimize their stress as much as possible to do their activities properly.

Based on preliminary data collection, most children with stress are at the age of 6 years. According to research by (Kosegeran, 2013), the age of six (early school years) was an essential phase for children to socialize with their social environment. At this age, a child wants to be liked by his peers. Children begin to try to get to know each other and learn from each other. Wulandari (2011) believes that aged 6-12 years is a sensitive phase for understanding their social environment. At this stage, the child finds out comprehensively whatever he wants to know about his social environment. Children in this phase easily withdraw when something goes wrong when introducing themselves in their social environment. This phase is the initial learning phase of a child's social learning. When this phase is disturbed, it will have an impact on children's development from social aspects (withdrawn, shy, difficult to interact with other people, do not want to talk, and are less able to work in groups), intellectual aspects (have low grades in lessons, are less able to answer when asked) and cognitive (lack of ability to read, count, and recognize

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simple logic) (Setyowati, 2017). So the stress that appears in children aged 6-10 years should not occur because they are vulnerable and effortless to withdraw from their environment, which results in low development of children's thinking, emotions, and social skills.

Description of Stress Levels in Children with HIV AIDS after the combination of storytelling and music therapy

Based on the results, after the combination of storytelling and music therapy, stress had decreased significantly. Stress reduction occurred in 26 respondents. After treatment, children who were initially tricky to socialize with, withdraw from the environment, and afraid to meet other people turned into children who were easy to communicate and socialize with people. According to research by Wulandari (2011), The music applied to elementary school children could vary; some examples classical, traditional music, etc. It could help children increase their feelings of pleasure and distract children from all the problems they faced, such as learning, doing assignments, or other trigger factors. In principle, the music can help the children get distracted by negative emotions (Solli, Rolvsjord and Borg, 2013).

Research conducted by Padila (2019) explained that storytelling is a type of therapy that can be given to children to improve their ability to interact with someone. Storytelling could provide a slow approach to provoke their interactions with someone. This therapy can facilitate and stimulate children indirectly to interact with other people (Harsismanto, 2019). Research results by Susanti (2011) showed that age and attitude determined the method and type of storytelling in children. A therapist must understand various storytelling methods so that children want to interact and start therapy. A therapist cannot provide the same storytelling model.

Based on the data, there was a failure of therapy on one sample, while three respondents experienced a constant stress level. This failure is due to difficulty adjusting music or storytelling based on the child's age and personality, so children are less interested and focus during an intervention.

A study conducted by Siboro (2018) explained that there was a changeable personality in children. New things attract school-age children because of their curiosity. This curiosity disappears overtime when the child feels bored. The implementation of music therapy and storytelling in children needs to pay attention to other factors that trigger therapy's failure, such as the child's culture of life, children's personality, and children's emotions (Elefant *et al.*, 2012). A different family environment influences how to treat them, so it is necessary to pay close attention to their developmental age and background. When their social environment likes *dangdut*, it will be easier to do music therapy by listening to *dangdut* than other music types. Storytelling therapy using videos is more suitable for children who enjoy playing with cellphones than reading or listening to stories (Ayun, 2017).

The combination of music and storytelling shows a higher success rate than music therapy or storytelling alone, namely 86.7%. According to Wulandari's study (2011), music therapy was 72.5% effective in

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reducing stress. In comparison, a previous study reported that storytelling by watching cartoons was 80% effective in decreasing distress (Padila, 2019). The advantage when combine storytelling and music therapy is that the interventions are more varied. This variation increases the child's willingness during treatment. The combination of storytelling with music complements each other. Music makes storytelling less tedious and more interactive because when listening to music, the child's feelings get better. Besides, music helps melt the atmosphere amidst the boredom of listening to stories. As a result, the combination of music therapy and storytelling can reduce stress in children.

CONCLUSIONS

The combination of music therapy and storytelling can be a better alternative in reducing stress in children. Storytelling helps hone children's abilities and willingness to interact with other people, while music therapy helps increase children's feelings of comfort and happiness. This combination provides more varied interventions, impacting the better child's willingness and ability during the intervention sessions. It also needs to consider age, environment, and children's emotions to have an optimal effect. The combination of music therapy and storytelling requires parents' involvement as an environmental factor that helps children be more confident during the process.

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Implementation Of Diabetic Foot Spa And Sauna Bathing On Quality Of Sleep And Blood Glucose Levels In Individuals With Type 2 Diabetes

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A B S T R A C T

Diabetes is a chronic disease of glucose metabolism, which causes blood circulation obstruction such as tingling and leg pain, and itching. This study aims to determine the effect of diabetic foot spa and sauna bathing on sleep quality and blood glucose levels in individuals with type 2 diabetes. The design used a quasi-experimental. This study's population was all individuals with type 2 diabetes, applied simple random sampling, and a sample size of 60 respondents. The inclusion criteria were individuals with type 2 diabetes who did not have complications. The independent variables were sleep quality and blood glucose levels. The dependent variables were diabetic foot spa and sauna bathing. The instrument used a Pittsburgh Sleep Quality Index (PQSI) and a glucometer. The data analysis test utilized the paired t-test and independent t-test with a p-value of 0.000 ($p < 0.005$). The results of this study showed that 60 respondents, mostly (70%) women, 58.3% were aged 45- 60 years, almost half of the respondents (48.3%) had diabetes for less than one year up to five years and from the results t-test obtained $p=0.000$ ($p < 0.05$). There was an effect of diabetic foot spa and sauna bathing on sleep quality and blood glucose levels.

INTRODUCTION

Diabetes is a disease of blood sugar metabolism disorders. It has chronic hyperglycemia symptoms due to disruption in the secretion/absorption of insulin, impaired insulin function, or both (Skyler, J. S., et al, 2017). This disease has acute and chronic complications. Chronic complications that often occur are peripheral vascular disorders and sensory-motor neuropathy. A previous study reported that nearly 60% of sufferers experience microangiopathy or macroangiopathy complications (Chawla, A., Chawla, R., & Jaggi, 2016). This macroangiopathy obstructs blood flow to all organs (Maureen Farrell, Jennifer Dempsey, Suzanne C. O'Connell Smeltzer, 2013). Impaired blood circulation also results in tingling leg pain and skin itching, especially the folds around the genitals.

Diabetic patients in Indonesia reached 10.3 million – based on data from the International Diabetes Federation in 2017. This figure will continue to increase up to 16.7 million in 2045. The prevalence of diabetes was 10.9% in Indonesia and 8% in East Java (Riskesdas, 2018). 40.8% of patients with diabetes do not comply with the Chronic Disease Management Program (PROLANIS), such as home-visit and sports (Ristanova, 2018). Based on a preliminary study at the Taman Sidoarjo Public Health Center, seven of ten individuals with diabetes often experienced numbness. Their feet' tips or soles were

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frequently painful, so they can't rest, especially at night. Five people experience itching and black marks on their feet' skin and complained of itching in the genitals.

High blood glucose levels cause these complications. It will cause blood circulation disorders and result in organ failures, such as heart failure and kidney failure, and neuropathy (Maureen Farrell, Jennifer Dempsey, Suzanne C. O'Connell Smeltzer, 2013). Neuropathy causes sleep quality disturbance (Bahnasy, W. S., et al, 2018).

Foot care can minimize neuropathy. One way to do foot care is a diabetic foot spa, which is foot care which consists of several stages. The first stage is to do foot exercises. The feet are cleaned with soap and soaked in warm water, followed by massaging the feet and finger (Purwanto, 2014). Sauna bathing is also one way to increase circulation to prevent neuropathy by accelerating sweat to release toxins in the body, reduce joint pain, and increase the body's resistance (Cohen, M., Hussain, 2018). The sauna bathing works by increasing the temperature in a room. Increased room temperature will increase body temperature so that the body's metabolism will increase. Furthermore, the bodies convert blood sugar into energy so that blood sugar levels will decrease (Bistara, D. N., 2019). Based on the above description, the authors will research the influence of diabetic foot spa and sauna bathing therapy on quality of sleep and blood glucose levels in people with type 2 diabetes.

METHOD

The research design used was quasi-experimental. This study included all individuals with type 2 diabetes in the Taman Sidoarjo Public Health Center in 2020 (July-August 2020), totaling 128 people. Each month the average number of patients with Type 2 diabetes was 76 individuals. The study's sampling was simple random sampling, with a sample size of 60 respondents. In this study, the inclusion criteria were individuals with type 2 diabetes who did not have heart disease, heart failure, kidney failure, or stroke. The intervention group (given diabetic foot spa and sauna bathing therapy) was 30 respondents, and the control group (given diabetic foot spa) was 30 respondents. There were measurements in quality of sleep and blood glucose levels before the intervention. After interventions (three times a week), the authors remeasured the quality of sleep and blood glucose levels. The diabetic foot spa procedures such as diabetic foot exercises, then soaking in warm water for 5 minutes, followed by a foot massage with a foot scrub and rinsing, then finally gave a foot moisturizer. The researchers did sauna bathing therapy after a diabetic foot spa for 20 minutes in the intervention group. We utilized a portable sauna device with a solution containing spices. While in the control group, we did of diabetic foot spa three times a week. The Pittsburgh Sleep Quality Index (PQSI) was an instrument to measure the quality of sleep, and a glucometer was a tool to examine blood glucose levels. The data analysis utilized a paired t-test and independent t-test with a p-value of 0.000 ($p < 0.005$).

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RESULTS

Table 1 Distribution of respondents by age, gender, diabetes duration, smoking habit, medication adherence, and exercise

Characteristics of Respondents	Group				Total	
	Intervention		Control			
	F	%	f	%	f	%
Gender						
male	12	40	10	33.3	22	36.6
female	18	60	20	66.7	38	63.4
Age						
< 45 years	14	46.6	12	40	26	43.3
45 - 60 years	16	53.4	18	60	34	56.7
Diabetes Duration						
<1-5 years	10	33.3	12	40	22	36.7
6-10 years	8	26.7	6	20	14	23.3
11-15 years	6	20	6	20	12	20
16-> 20 years	6	20	6	20	12	20
Smoking habit						
Smoke	10	33.3	11	36.7	21	35
Do not smoke	20	66.7	19	63.3	39	65
Medication adherence						
Irregular	2 0	66.7	22	73.3	32	53.3
Regular	1 0	33.3	8	26.7	28	46.7
Exercise						
Often	7	23.3	7	23.3	14	23.3
Rarely	20	66.7	20	66.7	40	66.7
Never	3	10	3	10	6	10

Table 1 shows that most of the respondents are female, 45-60 years old, do not smoke, do not regularly take medication, and rarely have exercise. Almost half of them have diabetes for less than one year up to five years.

Table 2. The results of paired T-test on sleep quality

Group	n *	Pre		Post		t	p-value
		Mean	SD	Mean	SD		
Intervention	30	4.633	2.693	2.5667	0.568	4.003	0.000
Control	30	4.300	1.664	4.133	1.716	1.542	0.134

The mean value of sleep quality in the intervention group before the intervention was 4.6333 (SD 2.693), while after the intervention was 2.5667 (SD 0.568). There was a significant difference in sleep quality before and after the intervention (p=0.000) (Table 2).

Table 3. The results of paired T-test on blood glucose levels

Group	n *	Pre		Post		t	p-Value
		Mea n	SD	Mea n	SD		
Intervention	30	2,918	96.86	1.472	69.38	5,893	0.000
Control	30	2,630	67.02	2.575	65.06	0.784	0.439

The mean value of blood glucose levels in the intervention group before the intervention was 2.918 (SD 96.861), while after the intervention was 1.472 (SD 69,383). There was a significant difference in blood glucose levels before and after the intervention (p=0.000) (See Table 3).

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Table 4. Differences of mean value on sleep quality between the intervention and control groups

Group	Mean	SD	Mean Difference (95% CI)	P-value Independent T-test
Intervention	1.733	1.760	1.076- 2.390	0.000
Control	0.167	0.592		

In the sleep quality variable, the mean difference in the intervention group was 1.733 (SD 1.760), while the mean difference in the control group was 0.167 (SD 0.592). There was a significant difference in sleep quality between the intervention and control groups (p=0.000) (See Table 4).

Table 5. Differences of mean value on blood glucose levels between the intervention and control groups

Group	Mean	SD	Mean Difference (95% CI)	P-value Independent T-Test
Treatment	1.440	133.896	94.06-194. 064	0.000
Control	5.433	37.967		

In the blood glucose level variable, the mean difference in the intervention group was 1.440 (SD 133.896), while the mean difference in the control group was 5.433 (SD 37.967). There was a significant difference in blood glucose levels between the intervention and control groups (p=0.000) (See Table 5).

DISCUSSION

The results showed an effect of implementing diabetic foot spa and sauna bathing on the sleep quality in individuals with diabetes type 2. There was a decreased mean value of sleep quality after the intervention. A diabetic foot spa is a massage on feet soles to improve blood circulation and increase insulin. In comparison, sauna bathing is thermotherapy or temperature therapy using heat so that people can sweat. Sauna bathing can increase blood circulation, detoxification in the body, cardiovascular function, and improve sleep quality (Cohen, M., Hussain, 2018). The previous research reported diabetic foot spas on sleep quality in individuals with type 2 diabetes (Wardani, E. M., Wijayanti, L., & Ainiyah, 2019).

The implementation of the diabetic foot spa and sauna bathing was carried out three times in a row with a sauna bathing duration of 15 minutes and showed an increase in the mean from 2,567 to 4,633. The cause of its significance was because of the respondent's cooperation during the intervention. The intervention can reduce the physiological response to stress and provide a relaxing effect on the respondent so that sleep quality is good.

In the intervention group, the mean value of blood sugar levels decreased after the intervention. There was an effect of diabetic foot spa and sauna bathing on blood glucose levels in respondents. The high levels of blood glucose before the intervention is possible because of gender. Increased blood glucose levels are at risk of women with diabetes (OR = 1.37; 95% CI 1.26-1.49; p <0.001) (Idris, H., Hasyim, H., & Utama, 2017). Likewise, a study in Riyadh, Saudi Arabia, aimed to evaluate the risk of developing

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diabetes in 688 people. Their research showed that women were at risk of suffering diabetes (Alghadir, A., Awad, H., Al-eisa, E., & Alghwiri, 2014). That findings were different from a study conducted by Nordström et al. (2016) on 705 men and 688 women. They reported that the diabetes prevalence was 14.6% in men and 9.1% in women.

Women are more at risk of suffering diabetes because women have a component for insulin resistance. It increases when women get pregnant, do not move or exercise, or eat lots of carbohydrates. There is a process in reducing insulin sensitivity throughout women because they have less muscle mass. It does not support the high absorption of glucose and has relatively high estrogen and progesterone (Asiimwe, D., Mauti, G. O., & Kiconco, 2020). Besides, women have an index body mass more significant than men (Mildawati, Diani, N., & Wahid, 2019).

Sauna bathing causes an increase in body temperature so that glucose metabolism increases glucose use. Besides, more capillaries will open up so that more insulin receptors become available and will become more active. Then it will cause a decrease in blood glucose in individuals with diabetes (Asiimwe, D., Mauti, G. O., & Kiconco, 2020). The implementation of diabetic foot spa and sauna bathing accelerates the reduction in blood glucose levels by increasing glucose use.

A diabetic foot spa can improve blood circulation. During a diabetic foot spa session, individuals feel relaxed so that it enhances their quality of sleep. Hot temperatures at sauna bathing make the body sweating, widen blood vessels, launch circulation, and stimulate endorphins. It has an impact on body relaxation. The implementation of a diabetic foot spa and sauna bathing raises the quality of sleep

CONCLUSIONS

Implementation of sauna bathing and diabetic foot spa affect the quality of sleep and blood glucose levels. Therefore, this implementation could be an independent nursing intervention to prevent complications in individuals with type 2 diabetes.

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Development Of Stunted Toddlers Aged 24-59 Months Using Prescreening Developmental Questionnaire (PDQ) In Air Dingin Public Health Center, Padang 2019: An Overview

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A B S T R A C T

Stunting is a chronic malnutrition problem that resulted from an insufficient nutritional intake for a long time. This problem can develop during pregnancy, infancy, childhood, and throughout the life cycle due to feeding that does not accommodate the nutritional needs. Stunting correlates with disorders of fine motor, gross motor, language, and personal social skills. This study aims to perceive an overview of stunted toddlers aged 24-59 months using the Prescreening Developmental Questionnaire (PDQ). The authors carried out this research in Air Dingin public health center, Padang, from April to September 2019. This research was descriptive that included 40 toddlers aged 24-59 months diagnosed with stunting. The data presentation was a frequency distribution table and percentage. This study obtained that 22 toddlers (55.0%) were girls, seven toddlers (17.5%) experienced a developmental deviation, and 26 toddlers (65%) had suspected developmental deviation. In short, there were several cases of stunted toddlers who underwent a developmental deviation.

INTRODUCTION

The WHO Child Growth Standard defines stunting by using the index of length-for-age or height-for-age compared to a limit (Z-Score) of less than -2 SD. (De Onis, 2015) In 2016, WHO published data that 22.9% of children under five years old are a stunted child. This report revealed a 56% stunting prevalence in Asia, 34.1% in South Asia, 25.8% in Southeast Asia, and 38% in Africa. (WHO, 2016).

Basic Health Research (Riskesdas) 2018 reported stunting data of the children in Indonesia. This data showed that the proportion of children under five years who were moderate and severe stunting was 30.8%, and children under five who were underweight and severe underweight was 10.2% (RISKESDAS, 2018).

The Ministry of Health published a Nutrition Monitoring Pocket Book in 2017. This report obtained data in West Sumatra that the cases of malnutrition and nutrition deficiency of the children under five were 3.4%. Other data revealed that children aged 0-59 months who suffered from malnutrition were 3.3%. Another report found 30.6% stunting children; in detail, children aged 0-59 months with moderate and severe stunting were 21.3% and 9.3%, respectively. These figures increased from the previous year –

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18.9% stunted children and 6.7% severely stunted children. Data from Padang Health Office in 2017 reported that there were 3,269 (20.04%) stunted children (Kemenkes RI, 2018).

Stunting is one of the health problems caused by chronic malnutrition. The disproportion of feeding with the amount of nutritional need since pregnancy, infancy, and childhood can lead to a lack of nutritional intake. (Kementerian Kesehatan Republik Indonesia, 2018). There are direct causes – exclusive breastfeeding history, infectious disease history, inadequate food intake, and low birth weight – and indirect causes of stunting – parents' education level, parents' occupations, and the family's economic status. Stunted children may experience obstacles in their physical and mental development. Small children have a risk of decreased intellectual and an increased risk of degenerative diseases in the future (Danaei *et al.*, 2016).

Stunted children can experience disturbances in motor and mental development in childhood, a higher risk of experiencing communicable and non-communicable diseases, an increased risk of overweight and obesity, worsening achievement in school, and low education level that affect the future income. Stunting in children can become a factor that can predict the human resources' quality of a country. Stunting can cause long-term losses to the national economy (Crookston *et al.*, 2011). The stunting impact becomes the authors' background in conducting observational research on "The development of stunted toddlers aged 24-59 months using the Prescreening Developmental Questionnaire (PDQ) in the Air Dingin public health center Padang, 2019".

METHOD

This research was carried out in the Air Dingin public health in Padang from April to October 2019. This descriptive categorical research used the total sampling method, including all children aged 24-59 months who had previously been diagnosed with stunting and registered at Air Dingin public health center. The obtained sample size was 40 toddlers. Data collection on child development by an interview with mothers or child caregivers using the Prescreening Developmental Questionnaire (DPQ) (Dhamayanti, 2016). Data presentation were in terms of frequency and percentage.

RESULTS

In this study, table 1 below describes the frequency distribution of the respondents by gender:

Table 1. Characteristics of respondents based on gender

Gender	*n*	*%*
Boy	18	45.0
Girl	22	55.0
Total	40	100

Based on Table 1, from the 40 respondents, most of them were girls (55.0%).

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This study obtained data on the frequency distribution of respondents' development in table 2 as follows:

Table 2. Frequency Distribution of Stunted Children's Development

Development of Stunted Children	*N*	*%*
Suspected Developmental deviation	26	65.0
Developmental deviation	7	17.5
Appropriate development	7	17.5
Total	40	100

Based on Table 2, of the 40 respondents, 17.5% of the children experienced developmental deviation.

DISCUSSION

This study reported that – from 40 stunted subjects – 55.0% were girls (22 children). This finding was in line with Hanani's previous research in 2016 in Jangli Village that little children were mostly girls, as much as 54.5%. Another study conducted by Nasrul 2014 in Bontoramba District, Jeneponto Regency, obtained different results that most stunted children were boys (51.6%). In summary, boys and girls are at risk of experiencing stunting (Hafid and Nasrul, 2016; Hanani and Syauqi, 2016).

For a toddler, the first 1,000 days of life is a critical period. When a toddler obtains nutritional intake deficiency in the early 1000 days of life and experiences stunting, the toddler can have difficulties catching up with age-appropriate growth. For this reason, fulfilling the toddler's nutritional intake in the first 1000 days needs serious attention (Kemenkes RI, 2014; Husnah, 2017).

In this study, the Prescreening Developmental Questionnaires (DPQ) examination from mothers or caregivers showed 26 of 40 stunted toddlers (65%) indicated suspected developmental deviation. This finding was in line with Hanani's previous research results, in 2016 that 72.2% of small children experienced suspected developmental delay. Another study conducted by Hardiana Probosiwi in Kalasan, Yogyakarta, in 2017 obtained data on the suspected developmental disorder in children, about 38.68%. (Probosiwi, Huriyati, and Ismail, 2017).

When stunting occurs before five years old, developmental disorders can happen in motoric, cognitive, language, and social skills. The development of all brain parts that affect motoric, cognitive, and socio-emotional development is complete at five years (Vazir and Boindala, 2016; Arini, Mayasari, and Rustam, 2019).

The disturbance in the motoric area –experienced by stunted children – results from an obstacle in the muscle maturation process. That disturbance affects the mechanical ability of the muscles. Lack of nutrients for an extended period, especially the intake of energy, fat, and protein, will inhibit muscle tissue formation and maturation (Pantaleon, Hadi, and Gamayanti, 2016). Lack of nutrients also affects brain development and disrupts the development of the child's social skills. Children with stunting tend to express an apathetic attitude towards their social environment. Additionally, children with malnutrition

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conditions will experience susceptibility to suffering from infectious diseases, both acute and chronic. The child becomes weak due to infection, less exploring the environment, and further influences the personal and social development of the child (Nahar *et al.*, 2012; Casale, Desmond, and Richter, 2014).

Developmental disorders in the cognitive and language areas can occur in stunted children because children aged 0 to five are still at the pre-operational stage of development, a developmental stage of children who are not ready to engage in activities requiring logical thinking. They can understand symbols, self-identity, the cause and effect of an event, and numbers and gather in a group. At this age, the child's language development process by carrying out a systematic mapping process in the brain also happens. When there is a long-term shortage of nutrients, there will be an obstacle in brain cells' development process (Gunawan, Fadlyana, and Rusmil, 2016; Hartanto *et al.*, 2016).

CONCLUSIONS

Based on the overview of the development of stunted children in Air Dingin Public health center in Padang in 2019, this study concludes that most stunted children are girls and experience suspected developmental deviation.

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The Effect of Ankle Strategy Exercises on Static Balance in The Elderly

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A B S T R A C T

Decreased muscle strength is a musculoskeletal disorder in the elderly, resulting in slow movements and impaired physical mobility. Physical changes that occur in the elderly cause the risk of falling. This study analyzes the ankle strategy exercise's effect on static balance in the elderly at Regional Technical Implementation Unit (UPTD) Griya Werdha Surabaya. This study was Pre-Experimental with One Group Pre-Post Test Design. From the population, there were thirty-five respondents by simple random sampling. This study's independent variable was ankle strategy exercises with frequency three times a week within a month. The dependent variable was a static balance with the instrument Time Up Go (TUG) test. The authors analyzed the data with the Wilcoxon test. The study results showed a significant effect of the ankle strategy exercise on static balance in the elderly (p=0,000). The result showed a decrease in the number of elderly who have the high-risk of falling before the ankle strategy exercise (60% of elderly have a high risk of falling) and after the intervention (34% of elderly have a decreased risk of falling). The elderly should do the ankle strategy exercise independently or with assistant three times a week to improve their static balance and decrease their high-risk of falls.

INTRODUCTION

The Elderly will experience a physical decline condition characterized by less clear hearing, worsening vision, decreased muscle strength, musculoskeletal disorders resulting in a slow movement, and excessive body movement (Kurnianingsi et al., 2012). Musculoskeletal impairment plays a significant role in the risk of falling in the elderly (Sunaryo & Christian, 2016).

The physical changes condition in elderly would limit the independence in meeting daily needs and cause the risk of falling (Kurnianingsi et al., 2012). The balance disorders affect incidents of falls (Supriyono, 2015). Low balance is the cause of falls' risk (Nejc, Loefler, Cvecka, Sedliak Milan, & Kern, 2013).

Static balance is the ability to maintain postural stability or individuals' ability to sustain the center of gravity and the support base (Inggrid, 2016). Static balance describes as a standing position without any activity. An inactive or silent state is the prefix before the move occurs. This position needs a healthy balance base for the coordination of better movement and more target. Static position improvement may lower the risk of falling on the elderly while sitting or standing (Pristianto, Adiputra, & Irfan, 2016).

A previous study showed that in Indonesia, the injury prevalence due to falls at the age of 65-74 years old was about 67.1%, and 75 years old was approximately 78.2% (Balitbangkes, 2013). The falls among seniors living in the community increased from 25% at 70 to 35% after 75 years old (Kurnianingsi et al.,

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2012). An initial survey conducted on September 1, 2018, in 10 elders at the Regional Technical Implementation Unit of Griya Werdha **(**UPTD Griya Werdha) Surabaya found three of seven seniors were at risk of fall incidents. Those elderly used aids and had an acute disease, such as hypertension, arthritis, and diabetes mellitus. The activities that often caused the elderly to fall were waking up immediately, standing up, and into the bathroom—injuries sustained by the elderly, often with bruises on certain parts of the body. The elderly made some efforts like handled on wall handrail while going down *(*Stainless Steel*).* The activities performed in the orphanage are usually gymnastics every morning.

Older people who have a risk of falling have daily activities with a range of dependency levels or lack physical activity (Tamher & Noorkasiani, 2009). Conditions with decreased visual ability, vestibular, and somatosensory will undoubtedly worsen the balance in the elderly, and their focus also gets impaired (Base of Support) (Pristianto et al., 2016). Besides, the musculoskeletal decrease condition also affects muscles and postural, which lead to the change of gravity center toward the focus in the elderly. The strengths of both lower and upper extremities will decrease over time. It causes the elderly to experience balance disorders often while standing and prone to falls (Pristianto et al., 2016).

There are two factors cause falls in the elderly. Intrinsic factors include walking disorders, weakness of lower extremities, joint stiffness, syncope. Extrinsic factors include poorly lit room light, slippery floors, tripping objects, dangerous holding places, lying down beds, or low squat toilets (Ashar, 2016).

The efforts that can reduce the risk of falling on the elderly are exercises using ankle strategy exercise (Widiarti & Fatarudin, 2018). Ankle Strategy Exercise is the first adjustment strategy to optimize balance through joint contractions (Hyun Choi & Jun Kim, 2015; Widiarti & Fatarudin, 2018). The ankle strategy exercise movements are the head and body forward, accompanying the forward shift in the middle of the mass. The head backward, and the body accompanies the change (Widiarti & Triyono, 2018). This study analyzes the Ankle Strategy Exercise on static balance in the elderly in UPTD Griya Werdha Surabaya.

METHOD

The study design was pre-experimental with One Group Pre-Post Test Design. The authors did this study on February-March 2019 in UPTD Griya Werdha, Surabaya. The populations were 42 people, and the respondents were 35 people with inclusion criteria: willing to be a research respondent with informed consent, able to participate in activities from start to finish, while the exclusion criteria, namely, the elderly who have heart disease, stroke, mental disorders, and dementia.

This study used a simple random sampling technique. The dependent variable was the ankle strategy exercise, and the independent variable was a static balance. The instrument utilized the Time Up to Go (TUG) test. The TUG test itself is a tool for screening falls in the elderly. The researchers gave Ankle

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Strategy Exercise three times a week for one month. The statistic test applied Wilcoxon Signed-Rank with a significance value α <0.05.

There was human ethics in selecting respondents, such as providing information about the research implementation, signing informed consent without mentioning names, and keeping all respondents' data confidential.

RESULTS

The univariate data analysis consisted of age, gender, occupation, education, and elderly activities.

Table 1 Distribution of Elderly Characteristics at UPTD Griya Werdha Surabaya (n=35)

Characteristics	Frequency	%
Age		
60 - 74 Years Old	23	65,7
75 - 90 Years Old	12	34,3
>90 Years Old	0	0
Gender		
Male	17	48,6
Female	18	51,4
Job		
Civil servants	0	0
Private Employees	4	11,4
Self-Employed	16	45,7
Housewives	12	34,3
Unemployed	3	8,6
Education background		
Elementary School	3	8,6
Junior High School	13	37,1
Senior High School	18	51,4
Diploma/Bachelor degree	0	0
Uneducated	1	2,9
Physical activity		
Often	15	42,9
Rarely	18	51,5
Never	2	2,9

Most of the elderly were 60-74 years old (62.9%), women (51.4%), self-employed (45.7%), education levels of high schools (51.4%), and rarely did physical/sporting activity (51.5%) (Table 1).

The bivariate data analysis includes the effect of static balance before and after the ankle strategy exercise.

Table 2 Description of Static Balance in Elderly at UPTD Griya Werdha Surabaya

No.	Category	Before		After	
		Amount	%	Amount	%
1.	No risk of falls	14	40	23	66
2.	High risk of falls	21	60	12	34
	Amount	35	100	35	100
Wilcoxon signed-rank test (p-value = 0.000)					

Table 2 shows the decreased number of respondents with a high risk of falls, from 21 respondents (60%) before the intervention to 12 respondents (34%) after the ankle strategy exercise. The Wilcoxon

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signed-rank statistical test (p-value=0.000) shows a significant effect of Ankle Strategy Exercise on the static balance in the elderly.

DISCUSSION

Static Balance before Ankle Strategy Exercise

The results showed that 21 older people (60%) were mostly at high risk of falls by measuring static balance with the TUG test. The Time Up and Go (TUG) test is a valid tool for screening falling on older people (Virtuoso, Gregório, de Medeiros, & Mazo, 2014). Static movement on the Time Up Go to Test measuring instrument is from sitting to stand or prefix before moving. This test is faster, simpler, and uses minimal tools. The Elderly will experience a physical decline characterized by less clear hearing, worsening vision, decreased muscle strength, and musculoskeletal disorders, leading to slow movement and excessive body movement (Kurnianingsi et al., 2012). Elderly who have a high dependency level and lack physical activity at risk of falling (Tamher & Noorkasiani, 2009).

Lack of physical activity will further decrease the physical ability of the elderly. Low postural muscle ability will disrupt the static balance in the elderly and lead to fall incident. Musculoskeletal impairment plays a significant role in the risk of falling in the elderly (Sunaryo & Christian, 2016).

The decrease in musculoskeletal function will also affect muscles and postural in the elderly. The change in posture affects the shift in the Center of Gravity in the elderly. The decrease of both lower and upper muscles causes the elderly to experience balance disorders often while standing and prone to falls (Pristianto et al., 2016).

The elder who is at high risk of falling is over the age of 74. Besides, physiological changes due to the increasing age will decrease alertness and limiting physical activity. Restrictions on physical activity will lead to atrophy or muscle weakness that disrupts balance (Achmanagara, 2012). Musculoskeletal disorders can weaken muscles, bones, and joints. It creates a low body balance, which is the cause of the risk of falling (Nejc et al., 2013). Lack of physical activity will further decrease the physical ability of the elderly. Low postural muscle ability in supporting the body will cause a static balance in the elderly to fall (Pristianto et al., 2016).

Factors that influence body balance are age, activity, musculoskeletal, and gender, affecting low static balance that causing a high-risk of falls. 60-70 years old seniors have decreased muscle strength in doing activities, so they experience muscle weakness. The female elderly have a lower level of balance and a higher risk of falls than males. It is associated with a decrease in the hormone estrogen in older women post-menopause. The higher the level of education also affects the balance of static, because the higher the level of education, the easier it is to perform the ankle strategy exercise well. Age, activity, musculoskeletal**,** and gender can cause static to unbalance.

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Static Balance after Ankle Strategy Exercise

This study result showed that 12 of 35 (34%) respondents had a decreased number of high-risk static balance. A previous study on 32 elderly showed that ankle strategy exercise reduced the number of seniors who had a high risk of falling, from 12 to 5 respondents (Widiarti & Triyono, 2018)

All physical activity requires body balance (Achmanagara, 2012). Physical activity restrictions can lead to atrophy or muscle weakness that interferes with body balance (Achmanagara, 2012). Physical activity can slow bone density loss and increase muscle size and strength. Physical activity can prevent the occurrence of falls in the elderly. It can carry out at leisure and leads to a person's ability to maintain flexibility, strength, and flexibility in the so-called physical exercise (Achmanagara, 2012). Improvement of the static position may lower the risk of falling on the elderly while sitting or standing (Pristianto et al., 2016).

This study results suggest that physical activity can improve static balance. Intense physical exercise can improve muscle strength in the elderly. Doing physical activity at least three times a week can help the elderly in improving balance. Physical exercise with sufficient intensity can affect muscles' size, strength, and capacity on the musculoskeletal system changes due to aging. Ankle Strategy Exercise will reduce the risk of falls in the elderly.

The Effect of Ankle Strategy Exercise on Static Balance in the Elderly

Based on the results, most respondents (60%) were at high risk of falls before the Ankle Strategy Exercise. While after the intervention, most of them (66%) were in the category of no risk of falls. The Wilcoxon test results get Z = -5,114 and p=0.000 and $\alpha = < 0.05$. When a p-value is lower than α, there is rejection in H_0 and acceptance in H_1. There was an effect before and after the intervention.

Prior research on 63 respondents showed no more improving static balance in undergraduate students in Physiotherapy Stikes' Aisyiyah, Yogyakarta. The analysis utilized a paired t-test before and after intervention with p=0.000 (intervention group) and p=0.025 (control group). Based on the complementary tests in both groups, hypothetical testing used data after treatment. Static balance variables in both groups using the independent hypothesis test of the t-test sample obtained p=0.625 (p>0.05) (Yuliana et al., 2014). It indicates an influenced ankle strategy exercise factor, such as age, activity, musculoskeletal, and gender. The ankle strategy exercise duration to improve the static balance in older people is three times a week for one month. This study's influenced factors were age, activity, how to do the right Ankle Strategy Exercise, and respondents' participation in ankle strategy exercise. Seniors who are active and adequately doing the ankle strategy exercise can improve static balance and reduce the high-risk of falls.

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CONCLUSIONS

There is a significant effect of ankle strategy exercise on the static balance in the elderly (p =0.000). The Frequency of ankle strategy exercise is three times a week to improve static balance and reduce the high-risk of falls in the elderly. Further research should consider adding a control group to evaluate the differences between intervention and control groups.

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Factors Affecting Toddlers' Development in Pamekasan Regency

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A B S T R A C T

Toddlers require basic needs – stimulation, love, and care – in the process of growth and development. Parents, especially mothers, are the most important factors in performing these three tasks: honing, loving, and fostering. The mother's physical and psychological conditions, including the mother's age at marriage, education, and stimulation, will impact children's development. This study aims to determine the factors that influence toddlers' development in the Pamekasan Regency. The research method used was descriptive-analytic, with a retrospective design. This study consisted of 110 mothers with toddlers by fixed exposure sampling in Waru, Batu Marmar, and Pasen Public Health Center. The dependent variable was the toddlers' development. The independent variables were the mother's age at marriage, family income, stimulation, mother's LILA during pregnancy, and birth weight. The analysis used the path analysis method. The results showed that the toddlers' development was influenced by the mother's age at marriage (b = 0.07, SE = 0.02, p = 0.001), family stimulation (b = 0.02, SE = 0.01, p = <0.001) and birth weight (b = 0.00, SE = 0.00, p = 0.373). This study concludes that maternal marriage age, family stimulation, and birth weight affect toddlers' development.

INTRODUCTION

Toddlers are children in the age range of 0-5 years, while other definitions describe toddlers are in the age range of 0-3 years (Adriani, 2012). It is the golden age period because of fast growth and development (Prasetyawati, 2011). So that at this time, the role of parents and the environment will be very influential in determining the success of the next process.

Factors that can influence the process of child development include genetic factors and environmental factors. Environmental factors themselves include conditions during the prenatal, natal, and postnatal periods. One of the prenatal factors can come from the mother, namely the mother's age at marriage and her education. The mother's age at marriage will determine the mother's physical and psychological readiness to accept her new role.

Based on existing data, for rural areas, the early marriage ratio fell from 72 per 1,000 marriages in 2012 to 67 per 1,000 in 2013. The early marriage ratio was inversely different from urban areas. In 2012, its incident was 26 out of 1,000 marriages and increased to 32 out of 1,000 marriages in 2013. Meanwhile, according to Statistics Indonesia, in 2015, one in five women has married before the age of 18. Whereas in Pamekasan Regency in 2017, it reached 30% of the total adolescents (Statistics Indonesia, 2016). On

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August 15, 2018, the preliminary study results obtained data about young women who had early marriage in the past year. From 3 working areas in the community health center of Batumarmar, Waru, and Pasean, the highest rate was in Pasean community health center.

Meanwhile, the natal factor is the mother's health during pregnancy – evaluation in the mother's upper arm circumference (LILA) during pregnancy – and perinatal, namely the baby's condition at birth, such as birth weight. The number of births with LBW in Pamekasan Regency in 2015 was 396 babies (3.1%). This number has decreased compared to 2014, which was 398 babies. Delivery with low birth weight should be a particular concern because this condition is closely related to neonates mortality (0-28 days) (Pamekasan, 2016).

In addition to genetic and environmental factors for toddlers, other factors also show significant results on children's development: economic status, education, and children's position in the family (Lestari RD, Novadela T., 2016). Children who get adequate nutritional intake also show age-appropriate growth and development (Lindawati, 2012). The current process of child development will influence future success. Thus the development of toddlers must get good attention from various parties. One of them is by doing early detection of children's growth and development according to their age. One of the tools in monitoring children's growth and development is the KMS book, which is currently also in the KIA book (Maternal and Child Health).

METHOD

The research method was descriptive-analytic, with a retrospective design. The research was carried out from September to December 2018 in the Waru, Batu Marmar, and Pasean Community Health Center. The study population was mothers who had children under five. There were 110 respondents in this study. The independent variables were the mother's age at marriage, family stimulation, income, mother's LILA during pregnancy, and the toddlers' birth weight. At the same time, the dependent variable was the toddlers' development. Data collection utilized a questionnaire given to the mother and the MCH Handbook for LILA data and birth weight. The authors obtained child development data from the KIA book. Then the data was collected and then processed using path analysis.

RESULTS

Table 1 Frequency Distribution of Research Variables

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Variables	Frequency	Percentage (%)
1. Age at Marriage		
<16 years	30	27.3
≥ 16 years	80	72.7
2. Family Income		
Low (<1,588,000)	42	38.2
High (≥1,588,000)	68	61.8
3. Stimulation		
Less	23	20.9
Adequate	87	79.1
4. LILA While Pregnant		
<23.5 cm	36	32.7
≥23.5 cm	74	67.3
5. Birth Weight		
<2500 grams	40	36.4
≥ 2500 grams	70	63.6
6. Toddlers' Development		
Age-appropriate	99	90
Not Age-appropriate	11	10
Total	110	100

Table 1 shows that most of the respondents are married at ≥ 16 years old, have high family income, give adequate stimulation to their child, and have Lila ≥23.5cm while pregnant. Mostly, their babies' born weight is ≥ 2500 grams. 90% of the respondent's children have age-appropriate development.

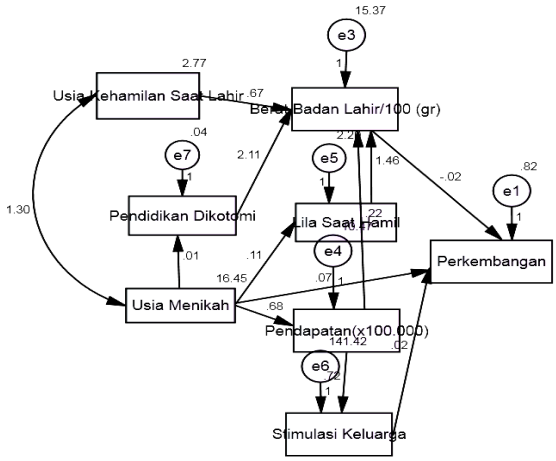

Figure 1 A structural model with unstandardized solution variables

Figure 1 shows that toddlers' development is directly affected by age at marriage, family stimulation, and birth weight. Meanwhile, LILA during pregnancy and family income is indirect factors.

DISCUSSION

This study indicated a direct relationship between the mother's age at marriage and toddlers' development. The effect of the correlation was positive and statistically significant. Children who have mothers with young ages tend to have more disruption in language development. The social-emotional of young mothers also has more problems. Mothers' ability to make social interactions with the environment will indirectly affect parenting and impact children's development (Bhattacharya T, Ray S, 2017).

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Furthermore, there was an indirect correlation between LILA during pregnancy and toddler development (Figure 1). This indirect correlation is because of: 1) The effect of a positive relationship between the mother's LILA during pregnancy and birth weight 2) The impact of a positive relationship between birth weight and development. Meeting the needs of *asah* and foster care in the first year of life will affect the child' growth in the following year (Pem D., 2015). Birth weight has a direct influence on toddler development. The body weight at birth influences development during childhood. Children born with LBW are at risk of experiencing problems in their development. External factors such as the environment, stimulation, and parenting can change these conditions. Even though children born with low birth weight, they still have the opportunity to grow and develop when they received adequate external factors (stimulation and parenting) (Linsell L, Malouf R, Morris J, Kurinczuk JJ, 2015). Family income has an indirect effect on toddler development. This indirect correlation is because of: 1) The impact of a significant positive relationship between income and family stimulation. 2) The effect of a positive relationship between family stimulation and development is statistically significant. Socio-economic status affects health status, especially in children (Eddy, 2009).

Family stimulation has a direct effect on toddler development. Development during childhood is a key for the continuation of a generation's life and a nation's progress. Learning in childhood can be used as a basis for well-being in adulthood. The first year of life is a critical period for child development. Therefore, we need optimal efforts for the continuity of growth and development. Parents/caregivers should provide stimulation as often as possible to children, so there will be no developmental abnormalities experienced by children (McCoy, D.C., et al., 2016)

CONCLUSIONS

This study concludes that maternal marriage age, family stimulation, and birth weight affect toddler development. Further research should consider evaluating other determinant factors that influence toddlers' development.

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Description Of Mothers' Motivation In Developmental Stimulation Of Children Aged 1 - 3 Years Old In Sambungrejo Village, Sidoarjo

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A B S T R A C T

Children will grow faster when their mother stimulate their development. But in fact, parents' awareness is still low due to parents' reluctance. They believe that stimulation is for children with developmental delay. This research aims to describe the mothers' motivation in the developmental stimulation of children aged 1-3 years old in Sambungrejo Village District Sidoarjo. This study used a descriptive design. The population was mothers with children age 1–3 years in Sambungrejo Village Sukodono Sidoarjo. There were 50 respondents with simple random sampling. The research variable was mothers' motivation in the developmental stimulation of children aged 1-3 years. The instrument utilized a questionnaire. The data analysis was frequency distribution. The results showed that 62,5% of respondents had low motivation, while 37,5% of respondents had a high motive to perform stimulation in developing children aged 1–3. The study concludes that most mothers have low motivation in developmental stimulation. Health workers should give health education about the developmental stimulation of children to mothers.

INTRODUCTION

Growth and development is a continuous process that occurs conceptionally and continues into adulthood. The development period of children aged 1-3 years is a golden age because children experience speedy development, including gross motor development, fine motor skills, speech, language, cognitive, and social. Therefore, the process of child development must receive maximum attention from parents. Parents should provide stimulation to their children so that children's development can run optimally. There are many things parents can do, one of which is to invite children to play in an atmosphere full of joy and love (Hidayat, Alimul, 2011). Playing activities and an atmosphere of love are essential to stimulate the entire sensory system, train fine and gross motor skills, communication skills, and feelings and thoughts about children.

Children who get a lot of stimulation will develop faster than children who don't get stimulated. The earlier and the longer the stimulus giving, the greater the benefits for infants and toddlers (Maryunani, 2010). But in fact, parents' awareness of stimulation is still low. This problem includes parents' reluctance to give their children a stimulus because they believe it is for children with delayed development. Even though children have normal development, children still need stimulation (Maryunani, 2010).

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Statistics Indonesia (BPS) reported that in 2018 one in three (30.1%) Indonesians were children – 79.55 million Indonesians were children aged 0-17. Fast development occurred in the First 1,000 Day of Life (HPK), or the so-called golden period and critical period. This initial phase will determine the next development phase (Kementerian Pemberdayaan Lingkungan dan Perlindungan Anak dengan Badan Pusat Statistik, 2018).

According to WHO, in 2013, 8.1% of children under five had developmental disorders, and 1.92% of school-aged children had mental retardation. The Statistics Indonesia (BPS) projects that 32.24 percent or 83.4 million of Indonesia's population in 2016 were children aged 0-17. The children in Indonesia will not change significantly in the next few periods. According to the Ministry of Health of the Republic of Indonesia, 2014, 16% of Indonesian toddlers experienced developmental problems, fine and gross motor development, hearing loss, lack of intelligence, and speech delays. The coverage of under-five children services in East Java Province in 2016 reached 82.60%. Sixteen districts/cities did not get the specified target (83%). According to the East Java Provincial Minimum Service Standards, the coverage rate for early detection of children's growth and development under five in East Java in 2011 was 53.44%. This coverage figure was lower than the target for early detection of growth and development of children under five in East Java Province in 2010, namely 65% (Depkes, 2009).

A preliminary study was carried out in an integrated service post (Posyandu) Kontakrejo Village, Subdistrict Sidoarjo, in September 2019. From the results of interviews with cadres, there was counseling about stimulating child' development. However, providing stimulation to children was still very low, even though there was counseling. The authors did interviews with ten mothers – seven of ten mothers did not stimulate their children. Of seven children who get stimulation, three of them had gross motor delays. Mothers reported that their children could not walk at aged more than 18 months. Two of three mothers did not perform stimulation because they were working mothers – grandmothers were caregivers – and gadgets' influence at home. One mother believed that her child would develop independently, so there was no need for stimulation.

Meanwhile, four of seven unstimulated children experienced speech delays. Mothers stated that their children could not say "mama" and "papa" at 18 months. Of four children who experienced speech delays, the mother did not stimulate her child because she felt that her child would develop independently, so there was no need for stimulation.

All mothers should stimulate their children with or without developmental delays. The mothers – especially mothers who are working moms and entrust their children to grandmothers – feel that their children will develop independently. There is a low motivation for stimulating children.

The low motivation of mothers to stimulate child development is one of the causes of the high rate of developmental disorders and children being easily stressed and depressed. Children cannot expand

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socialization, understand their abilities and weaknesses. Stimulation is a behavior in health. Factors that influence health behavior include internal factors – motivation, positive reinforcement, the strength of action, race, gender, physical characteristics, personality, intelligence, talents – and external factors. External factors consist of predisposing factors (knowledge), enabling factors (facilities and infrastructure), reinforcing factors (attitudes and behavior of health workers and community leaders) (Notoatmodjo, 2010).

The efforts of cadres and health workers in toddlers' development, especially midwives, play an essential role in increasing public awareness in stimulating child development. There was a problem in motivational factors, especially in mothers with children aged 1 - 3 years in Kontakrejo, Sub-district Sukodono District Sidoarjo.

METHOD

The study was a descriptive observational with 50 respondents by simple random sampling. Respondents were mothers who had children aged 1-3 years old with inclusion criteria in the village of Kontakrejo, Sub-district Sukodono District Sidoarjo. The variable was mothers' motivation in developmental stimulating. Data collection utilized a questionnaire.

RESULTS

Table 1 Percent distribution of respondents by maternal age, Sidoarjo 2019

Maternal Age (Years)	Freq	Percentage (%)
21-25	8	33.3
26-35	11	45.9
36-45	3	12.5
46-55	2	8.3
Total	24	100

Table 1 shows that almost half (45.9%) of respondents are aged 26-35 years or early adulthood, and a half (50%) of the respondents have a basic education level (SD-SMP).

Table 2 Percent distribution of respondents by the employment, Sidoarjo 2019

Employment	Frequency	Percentage (%)
Not working	18	75
Working	6	25
total	24	100

Table 2 explains that most of the respondents (75 %) do not work

Table 3 Percent distribution of respondents by parity, Sidoarjo 2019

Parity	Frequency	Percentage (%)
Primipara	12	50
Multipara	7	29
Grande multiparous	5	21
total	24	100

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Table 3 narrates that half (50%) of the respondents are primiparous.

Table 4 Description of mothers' motivation in developmental stimulating, Sidoarjo 2019

Motivation	Frequency	Percentage (%)
Low	15	6 2.5
High	9	37.5
total	24	100

Most of the respondents (62.5%) had a low motivation in developmental stimulating among children aged 1 - 3 years (table 4).

DISCUSSION

Most of the respondents (62.5%) had a low motivation in developmental stimulating among children aged 1 - 3 years. Respondents said that focus on stimulation is for children with developmental delay. According to Maslow's theory cited by (Saam, Z. Wahyuni, 2012) motivation is a change in energy in a person marked by the emergence of feelings and a positive response to a goal. In the present era, many mothers do not pay much attention to the development of their children. Most of the mothers are career women, so there is a reduction in monitoring children.

Based on the results of the study, half of the respondents (50%) were primigravidas. A mother's previous experiences influence her knowledge. A mother who does not have a child has less experience than a mother who has children. They do not have expertise in stimulating child development. With this inexperience, it can be the reason for less motivation in seeking information. (Notoatmodjo, 2010) states that experience is a source of knowledge to obtain knowledge's truth based on personal experience.

Based on the research results, 75% of respondents were housewives (IRT). A mother who works in a domestic area has more time to socialize with neighbors than a working mother. Individuals will adopt innovations from their surroundings rather than their perceptions and opinions.

Most mothers in this study only had a basic level of education. Half of them (50%) had Primary School and Junior High School educational level. The lower a person's education, the more difficult it is to understand health workers' information, affecting the mother's awareness to stimulate child development. Education can influence a person in motivation, attitudes, and attention to participate in health development. The lower one's education, the less information they have (Nursalam, 2012).

Most mothers had lacked the awareness to stimulate children's development. Based on the research results, 45.9% of respondents were 26-35 years old on average or in the early adulthood stage. They believed that their children would develop on their own, so that stimulation was not necessary. An individual has more mature thinking in the early adulthood stage, faster capturing the information, memory, and concentration – especially in health information. There is an opinion by Fekhlman (2011) that is different from this study's result. He believes that personality is relatively stable in the early adult

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stage, but life stages and events can influence personality changes. In the early adult stage, cognitive development is better at decision making and adjusting to new experiences.

CONCLUSIONS

Most mothers do not stimulate the development of children aged 1-3 years. They have low motivation in developmental stimulation in Kontakrejo, District Sidoarjo in 2019. The authors suggest that health workers should give health education about the developmental stimulation of children to mothers.

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Effect Of Roselle Petal Extract On Decreased Levels Of MDA In Rats With Type 2 Diabetes

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A B S T R A C T

Diabetes mellitus type 2 is a metabolic disorder, namely a decrease in peripheral tissues' response to insulin. Free radicals increase, which results in the forming of Malondialdehyde (MDA). Roselle flower petals is an antioxidant to reduce free radical damage. This study aims to analyze the effect of roselle petal extract on decreased MDA levels in mice induced by diabetes. The rats were divided into four treatments group as follow: 1) control negative, 2) control positive, 3) treatment dose I (administering roselle petal extract 195 mg/200 gram body weight), 4) treatment dose II (giving roselle petal extract 260mg/ 200 gram body weight). MDA levels were measured using Thiobarbituric acid (TBA) assay. There was an effect of rosella petal extract in the group with 260 mg/200 of rosella petal extract (p=0.005) and 195 mg/200 of rosella petal extract (p=0.041) compared with the positive control group. Rosella petal extract significantly reduces MDA levels in rats induced by type 2 diabetes.

INTRODUCTION

Diabetes type 2 is the most common type of diabetes. The pathogenesis of this diabetes type 2 is characterized by a metabolic disorder that leads to decreased peripheral tissue response to insulin (Kumawat *et al*., 2009). The increased levels of free radicals in the body damage the insulin receptor or the glucose transporter found in cell membranes of peripheral tissue. Lipid peroxidation is caused by excessive free radicals that will oxidize and attack the cell membrane's lipid components (Jusman and Halim, 2010). Along with the increase in free radicals, the lipid peroxidation of cell membranes also increases, resulting in the final product in the form of Malondialdehyde (MDA). To, the body needs antioxidants to reduce the damage caused by free radicals. Antioxidants are compounds that can neutralize free radicals by complementing the lack of electrons that free radicals have so that they become stable and inhibit the chain reaction of forming new free radicals (Erejuwa, Sulaiman and Wahab, 2011). Xanton, phenols, and flavonoids in rosella petals extract can work as an anti-oxidation capable of reducing negative impacts in the form of damage in the host body due to free radical compounds *Reactive Oxygen Species (ROS)*. Rosella petals contain calcium, vitamins C, D, B1, B2, magnesium, omega-3, beta-carotene, and 18 essential amino acids for the body. Rosella petals have anti-cancer, antihypertensive, and antidiabetic properties (Mardiah, Ashadi and Rahayu, 2009). High levels of antioxidants in roselle petals can inhibit free radicals. The active substances in roselle petals include

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gossypetin, anthocyanins, and glucoside hibiscus. Excessive exposure to free radicals, including kidney disease and diabetes mellitus, results in several chronic diseases (Hamzah, Ismail and Sandi, 2014). Roselle can prevent the development of atherosclerosis and cardiovascular complications due to diabetes (Maria, 2009).

Previous research by (Ulilalbab and Maskanah, 2018) reported an effect of treatment rosella on MDA levels. Other studies showed an effect of rosella extract in prediabetic patients, but its effectiveness was less optimal because of the lack of dosage (Mayasari *et al.*, 2018). Therefore, the researchers want to prove roselle petal extract's effect on reducing MDA levels in white rats induced by diabetes type 2. This study used different doses and times of experiment to reduce MDA levels more effectively.

METHOD

The in vivo stage used is the true experimental laboratory, a post-test control – treatment design randomized (CRD). The sample consisted of 24 male rats selected by random sampling. There were four groups: one negative control group (KN), one positive (KP), and two treatments (P1 and P2). The researchers gave roselle petal extract on two treatment groups (P1 and P2). The rats' treatment group provided roselle petal extract dose 195 mg / 200 g BW in P1 and 260 mg / 200 g BW in P2.

This study's tools and materials were: roselle petal extract, experimental mice, rat food (BR-1 Comfeed chicken pellets), TBA solution, TCA solution, chloroform, distilled water, injection syringe, non-EDTA tubes, capillary tube microhematocrit, gastric swabs, Eppendorf tubes, microtube, and mouse cages.

The authors obtained roselle petals from Joho Village, Semen District, Kediri Regency, East Java. The roselle petals extract used the brewing method with water solvent at 70 ° C while stirring for 15 minutes. Rosella petal extract was administered using gastric swabs and carried out for 21 days with each dose, namely dose 195 mg / 200 g BW in group P1, dose 260 mg / 200 g BW in group P2. The dose of rosella petals used was 3-4 roselle petals. So the dose for mice, namely: (10 x 1000 mg x 0.018 x 50/70) / 200 g BW = 128.6 mg / 200 g BW, equivalent to 130 mg / 200 g BW. The first dose, 1.5 x 13 mg / 200 g BW = 195 mg / 200 g BW. The second dose, which is 2 x 130 mg / 200 g BW = 260 mg / 200 g BW.

We took 0.5 ml of blood from the hearts of rats for the determination of biochemical parameters. Then put into a tube, centrifuged at 3000 rpm for 15 minutes at a temperature of 20^0C. We checked MDA levels by the TBA method from the serum of red blood cells. The wavelength of spectrophotometric was 532 nm with maximum adsorption. The Ethics Committee of the Faculty of Medicine, the University of Hangtuah Surabaya, approved this study with registration E/024/UHT.KEPK.03/IV/2020 dated 18 April 2020. The animal protocol followed an ethical review. Data analysis took three weeks because the time and dose were different. We did this research at the Laboratory of the Faculty of Medicine, Airlangga

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University, Surabaya. Normality analysis of the data used the Shapiro-Wilk test and homogeneity test with Levene's Test. Data were analyzed by one-way ANOVA using SPSS 16 software.

RESULTS

The results showed an overview of the MDA serum levels of strain rats in figure 1.

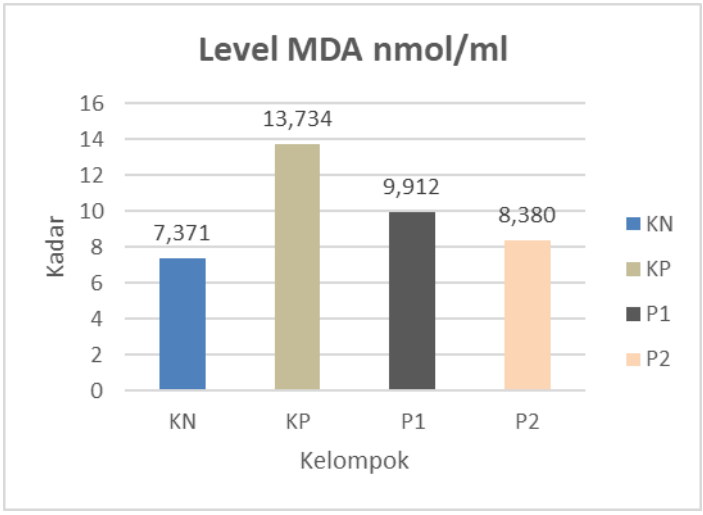

Figure 1. Average MDA Levels by Group

The average MDA levels were 8.380 nmol/ml in the P2 group, 9.912 nmol/ml in the P1 group, 13.734 nmol/ml in the KP group, and 7.371 nmol/ml in the KN group. The highest MDA levels were in the positive control group (KP), while the lowest MDA levels were in the negative control group (KN). In the treatment group, MDA levels close to the negative control group were the P2 group (Figure 1). The results obtained from this study preventively showed that the group treated with roselle petal extract along with alloxan administration showed a decrease in MDA levels compared to the group that was given only alloxan without being given roselle petal extract.

Table 1. Differences in MDA levels in various groups

Group	Unit	Average ± SD
Rosella petal extract dose 260 mg/200 g BB	P2	$8,380^{a}$ ± 2,219
Rosella petal extract dose 195 mg/200 g BB	P1	$9,912^{a}$ ± 2,295
Positive control	KP	$13,734^{b}$ ± 2,850
Negative control	KN	$7,371^{a}$ ± 1,503

The MDA level in the P2 was not significantly different from the P1 group and negative control group, where the significance value of rosella petal extract at a dose of 260 mg / 200 g BB was p=0.685, and the negative control was p=0.882 (p> 0.05). Positive control showed significant differences from all groups. Each of these groups had a significance value of p <0.05. Meanwhile, the P1 group's significance value was p=0.882 (p.>0.05), and in the P2 group was p=0.246. We analyzed the difference in dosage to see the effect between the dose of rosella petal extract and serum MDA levels. The treatment group of rosella petal extract at a dose of 260 mg/kg BW and a dose of 195 mg/kg BW had an average tendency to decrease MDA levels.

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DISCUSSION

There was a significant difference between positive group control (KP) and negative group control (KN) at 7.371 ± 1.503 nmol/ml and 13.734 ± 2.850 nmol/ml. Alloxan treatment increased the MDA levels in the positive control group. The imbalance between the formation of Reactive Oxygen Species (ROS) and antioxidants, where free radicals are higher than antioxidants, produce MDA in the body. Excess hydroxyl and peroxynitrite radicals can attack cell membranes and lipoproteins to produce lipid peroxides and MDA (Akim *et al.*, 2011). MDA is one of the end products where the radicals from lipid peroxidation are toxic to living cells. Besides, MDA is a parameter of free radicals in the body and is considered a biomarker to determine oxidative stress (Pirinccioglu *et al.*, 2010).

Research conducted by Suwandi (2012) reported a 28.1% decrease of MDA levels in the group given roselle petal extract at 250 mg and a 50.2% decrease of MDA levels in the group given roselle petal extract at 500 mg/kg BW. MDA in both groups given treatment in the form of rosella petal extract orally for 14 days. The mean MDA levels in the treatment group with 260mg of roselle petal extract and the treatment group with 195mg of roselle petal extract were lower than the positive control group. Roselle petal extract contains non-enzymatic flavonoid antioxidant compounds, total phenol, and high antioxidant activity (Hassoon, Ussain and Harby, 2018). Flavonoids are phenol group compounds that function as good reducers and inhibit many non-enzymatic oxidation reactions (Selawa, Runtuwene and Citraningtyas, 2013).

Flavonoids can significantly reduce MDA levels. Flavonoids are exogenous antioxidants to prevent oxidative stress. Flavonoids can work as antioxidants directly by donating hydrogen ions to neutralize the toxic effects of free radicals. Moreover, it has an indirect antioxidant impact by increasing endogenous antioxidant genes (Rasyid, Ismiarto and Prasetia, 2012).

CONCLUSIONS

MDA levels differ between the negative control group, the positive control group, and the treatment group. The treatment group given roselle petal extract at 260 mg is more effective in reducing MDA levels in mice with type 2 diabetes. The MDA levels in the positive control group have the highest levels compared to other groups. The group treated with rosella petal extract showed decreased MDA levels than the group without giving roselle petal extract. Further research should conduct additional analysis for the active ingredient components in rosella petal extract.

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Surveillance Implementation Of HIV/AIDS In Jember Regency

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A B S T R A C T

The number of people living with HIV/AIDS in Indonesia is increasing every year. HIV/AIDS surveillance is the most effective way to control the spreading of HIV/AIDS cases. This study aims to describe the implementation of HIV/AIDS surveillance in Jember. This paper was a descriptive study that included all public health centers (PHCs) conducting HIV/AIDS surveillance. The sample was the Jember District Departement of Health Office and four PHCs using purposive sampling. Variables in this study were input, process, and output. The data was obtained from an interview using a questionnaire. The results indicated that the four PHCs did not have an epidemiologist. Data collection mostly derived from Voluntary Counseling and Testing (VCT) and mobile VCT. Processing HIV/AIDS surveillance data utilized the HIV/AIDS and STDs Information System (SIHA) application and validated by the District Department of Health Office once a month. However, only two PHCs conducted analysis and data interpretation. Dissemination was only done by the District Departement of Health Office and 2 out of 4 PHCs. Hence, the components and process of surveillance needed to be optimized.

INTRODUCTION

Human Immunodeficiency Virus-Acquired Immuno Deficiency Syndrome (HIV/AIDS) is a chronic infectious disease that is still a significant global public health problem today. Worldwide HIV prevalence reached 36.9 million at the end of 2017, while the incidence rate was 1.8 million people. The mortality rate due to HIV globally was 940,000 in 2017 (WHO, 2018a). The number of new HIV cases in Indonesia was 30,935 cases in 2015, then increased to 41,250 cases in 2016, and decreased to 33,660 cases in 2017. So, the number of new HIV cases within three years was 105,845 people (Health Ministry of Indonesia, 2018). The number of AIDS cases in Indonesia up to 2016 was 86,780 cases. AIDS cases increased in 2016 compared to 2015, which was 7,491 cases.

The percentage of HIV/AIDS patients in males was more significant than in females in 2016. The rate of HIV male patients was 63.3%, and female was 36.7%. While the percentage of people with AIDS (Acquired Immune Deficiency Syndrom) a male was 67.9% and 31.5% for female (Health Ministry of Indonesia, 2017). East Java Province was the highest number of new HIV cases in Indonesia, with 15,931 patients during 2015 and 2017 (Health Ministry of Indonesia, 2018). In December 2016, the number of

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HIV cases in East Java Province was 36,881 cases, and the number of AIDS cases was 17,394 cases (Health Ministry of Indonesia, 2017).

Jember Regency was the fourth-highest Regency for HIV/AIDS cases after Surabaya City, Pasuruan Regency, and Malang Regency. The number of people with HIV/AIDS in Jember Regency, from 2004 to April 2018, was 3,786 cases. Meanwhile, the number of AIDS cases from 2004 to April 2018 was 943 cases. Districts with the highest HIV/AIDS prevalence in Jember Regency included Puger District (405 cases), Gumukmas District (247 cases), Kencong District (247 cases), and Wuluhan District (233 cases) (Jember Health Office, 2018).

One of the government's efforts to combat the spread and reduce HIV/AIDS cases is implementing an integrated surveillance system. Surveillance is the most effective way to control infectious diseases in the community through surveys (Candra B., 2009). It is a system that runs continuously and has four main activities, namely data collection, data processing, data analysis and interpretation, and data dissemination. The primary purpose of surveillance is to detect changes in trends or distribution to initiate investigations or take control measures (Amirudin R., 2017).

The Implementation of Health Surveillance must be carried out in every health facility and health agency, starting from the district/city to the central level (Indonesia, 2003). Indonesia has a comprehensive HIV/AIDS surveillance system and adheres to implementing Second Generation Surveillance since the early 2000s. The HIV/AIDS Surveillance System reports cases of HIV, AIDS, and STDs, estimates the number of populations at risk, Sentinel Surveillance, and the Integrated Biology and Behavior Survey (IBBS) periodically. Surveillance activities are carried out routinely by the Public Health Center reported to the District/City Department of Health Office and the Provincial Health Office (WHO, 2017).

A preliminary study conducted by the authors in the HIV/AIDS programs of the Jember Department of District Health Office stated that HIV/AIDS surveillance in 2018 had not been optimal. One of the factors that influenced HIV/AIDS surveillance was the lack of awareness in reporting. Primary Healthcare (PHC) did not regularly report the results of surveillance activities to the Jember District Department of Health Office. Besides, in AIDS cases, PHC only revealed to the Jember District Department of Health Office when AIDS cases had occurred.

The Implementation of health surveillance should be by the surveillance performance indicators. At least, surveillance performance indicators include report completeness, report accuracy, and other surveillance performance indicators defined in each program (Health Ministry of Indonesia, 2014). So this study aims to describe the implementation of HIV/AIDS surveillance in Jember Regency.

METHOD

This paper was a descriptive study. Respondents were the person in charge of HIV/AIDS surveillance at the Jember District Department of Health Office and Public Health Center's surveillance team. The

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sample size was determined using the purposive sampling technique. The sample in this study was one person in each surveillance team of the Jember District Departement of Health Office, and the surveillance team from four PHCs selected out of fifty clinics that carry out HIV/AIDS surveillance. The PHCs were Puger PHC, Gumukmas PHC, Kencong PHC, and Wuluhan PHC from September to December 2018.

The variable in this study refers to the systems approach, including input, process, and output. Primary data was obtained through direct interviews with respondents using a questionnaire. Meanwhile, secondary data collection utilized the Jember District Department of Health Office documentation and the four PHCs. The data collected then processed and analyzed descriptively by comparing the study results with the theory and or program guidelines.

RESULTS

Table 1. Human Resources of HIV/AIDS Surveillance Based on Duty and Education Level

Health Facility	Human Resources	Educational Level
Jember District Departement of Health Office	1 Epidemiologist	S1 Public Health
Kencong PHC	1 HIV/AIDS Programmer	D3 Midwifery
	1 *Record and Report* (RR)	S1 Nursing
Gumukmas PHC	1 HIV/AIDS Programmer	D3 Nursing
	1 *Record and Report* (RR)	Senior High School
Puger PHC	1 HIV/AIDS Programmer	D3 Nursing
	2 *Record and Report* (RR)	Physician & S1 Nursing
	2 Counselor	D3 Nursing dan Senior High School
	1 laboratory assistant	D3 Health analyst
	1 Case Manager	Senior High School
Wuluhan PHC	1 HIV/AIDS Programmer	S1 Nursing
	1 *Record and Report* (RR)	D3 Nursing
	2 Counselor	D3 Midwifery & Physician
	2 Case Manager	D3 Midwifery & Senior High School
	1 Cadre	Senior High School

HIV/AIDS surveillance at Jember District Health Office was part of the Communicable Disease Prevention and Control Section (P2PM). The person in charge of HIV/AIDS surveillance at the Jember District Departement of Health Office was one epidemiologist who had a Bachelor of Public Health (S.KM). The four PHCs had a programmer for HIV/AIDS surveillance. Most of the education background for the HIV/AIDS surveillance team at PHCs was a diploma / D3, but it was still there human resources were with a senior high school as the education background (table 1).

Table 2. Components of HIV/AIDS Surveillance Implementation

Component	Jember DDHO	PHC			
		Kencong	Gumukmas	Puger	Wuluhan
Input					
Infrastructure					

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Component	Jember DDHO	PHC			
		Kencong	Gumukmas	Puger	Wuluhan
a. Computer	v	v	v	v	v
b. Communication (telephone etc.)	v	v	v	v	v
c. Reference for epidemiologist surveillance, research, and health studies	v	v	v	v	v
d. Guidelines for implementing epidemiological surveillance and computer application programs	v	v	v	v	v
e. Epidemiological surveillance data recording form according to the guidelines	v	-	v	v	v
f. Tools for implementing epidemiological surveillance at PHC	v	-	v	v	v
g. Transportation (motorcycle & car)	v	v	v	v	v
Financing					
a. APBD (The Regional Revenue and Expenditure Budget)	v	v	-	v	v
b. BOK (The Health Operational Aids)	v	v	v	v	v
Type of Implementation					
1. Implementation Method					
a. Integrated Routine Epidemiological Surveillance	v	-	v	v	v
b. Special Epidemiological Surveillance	-	v	-	-	-
c. Sentinel Surveillance	-	-	-	-	-
d. Epidemiological Studies	-	v	-	-	-
2. Data Collection Activities					
a. Active surveillance	-	-	-	v	v
b. Passive surveillance	v	v	v	v	v
3. Implementation Pattern					
a. Emergency Pattern	v	v	-	v	v
b. Patterns other than emergencies	-	-	v	v	v
Process					
Data collection					
1. Data Source					
a. VCT (Voluntary Counseling and Testing)	-	v	v	v	v
b. Mobile VCT	-	-	-	v	v
c. Antenatal Care (ANC)	-	-	-	v	-
d. Posbindu (the community health post for non-communicable diseases prevention activities)	-	-	-	v	-
e. PHC Report	v				
2. Data collection methods					
a. VCT Report	v	v	v	v	v
Data processing					
1. Data processing applications					
a. SIHA (HIV/AIDS Information System)	v	v	v	v	v
2. Data Validation					
a. Every one month	v	v	-	v	v
b. Every three months	v	-	v	-	-
3. Grouping data					
a. Age factor	-	-	-	v	v
b. Characteristics, region, risk factors, HIV/AIDS status, and death from AIDS	v				
Data Analysis and Interpretation	v	-	-	v	v
Surveillance Networks					
a. NGO	v	v	v	v	v
b. Village Midwife	-	v	v	v	v
c. Village Nurse	-	v	v	v	v
d. Clinic	-	v	v	v	v
e. Stakeholders	v	v	v	v	v
Output					

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Component	Jember DDHO	PHC			
		Kencong	Gumukmas	Puger	Wuluhan
Dissemination					
a. Internal mini-workshop (1x/month)	-	-	-	v	v
b. Regency workshop	v	-	-	v	v
Recommendations and Follow up Alternative	v	-	-	v	v

In the Jember District Department of Health Office, facilities and infrastructure met the quality and quantity requirements. Likewise, most PHCs, however, only Kencong PHC did not use forms and equipment packages in implementing surveillance (Table 2).

The financing source for implementing HIV/AIDS surveillance in Jember Regency from the District Revenue and Expenditure Budget (APBD) and Health Operational Assistance (BOK), which was part of the Communicable Disease Prevention and Control Section (P2PM) of the Jember Regency Health Office. Meanwhile, financing budget for four PHCs from the District BOK and or APBD (table 2). Especially at the Gumukmas PHC, the funding was used only from the BOK because this budget was sufficient for implementing the HIV/AIDS surveillance program in Gumukmas District. Meanwhile, according to the person in charge of the HIV/AIDS surveillance program at the Puger PHC and Wuluhan PHC, the budget from the BOK and the district APBD were insufficient for the surveillance program. Then related to the constraints in budgeting, the person in charge of the HIV/AIDS surveillance program at the Kencong PHC and Puger PHC stated that the disbursement of funds required a slow process and a relatively complicated bureaucratic problem.

The type of HIV/AIDS surveillance at the District Department of Health Office of Jember, Gumukmas PHC, Puger PHC, and Wuluhan PHC implemented an integrated routine epidemiological surveillance method, namely HIV surveillance and prevention become AIDS stage. The Jember District Department of Health Office has never conducted an epidemiological study to support HIV/AIDS surveillance. The activity of collecting surveillance data at the Health Office was passive through the PHCs reports. Whereas in the four PHCs, the majority came from VCT. The data collection consisted of two categories, active-passive and passive. When there is a new case in the population, the data collection becomes active. The pattern of implementing HIV/AIDS surveillance at the Health Office used an emergency implementation pattern, using a laboratory examination of the rapid test. Clinics and physicians also reported to the PHC before being reported to the District Department of Health Office. Most of the PHCs experienced obstacles in collecting surveillance data. The results of the interview stated that the most dominant reason came from the internal team. They did not regularly enter and process the surveillance data because officers also had multiple duties. It affected the discipline in data entry to hamper the quality of data generated from surveillance activities.

HIV/AIDS surveillance data processing utilized the SIHA application (HIV/AIDS Information System). Most of the PHCs validated every month, except for the Gumukmas PHC, which validated the data every three months. Validation was generally carried out at the Jember District Department of Health Office

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every specific period. The Health Office validated the data by providing feedback on the data reported by the PHCs. Jember District Health Office, Puger PHC, and Wuluhan PHC classified data based on characteristics and risk factors, then presented the data by recapitulating using Microsoft Excel. Data presentation were tables, graphs, or diagrams as needed. Meanwhile, the other two PHCs, Kencong PHC and Gumukmas PHC did not classify cases yet.

The Jember District Department of Health Office carried out data analysis by analyzing the highest risk factors in HIV/AIDS cases and interpreting them on the annual report incorporated into the Infectious Disease Prevention and Control Section (P2PM) report. Meanwhile, Kencong PHC and Gumukmas PHC did not analyze and interpret HIV/AIDS surveillance data.

The Jember District Department of Health Office was active in building epidemiological surveillance networks such as cooperation and partnerships with Non-Governmental Organizations (NGOs) in Jember Regency that concern HIV/AIDS, such as KSD Pelangi, Laskar, and Ogawa. Likewise, the four PHCs had surveillance networks in carrying out HIV/AIDS surveillance, including NGOs, village midwives, village nurses, clinics, and cross-sectoral stakeholders.

The Health Officer disseminated the outputs of HIV/AIDS surveillance activities in the annual evaluation with all health facilities in Jember Regency. There was the dissemination of HIV/AIDS surveillance in Jember Regency to the Provincial Health Office. Of the four PHCs, only two PHCs carried out information dissemination in HIV/AIDS surveillance activities – Puger PHC and Wuluhan PHC through a once-a-month internal mini-workshop and a District Workshop (table 2).

The Jember District Department of Health Office has carried out recommendations and alternative follow-ups on HIV/AIDS surveillance results. PLWHA (people living with HIV/AIDS) must receive assistance and supervision by health workers to not reach the AIDS stage by consuming ARV routinely. Meanwhile, the Puger PHC provided recommendations and alternative follow-up actions. Its actions included the activity plan postponement when there was a lack of funds for HIV/AIDS surveillance and surveillance officers' training to maximize surveillance activities. Meanwhile, Wuluhan PHC provided recommendations and alternative follow-up with treatment assistance from start to finish for PLWHA and finding the solution for finding key populations. In this case, PLWHA assistance and active surveillance systems were still obstacles in implementing surveillance at Wuluhan PHC.

DISCUSSION

Surveillance has four main activities: data collection, data processing, data analysis, and interpretation, also dissemination. In the Implementation of HIV/AIDS surveillance in Jember District, most of the data collection came from VCT and mobile VCT. HIV/AIDS surveillance data processing used the SIHA application and was validated by the Health Office once a month. However, only half of the PHCs

conducted report analysis and data interpretation. The dissemination occurred at the District Department of Health Office, while the PHC only conducted report analysis.

The surveillance staffs were appropriate at the health district office level, but at the PHC level, there was no skilled epidemiologist. It is not in line with the Regulation of the Minister of Health of the Republic of Indonesia Number 45/2014. In the management of health surveillance, there must be support in the availability of competent human resources in epidemiology (Health Ministry of Indonesia, 2014). Previous research described that epidemiologists in carrying out HIV/AIDS surveillance were only at the district level, but at the PHC level were health workers such as nurses and midwives (Chandra H, 2018). Lack of epidemiologists can be circumvented by including health workers appointed as the surveillance team in surveillance training from the Ministry of Health or the Provincial Department of Health. PHC can apply for surveillance training at the Provincial Department of Health when there is no such training. Several PHCs complained that they had multiple duties, so they could not manage their time with other nurses' responsibilities at the polyclinic. It is necessary to formulate an SOP for the nurse/midwife at the PHC who is in charge of the surveillance team so what are their duties and duration become clearer and stated.

The facilities and infrastructure for carrying out HIV/AIDS surveillance in PHC were by the requirements based on the Regulation of the Minister of Health of the Republic of Indonesia Number 45/2014 (Health Ministry of Indonesia, 2014). The facilities and infrastructure for carrying out HIV/AIDS surveillance are essential to ensure the sustainable supply of commodities related to the HIV/AIDS program so that efforts are needed to ensure the continuity of an uninterrupted supply (Chandra H, 2018). Funding in the Implementation of HIV/AIDS surveillance is by the Regulation of the Minister of Health of the Republic of Indonesia Number 45/2014 (Health Ministry of Indonesia, 2014). Funding for HIV programs originating from government spending has increased rapidly, and sources of funding have expanded. District Department of Health Offices and Health Facilities do not only have funding sources from the APBD but have expanded to include funding sources from capitation fees, BOK, and Village Funds. There should be a new mechanism to meet the increasing demands for financing the HIV/AIDS program so that funding sources can be sufficient to implement HIV/AIDS surveillance (WHO, 2017).

PHC officers play an essential and crucial role in recording data accurately and completely. Because it is the first door or the first data collector, the data will then be analyzed and reported by the District Department of Health Office to a high level to the Ministry of Health. Thus, surveillance officers who do not regularly collect data significantly affect the quality of the data produced. Therefore, data collection barriers should be used as a material to evaluate HIV/AIDS surveillance. By WHO guidelines, the data collection process must pay attention to the quality of data collected by implementing practices that ensure the quality of data standards during data collection and monitoring the data entry process (WHO, 2018b). According to the Regulation of the Minister of Health of the Republic of Indonesia No.74 of

2014, the data collected must be valid (accurate, complete, and timely) to facilitate processing and analysis.

The Ministry of Health has developed the reporting application software, namely SIHA, or a management information system used to manage data on HIV-AIDS and STI (Sexually Transmitted Infection) control programs to capture data originating from health service units. Health facilities have widely used SIHA to support HIV/AIDS surveillance, making it easier for health workers to process data. In this case, the District Department of Health Office and the four PHCs have used the SIHA application in the data processing process. Data validation in HIV/AIDS surveillance activities dramatically affects the quality of surveillance data. Validation was carried out by the Jember District Department of Health Office every specific period. The quality of all data entered is highly dependent on the accuracy of the medical records. When the surveillance officer finds irregularities in the client's data during the entry process, the client's entry process is postponed and confirmed until the data is genuinely valid. This process makes data validation require a specific period. According to the Minister of Health Regulation No. 74 of 2014, each HIV Counseling and Testing (HCT) service is required to report data on the results of its activities according to the reporting format available every month to the District Health Office (Health Ministry of Indonesia, 2014). There are still PHCs that perform surveillance under the required standard.

Ideally, STD and HIV/AIDS programs in district/city and provincial should conduct a simple analysis to show trends in HIV prevalence in each sentinel sub-population by time and place into an electronic format. It uses an application or software that generates graphs or tables simple (WHO, 2018). However, in Jember Regency, this was only done by the District Departement of Health Office and two PHCs. PHCs that do not perform data analysis and interpretation show that surveillance officers do not understand their surveillance team's duties. So it is necessary to carry out surveillance training or scientific updates related to surveillance to health personnel appointed as the surveillance team. So regularly and continuously, the surveillance process can produce meaningful data and information. The form of presenting data according to the Minister of Health Regulation No. 74 of 2014 is a report.

The four PHCs carried out the Implementation in Jember Regency. In the surveillance network, the four PHCs conducted surveillance networks with village midwives. The village midwife was considered the stakeholder who knew the surveillance target's conditions closely. The village midwife network is an internal network of PHC supervised by the District/ City Health Office (Health Ministry of Indonesia, 2003). According to the Decree of the Minister of Health of the Republic of Indonesia Number 1116 / MENKES / SK / VIII / 2003, PHC is obliged to coordinate epidemiological surveillance with practicing doctors, private midwives health service units in their working areas. This networking makes it easy to carry out practical surveillance activities. Besides, PHC is required to coordinate epidemiological surveillance between adjacent PHCs (Health Ministry Indonesia, 2003). Each PHC had not done this yet.

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The dissemination process is a vital process that can describe activity achievements within a period of one surveillance activity. Dissemination of data, information, and recommendations are the results of epidemiological surveillance activities. Parties responsible for disease control measures or efforts to improve health programs, research centers, study centers, and data exchange in epidemiological surveillance networks utilize these results (Health Ministry of Indonesia, 2017). District Departement of Health Office monitors reports on implementing HIV surveillance activities in all of their coverage areas through regular meetings to disseminate surveillance results in each district. Next, the District Department of Health Office makes a brief report on the surveillance results and distributes it to all concerned parties. However, the authors hope that the district department of health office conduct internal dissemination at the PHC because dissemination is essential as a basis for planning and evaluating the final results of interventions

CONCLUSIONS

In implementing HIV/AIDS surveillance in Jember District regarding input, the four PHCs do not have skilled epidemiologists. The Implementation of HIV/AIDS surveillance in Jember Regency includes data collection, mostly from VCT and mobile VCT. HIV/AIDS surveillance data processing use the SIHA application and was validated by the Health Office once a month. However, only half of the PHCs conduct report analysis and data interpretation. So, the district department of health office disseminate information on the output, while PHC only conduct report analysis.

We recommend that the surveillance officers are epidemiologists or provide surveillance training to health workers appointed as the surveillance team, so there woulb be optimization in data collection, processing, analysis, and interpretation. Then, there should be explanation and response on all obstacles in carrying out HIV/AIDS surveillance in the dissemination activity.

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Cervical Cancer Incidence Correlation With Hormonal Contraceptive Use

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A B S T R A C T

One of the most dangerous diseases for Indonesian women is cervical cancer. Hormonal contraceptive use is one of the risk factors for cervical cancer, especially in prolonged use for more than five years. This study evaluates the correlation between hormonal contraceptive use with cervical cancer incidence in Surabaya Wisnuwardhana Cancer Foundation. In this research, the authors used the analytical design with the cross-sectional approach. There were 30 respondents selected with the purposive sampling technique. The independent variable was hormonal contraceptive use, and the dependent variable was cervical cancer incidence. The instruments utilized questionnaires and medical records. Data analysis applied the Rank-spearman test with the significance level of $\alpha = 0.05$. The results showed that most of the respondents (63,3%) used hormonal contraception. Almost half of them (46.7%) are categorized in class 2 of pap smear classification (mild infection). Hormonal contraceptive use correlated with cervical cancer incidence (p=0.005). The prolonged hormonal contraceptive use, the greater cervical cancer incidence in women.

INTRODUCTION

Cervical cancer is cancer that appears in the cervix of women. The cervix itself serves as the uterus's entrance from the vagina (Collen and Robert, 2011). This cancer is the number one killer for Indonesian women. The high number of cervical cancer cases in Indonesia has made the WHO place Indonesia as the country with the highest number of people with cervical cancer in the world (Kementrian Kesehatan Republik Indonesia, 2013). In today's society, most of them use contraception to limit and keep their birth spacing. The increasing number of family planning acceptors is due to government programs to prevent a population explosion. Data from The National Population and Family Planning Board (BKKBN) shows that almost half of women use the hormonal contraceptive method. Hormonal contraception is still in great demand by women. Meanwhile, hormonal contraception itself is one of the risk factors for cervical cancer, especially if the use is longer or more than five years (Proverawati, 2010).

Based on data from The Global Cancer Observatory (GLOBOCAN), a project of the International Agency for Research on Cancer (IARCH), in 2012, reported that there were 14,067,894 new cases of cancer and 8,201,575 deaths from cancer worldwide. The highest percentage of breast cancer cases was in 2012. In 2012, the Incidence of cervical cancer globally was 14.0% new cases, and 6.8% of death cases due to cervical cancer (Sari, & Hartanto, 2016). According to the chairman of the Indonesian cancer foundation (Prof. Dr. dr. Aru Wicaksono), the number is also very high for people living with cervical

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cancer. Every year there are no less than 15,000 cases of cervical cancer in Indonesia. Data from the Wisnuwardhana Cancer Foundation in July - September 2018 on 150 women who conducted Pap smears. The pap smear classification results showed that 25 women were in class I (normal), 90 women were in class II (mild infection), 25 women were in class III (severe inflammation), and ten women were in class IV (suspicious and malignant cells). In a preliminary study conducted by researchers at the Wisnuwardhana Cancer Foundation in September 2018, from 7 people who ran a Pap Smear, six women (80%) had a mild infection or class II, and one woman (20%) experienced class I or normal. Six women mostly used hormonal contraception.

The American Cancer Society mentions several risk factors for cervical cancer. Its factors include multiple sexual partners, sexual intercourse at an early age, antiseptics, smoking, labor frequency, low economic, immune suppressants, and hormonal contraceptives (Riksani, 2016). Hormonal contraception is exposure to foreign hormones such as estrogen and progesterone in excess so that it disturbs the physiology in the body, including in the cervical tissue area. Estrogen and progesterone increase cell division in the ductal epithelium, thereby increasing the probability of mutations occurring. The estrogen and progesterone action mechanism also affects ovulation, implantation, gamete transport, luteolysis, and cervical mucus thickness. It is resulting in suppressing FSH and LH production. The mucus' thickness will prolong a carcinogenic agent's presence – by sexual contact and HPV virus – in the cervix.

Cervical cancer's impact causes several complications such as early menopause, vaginal narrowing, pain due to cancer's metastasis, abnormal vaginal fluid production, and even fatal death causes among women worldwide. Death occurs annually from this preventable disease. Therefore, the researchers wanted to investigate the correlation between hormonal contraceptives and cervical cancer incidence.

METHOD

The research design was an analytic and cross-sectional approach, namely the type of observational research where data collection was done once at the same time. The authors did this study at the Wisnuwardhana Cancer Foundation Surabaya for one week in April 2019. The population was all women who came to run the Pap Smear examination. There were 30 respondents with inclusion criteria. We applied a non-probability sampling technique with a purposive sampling technique. The independent variable was the hormonal contraceptive use, and the dependent variable was the cervical cancer incidence. The research instrument utilized a questionnaire and medical records (to measure the incidence rate of cervical cancer). The study's statistical analysis applied the Spearman Rank Correlation Test, with a significance value of $\alpha = 0.05$ and the result was $\rho = 0.005$. H0 ρ (0.029) $<\alpha$ = (0.05), which means that there was a rejection of H0. Hormonal contraceptive use correlated with cervical cancer incidence at the Wisnuwardhana Cancer Foundation Surabaya.

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RESULTS

Table 1 Frequency distribution of contraceptive use at the Wisnuwardhana Cancer Foundation Surabaya

No.	Use of contraceptives	Frequency	Percentage (%)
1.	Hormonal	19	63.3
2.	Non-hormonal	11	36.7
	Total	30	100.0

Table 1 shows that the majority of respondents (63.3%) use hormonal contraception.

Table 2 Frequency distribution of Pap smear classification at the Wisnuwardhana Cancer Foundation Surabaya

No	Pap Smear Classification	Frequency	Percentage (%)
1.	Class I	9	30,0
2.	Class II	14	46,7
3.	Class III	5	16,7
4.	Class IV	2	6,7
	Total	30	100,0

Table 2 describes that almost half of the respondents (46.7%) experience mild infection (level II).

Table 3 Cross-tabulation of the use of hormonal contraceptives with cervical cancer incidence rates in women at Wisnuwardhana Cancer Foundation Surabaya

No	Use of contraceptives	Pap Smear Classification								Total		
		Class I		Class II		Class III		Class IV				
		n	%	n	%	n	%	n	%	n	%	%
1	Hormonal	3	15,8	9	47,4	5	26,3	2	10,5	19	63,3	100
2	Non Hormonal	6	54,5	5	45,5	0	0	0	0	11	36,7	100
	Total	9	30	14	46,7	5	16,7	2	6,7	30	100	100

Table 3 narrates that of the 19 respondents who used hormonal contraceptives, almost half of them (47.4%) have a mild infection (class II). Of 11 respondents who used non-hormonal contraceptives, most of them (54.4%) had normal results (class I). Based on Rank-Spearman statistical test with maximum $\alpha = 0.05$, ρ value was 0.005, which means $\rho < \alpha$, there was a rejection of H0. There was a correlation between the use of hormonal contraceptives with cervical cancer incidence at the Wisnuwardhana Cancer Foundation Surabaya.

DISCUSSION

The Rank-Spearman statistical ρ value was 0.005 ($\rho < \alpha$), there was a rejection of H0. There was a correlation between the use of hormonal contraceptives and cervical cancer incidence at the Wisnuwardhana Cancer Foundation Surabaya. The use of hormonal contraceptives for five years or more increases the risk of cervical cancer two times (Aminati, 2013).

Based on table 3, class II of pap smear classification consists of respondents who used hormonal contraceptives. While class I of pap smear classification comprised of respondents who used non-hormonal contraceptives. Hormonal contraception is excessive exposure to foreign hormones such as

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estrogen and progesterone. It disturbs the body's physiology, including in the cervical tissue area. Estrogen and progesterone function increases the rate of cell division in the ductal epithelium. Thereby, it will increase the probability of mutations. Estrogen and progesterone affect ovulation, implantation, gamete transport, luteolysis, and cervical mucus thickness. As a result, there is a suppression of FSH and LH production. The thickness of the mucus will prolong a carcinogenic agent's presence – through sexual intercourse, including the presence of the HPV virus – in the cervix (Winarsih, 2017). Cancer dysplasia or precancerous condition is a term used to describe the early growth of abnormal cells in the cervix that can develop into cancer. The time it takes from dysplasia to carcinoma in situ ranges from 1-7 years, while the time needed from in situ carcinoma to invasive is 3-20 years (Riksani, 2016).

The more prolonged women use hormonal contraceptives (more than five years), the greater cervical cancer incidence. Long-term use of hormonal contraception will cause higher hormone progesterone levels in a woman's body. Women can have adverse effects caused by the hormone progesterone, including early cervical cancer symptoms such as irregular menstruation and pathological vaginal discharge. The process of cervical cancer progression is slow, preceded by changes in dysplasia. Dysplasia can occur when there is increased epithelial regeneration activity due to mechanical or chemical trauma, viral or bacterial infection, and hormonal balance disorders. Within 7-10 years, this development becomes a pre-invasive form that develops into an invasive cervical stroma in the presence of a malignant process. Expansion of lesions in the cervix can produce sores, exophytic growths and infiltrate the cervical analyzer. The lesions can extend to the fornix, tissues in the cervix, and parametria and eventually invade the rectum and bladder. This DNA virus attacks the surface epithelium of the cervix in the basal cells of the transformation zone, assisted by other risk factors resulting in irreparable changes in genes in vital molecules, persistence and loss of characteristics, and control of cell growth, resulting in malignancy (Arumaniez, 2010).

CONCLUSIONS

We conclude a correlation between hormonal contraceptive use with cervical cancer incidence at the Wisnuwardhana Cancer Foundation Surabaya. The prolonged hormonal contraceptive use, the greater cervical cancer incidence in women.

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Effect of Water Clover (Marsilea crenata) Leaf Extract on Estrogen Receptors-β in Skin Aging

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A B S T R A C T

Extrinsic and intrinsic factors influence skin aging. Hormonal changes, especially estrogen, significantly affect intrinsic skin aging. Decreased circulating estrogen levels reduce skin collagen content and skin elasticity. Isoflavones in *Marsilea crenata* (MC) leaf are active substances containing compounds that mimic estrogen. This study aims to analyze MC leaf extract against the estrogen receptor (ER)-β. The sample for this research was female Wistar Rats (*Rattus norwegicus*). All of them were 12 months old, with their weight was between 350 to 550 grams divided into five groups. P1 P2 and P3 were grouping with MC leaf extract administration in sequential doses 20 mg/kg BW, 30 mg/kg BW, and 40 mg/kg BW. At the same time, P4 was a positive control group, and P5 was a negative control group. The independent variable was *M.crenata* leaf extract. The dependent variables were (ER)-β expression and dermal thickness. The data analysis utilized the one-way analysis of variance (ANOVA) showed significant differences ($p < 0.05$). Each group showed significant results, and group P2 showed the highest expression of (ER)-β and dermal thickness. The result showed that there were significant correlations between both variables ($P<0.05$). This research has proved that water clover extract could become an alternative treatment in the future for skin aging. However, further research should find a proper dose for human consumption.

INTRODUCTION

Skin aging is a degenerative process influenced by intrinsic factors (genetic and hormonal) which occur together with extrinsic factors (sun, heat, pollution, smoking) (Chung, Cho, and Kang, 2004; Assaf, Adly, and Hussein, 2010; Garg, Khurana and Garg, 2017). Hormones such as estrogen, testosterone, dehydroepiandrosterone (DHEA), melatonin, cortisol, growth hormone (GH) decrease with age (Yaar, 2006; Zouboulis and Makrantonaki, 2006). Decreased circulating estrogen levels may lead to skin aging (Laure *et al.*, 2008; Thompson and Maiibach, 2010; Kohl *et al.*, 2011; Yaar and Gilchrest, 2012; Tobin, 2017).

Estrogen is useful in treating aging skin after six months of treatment in premenopausal women with skin aging symptoms. It improves skin elasticity and wrinkle depth is (Liu et al., 2019). Phytoestrogens bind to REα and REβ – more bound to REβ. After binding with ligands, these receptors can move from the cytoplasm to the nucleus, bind and influence the transcription control regions of small DNA or RNA, and express specific genes. Furthermore, steroids can bind to cell surface receptors, promote the formation of cytoplasmic cyclic nucleotides and related protein kinases, which in turn, through transcription factors control the expression of target genes. Therefore, phytoestrogens can influence estrogen-regulated

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processes. It affects the induction of sex hormone binding globulin (SHBG) and aromatase inhibition. (Sirotkin and Harrath, 2014).

Marsilea crenata (MC) or water clover is a group of *salviniales* living wild in aquatic environments such as ponds, rice fields, lakes, and swamps. There are isoflavones, a part of flavonoids, in MC leaves. Isoflavones are active substances that contain compounds that mimic estrogen. It can activate ER in mammals, so they are often called phytoestrogen isoflavones (Titisari *et al.*, 2016). Phytoestrogens are non-steroidal organic phytochemicals. There are several types in the phytoestrogens class: lignans, stilbene, coumestans, coumarin, dihydrochalcone, triterpenoids, and flavones. In humans, phytoestrogen activity is similar to estrogen. Phytoestrogen potential is estimated to be lower than 17-β-estradiol. The action mechanism of phytoestrogens is similar to structural 17-β-estradiol. This component binds to both ER-α and ER-β (Kapuscinska, Nowak, and Mickiewicz, 2015). The background of this research because there has not been a similar study regarding MC leaf extract's effect on ER- β on skin aging.

Table 1. Predicted compounds of 96% ethanol extract of *M.crenata* from Benowo District, Surabaya inmethanol solvent (Ma'arif, Agil and Widyowati, 2019).

No	Rt (min)	% Area	Measured m/z	Molecular Formula	Proposed Metabolite	Activity
1	0.201	0.0228	124.9790	CH3NO6	Unknown	-
2	1.535	2.4313	235.1423	C10H21NO5	4-(3-Hydroxypropyl)-4-nitro-1,7-heptanediol	-
3	2.232	0.1510	179.1315	C11H21NO7	2[(tertButoxycarbonyl)amino-2-deoxy-D glucopyranose	-
4	2.518	1.5144	293.1479	C12H23NO7	Methyl 6-deoxy-6-({[(2-methyl-2-propanyl)oxy]carbonyl}amino)-β-D-glucopyranoside	-
5	3.799	1.4856	327.1314	C15H21NO7	Methyl (3,4,5-triethoxy-2-nitrophenyl)acetate	-
6	4.427	1.4055	187.0642	C5H15N3Cl2	4-Hydrazinopiperidine dihydrochloride	-
7	4.610	0.3629	162.0321	C9H6O3	3-Hydroxy-2H-chromen-2-one (3 hydroxycoumarin)	Competitive inhibition of human recombinant DAAO [23].
8	4.896	0.1836	373.1375	C20H24N3SCl	Prochlorperazine	Analgesics [24], antiemetics [25]
9	5.228	0.9215	359.0997	C13H18N5O5Cl	Ethyl 4-[3-(4-chloro-3-nitro-1H-pyrazol-1-yl)propanoyl]-1-piperazinecarboxylate	-
10	5.445	0.0257	475.2990	C33H37N3	4-{Bis[4-(1-pyrrolidinyl)phenyl]methyl}-N,N-dimethyl-1-naphthalenamine	-
11	5.628	0.9906	343.1051	C10H21N3O8S	1-Azido-1-deoxy-2,3-bis-O-methoxymethyl)-5-O-(methylsulfonyl)-D-ribitol	-
12	5.845	0.6908	550.0951	C24H22O15	Quercetin-3-(6"-malonyl)-Glucoside	Antioxidant and antiatherogenic protective [26]
13	6.177	1.0895	498.1166	C25H22O11	4-(1,3-Benzodioxol-5-yl)-6-hydroxy-1-oxo 1,3-dihydronaphtho [2,3-c]furan-5-yl hexopyranoside	-
14	6.577	0.3205	534.1013	C24H22O14	2(3,4Dihydroxyphenyl)-5-hydroxy-4-oxo-4H chromen-7-yl 6-O (carboxyacetyl)-β-Dglucopyranoside "luteolin 7-O-(6-O-malonyl-β-D-glucoside"	-
15	6.908	0.2713	219.1625	C14H21NO	1-[1-(4-Methoxyphenyl)cyclohexyl]methanamine	-
16	7.206	2.0878	196.1105	C11H16O3	1-carboxy-3-hydroxyadamantane	-

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This study aims to determine MC leaf extract's effects for ER-beta on skin aging so that the research results will contribute positively to anti-aging dermatology.

METHOD

Section 1. Materials& Instruments Research

Material Research

- The experimental animal, female Wistar (*Rattus norwegicus*) rats, 12 months of age, and body weight between 350-550 grams were obtained through the Laboratory of the Institute of Tropical Disease, Airlangga University, Surabaya, and carried out for one week of acclimation before the intervention.
- Standard forage
- Clover leaf extract (*M.crenata*) is obtained from clover leaves extracted from 96% ethanol, which is made in the Pharmacy Laboratory of Airlangga University
- Estradiol Tablets
- Ketamine 50 mg / kg BW
- Materials for immunohistochemical examination
- Material for HE examination.

The instruments were:

- individual mouse cages
- rat fixator, razors
- 0.5 cm biopsy punch
- Tanita brand scale
- ruler, books and stationery
- some tools for preparation
- microscope**.**

Section 2. The Research Design

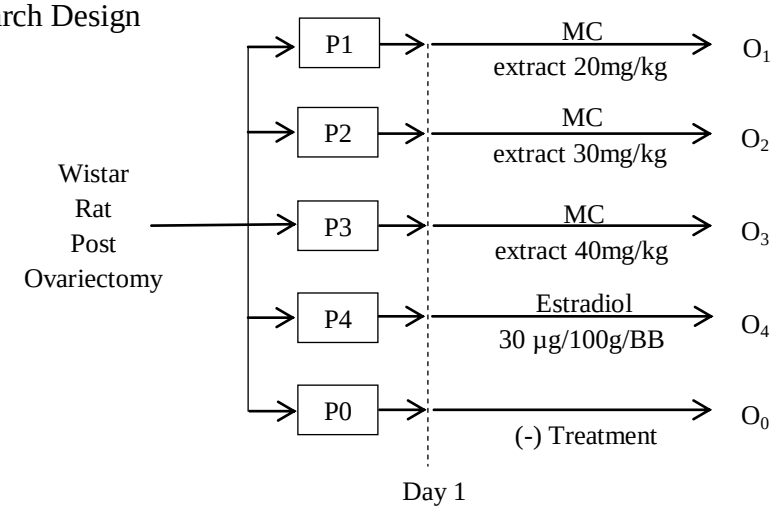

Figure 1. Research Plan

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The sample in this study was female Wistar rats (*Rattus norwegicus*) aged 12 months with weight between 350-550 grams which were ovariectomized by treatment: (1) was given 20 mg/kg BW MC extract (P1); (2) given 30 mg/kg BW MC extract (P2); (3) given 40 mg/kg BW MC extract (P3); (4) were given 30 µg / 100g BW estradiol tablet (P4); (5) dan no treatment (P0). This study's design used four rats in each group plus two rats in anticipation of rats getting sick or dying during treatment. The number of rats in each group was six rats, and the total number of rats for the five treatment groups needed is 30 rats. Samples taken were randomized into groups P1, P2, P3, P4, and P0. This study used a sample of Wistar rats (*Rattus norwegicus*) that met the inclusion and exclusion criteria of the study: (1) Inclusion criteria: All healthy and female Wistar rats (*Rattus norwegicus*), 12 months of age, 350-550 grams of weight; (2) Exclusion criteria: Rats had skin disorders, were sick and died.

Research using female Wistar rats was conducted at the Animal Stem Cell Laboratory of the Institute of Tropical Disease, Airlangga University, Surabaya. The process of extracting MC leaves was made at the Pharmacy Laboratory of HangTuah University, Surabaya. Immunohistochemical examinations were carried out at the Anatomical Pathology Laboratory, Faculty of Medicine, Brawijaya University. The research took place from January-September 2020. The research procedure:

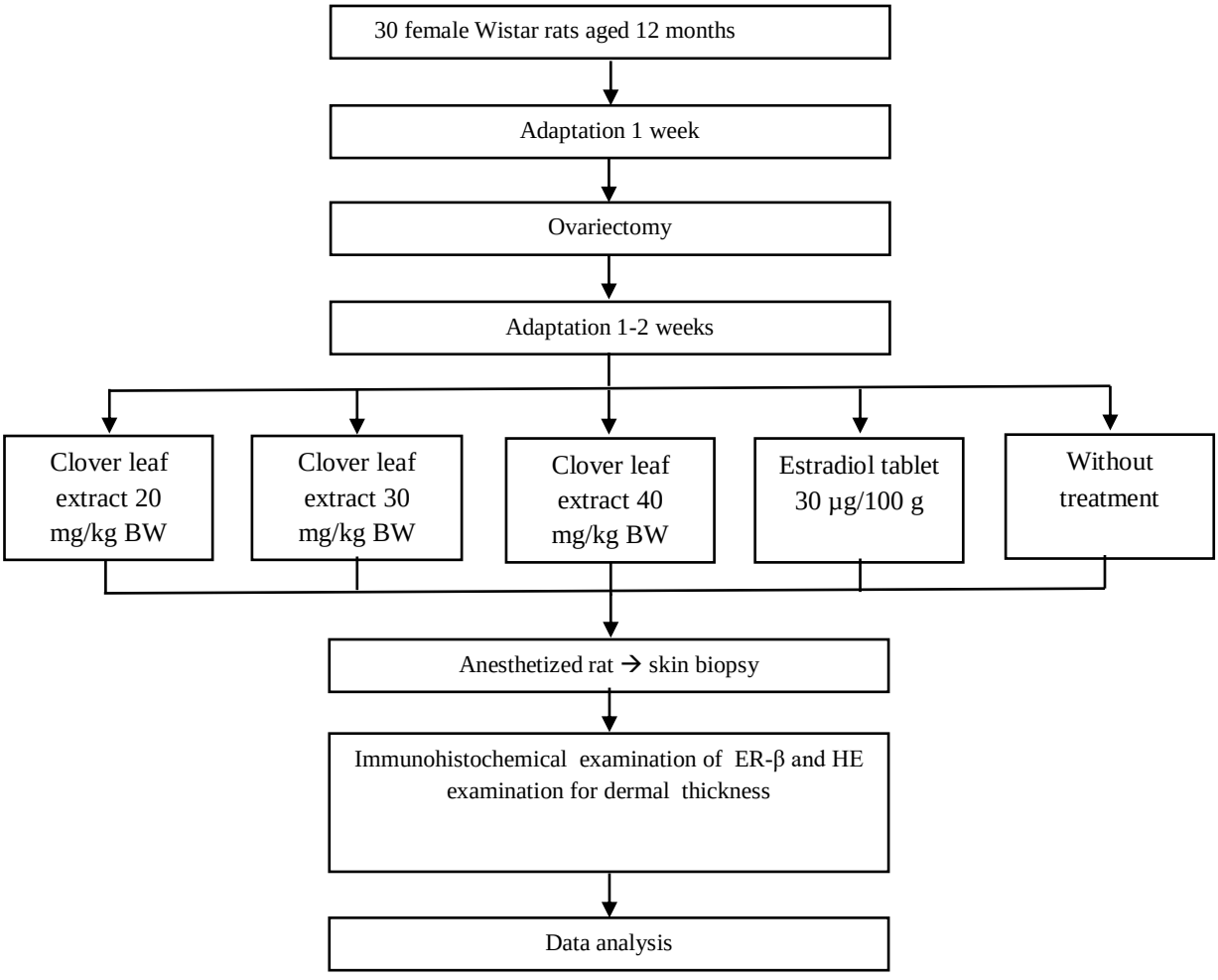

Figure 2. Research Procedure

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Data were collected from the research status, then performed cleaning, editing, and coding. Then data analysis utilized Statistical Package for the Social Sciences (SPSS) data format version 20.0 (SPSS, Inc., Chicago, Illinois). The statistical test used was the normality test with the Shapiro-Wilk test because the sample number was smaller than 30 per group, and the data were normally distributed ($p > 0.05$). Parametric statistical tests with the Pearson Correlation test analyzed homogeneous data for correlation analysis.

RESULTS

In this study, we treated post ovariectomy female Wistar rats with MC leaf extract with three different doses, group P1 at a dose of 20 mg/kg BW, and P2 at a 30 mg/kg BW dose, and P3 at a dose of 40 mg/kg BW. Another group, P4, was given estradiol tablets 30 µg / 100 g BW as a positive control, while the last group, P0, was not given any treatment. Several rats died during the treatment in the treatment group with MC leaf extract (1 group P1, three groups P3), one rat in the treatment group with estradiol tablets, and three rats in the control group

Table 1. Research Results

Group	Mean Expression ER-β±SD	Mean of Dermal Thickness±SD
P1 MC 20 mg/kgBW	7 ± 1,414	2,8575 ± 0,336
P2 MC 30 mg/kgBW	11,25 ± 1,258	3,445 ± 0,316
P3 MC 40 mg/kgBW	7,5 ± 1,291	2,1425 ± 0,121
P4 Estradiol 30 µg/100 g BW	9,25 ± 1,258	2,9225 ± 0,244
P0 Without Treatment	3 ± 1,826	1,9625 ± 0,115

Note: P1 : administration of MC leaf extract 20 mg/kgBW
P2 : administration of MC leaf extract 30 mg/kgBW
P3 : administration of MC leaf extract 40 mg/kgBW
P4 : administration of Estradiol 30 µg/100 g BW
P0 : group 0 Without treatment

P2 showed the highest ER-β expression and dermal thickness in the three treatment groups with MC leaf extract. ER-β expression in the P3 group was not as high as the P2 group but was still higher than the P1 group. In contrast, the dermal thickness in the P1 group was not as high as the P2 but was still higher than the P3 group. ER-β expression and dermal thickness in the P4 group were higher than the P1 and P3 groups but lower than the P2 group. The P0 group – without any treatment – showed the lowest ER-β expression and dermal thickness than other treatment groups (P1, P2, P3, and P4). The results showed that MC leaf extract affected ER-β and dermal thickness at the end of the study.

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There were significant differences in the ER-β expression and dermal thickness between groups with analysis using One-way ANOVA. The difference in mean ER-β expression and dermal thickness was significant when the p-value < 0,05. From the test results, the p-value was 0.000, so there was a significant difference in ER-β expression and dermal thickness between groups. Pearson correlation test analyzed a correlation between ER-β expression and dermal thickness of Wistar rats after ovariectomy. The results of this test showed that Sig. (2-tailed) between dermal thickness and ER-β was 0.000 < 0,05, which means there was a significant correlation between both variables.

DISCUSSION

This study aims to prove the effect of MC extract on increasing ER-β expression on skin aging. In this study, the average ER-β expression and dermal thickness increased after being treated with MC leaf extract and estradiol tablets. Studies on MC leaf extract in skin aging are still rare; however, there were studies on phytoestrogens from other sources. This study's result is in line with research conducted by Laswati et al. (2016), which uses phytoestrogens from tomatoes. The ER-β of post ovariectomy rats without phytoestrogens was lower than with phytoestrogens (Laswati *et al.*, 2016). One of the elements in *M.crenata* is an isoflavone. Isoflavone has a chemical structure similar to 17 –β estradiol – isoflavone can bind to estrogen receptors. Isoflavones act as agonists of estrogen receptors, but isoflavones have less activity than 17 –β estradiol. However, the endogenous estrogen levels in the body influence isoflavone's effect (Pilsakova et al., 2010).

A study done by Pilkasova et al. (2010) reported that isoflavones could inhibit the activity of 5α-reductase. 5α-reductase catalyzed the conversion of testosterone to 5α-dihydrotestosterone and aromatase P450. Isoflavones mediated the conversion from testosterone to estradiol. A low concentration of isoflavones inhibits aromatase activity. High isoflavone levels increase this enzyme activity (Almstrup et al., 2002). Isoflavones bind to the sex hormone binding globulin (SHBG) and stimulate its synthesis (Berrino et al. 2001). Alterations in SHBG concentration may yield changes in circulating steroid hormones (Pilsakova et al., 2010).

In another study by Mahmoud et al. (2015) reported that genistein, a component of phytoestrogens, can increase ER-β expression as the dose of genistein increases through the mechanism of phosphorylation, nuclear translocation, and ER-β transcription (Mahmoud et al., 2015). In this study, the P3 group showed ER-β expression not higher than the P2 group but higher than the P1 group. The ER-β expression in the P4 group (estradiol tablets) was higher than the P1 and P3 groups. These results align with the theory that states that phytoestrogen activity is lower than 17-β-estradiol (Pilsakova, Riecansky, and Jagla, 2010).

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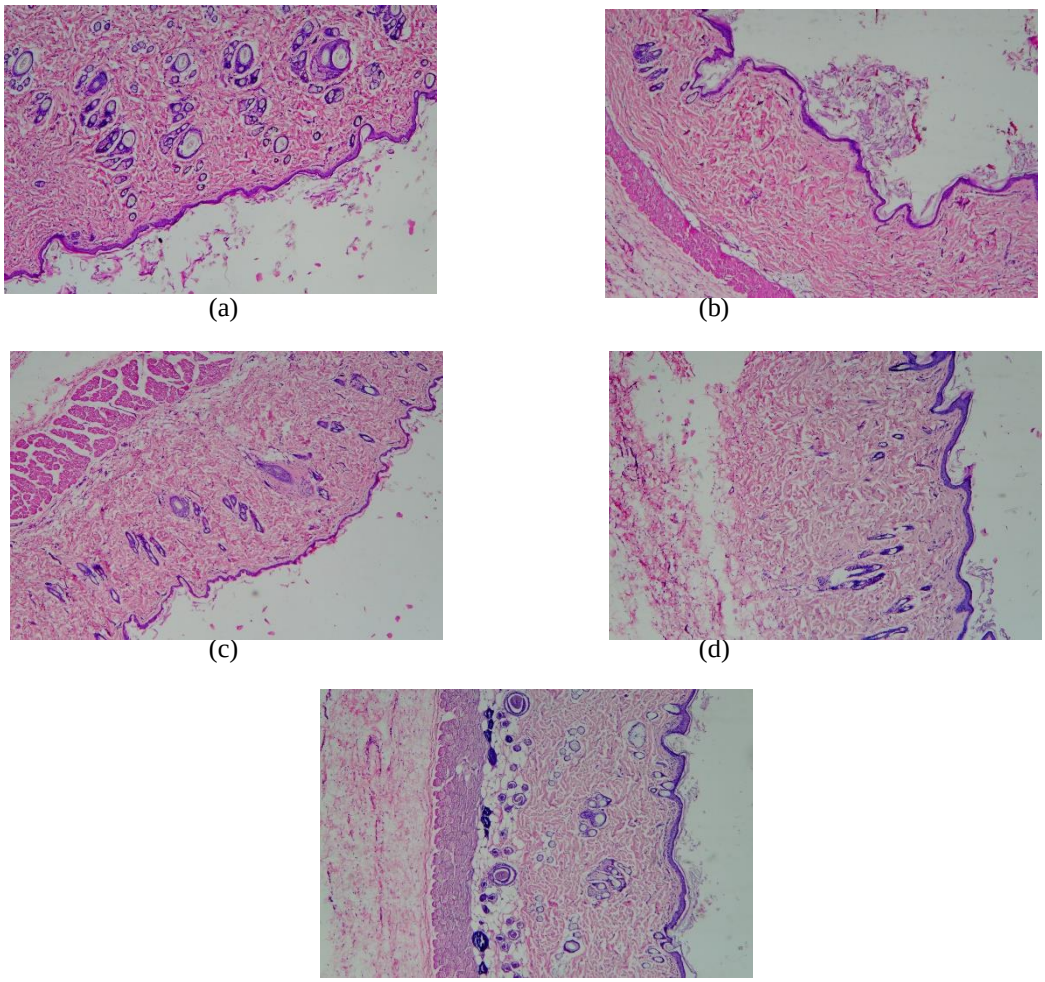

Figure 3. Skin cross-section (a) group P1, (b) group P2, (c) group P3, (d) group P4, (e) group P0

Apart from ER-β expression, this study also examined dermal thickness. The skin is a target organ for estrogen receptor beta hormone so that when there is a decrease in estrogen with aging, it will affect the skin. Manifestations of decreased estrogen in the skin include thinning of the skin, reduced collagen, dry and thin skin, and decreased skin vascularity (Liu *et al.*, 2019; Carneiro *et al.*, 2020). The skin aging mechanism occurs due to an increase in free radicals / ROS, which causes activation of cytokine and growth factor receptors on the surface of keratinocytes and dermal cells and initiates downstream signal transduction pathways (Chung, Cho, and Kang, 2004; Alam and Havey, 2010). Several signaling pathways can further increase inflammatory cytokines (IL-1, IL-6, TNF-α) and collagen-degrading enzymes (MMP) (Chung, Cho, and Kang, 2004; Baumann, Saghari, and Weisberg, 2009). An increase in MMP causes a decrease in the dermis quality, including a decrease in dermal thickness due to a decrease in the amount of collagen (Kavitha and Thampan, 2008; Baumann, Saghari, and Weisberg, 2009; Mizukoshi *et al.*, 2015). In this study, there was an increase in dermal thickness in the treatment group than in the control group that was not treated either with MC leaf extract or estradiol tablets. The optimal

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dose of MC leaf extract is 30 mg/kg BW/day. In this study, the P3 group with a 40 mg/kg BW dose found that the dermal thickness was lower than P1 20 mg/kg BW and P2 30 mg/kg BW and estradiol tablets. This result is similar to studies by Akyun, Fajariyah, and Mahriani (2019), which uses phytoestrogens in the form of black soybean ethanol extract. A study conducted by Akyun, Fajariyah, and Mahriani (2019) found that this plant extract can increase dermal thickness at a dose of 0.31 g / ml/day rather than the higher dose of 0.63 g /ml/day. The conclusion was 0.31 g / ml/day as an optimal dose (Akyun, Fajariyah, and Mahriani, 2019). Isoflavones can reduce wrinkling and skin thinning through collagen synthesis and decrease collagen degradation (Liu *et al.*, 2019). Another study by Moraes et al. (2009) showed an increase in dermal thickness with isoflavones still lower than the topical estrogen observed for six months.

CONCLUSIONS

Administration of water clover (M.crenata) leaf extract for four weeks increases the expression of β estrogen receptors and the dermal thickness in the Wistar post ovariectomy. MC leaf extract administration at a 30 mg/kg BW dose is optimal for improving skin aging more considerably than the 40 mg/kg BW/day dose. Finally, we can conclude that phytoestrogens in water clover have positive effects as estrogen replacement therapy.

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The Role Of Corticosteroid Administration On The Incidents Of Asphyxia Neonatorum Among Mothers With Preterm Delivery In Ponek RSUD Jombang

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A B S T R A C T

The causes of death for newborns 0-6 days in Indonesia are 36.9% respiratory disorders, 32.4% premature birth, 12% sepsis, 6.8% hypothermia, and 6.6% neonatal jaundice. A preliminary study in Comprehensive Emergency Services Neonatal Obstetric (PONEK) of Jombang Regional Public Hospital (RSUD Jombang) reported that the incidence of asphyxia neonatorum was 295 cases in 2016 and 341 cases in 2015. There were 98 cases of preterm delivery in 2016. This study aims to prove the effect of corticosteroid administration on neonatal asphyxia in mothers with preterm delivery. This study was an analytical study using a one-group after only design. The population was all women giving birth at RSUD Jombang with preterm labor diagnosis in January-May 2017, while the sample was 82. The instruments utilized questionnaires and checklists. The bivariate analysis applied the chi-square association test. Based on the results of the chi-square test $\chi 2 = 4.622 > \chi 2$ table; $p = 0.009 < \alpha$ (0.05). There was a correlation between corticosteroid administration and the incidence of asphyxia neonatorum in women with preterm delivery. This study's results could be an input for primary health care facilities to prevent neonatal asphyxia. Further research should develop other similar variables and increase the number of respondents.

INTRODUCTION

Asphyxia neonatorum is a condition that occurs when a baby doesn't get enough oxygen before, during, or after birth (Manuaba, 2007). Asphyxia can cause neonatal mortality about 8-35% in developed countries and 31-56.5% in developing countries. The incidence of neonatal asphyxia in the first minute is 47/1000 live births and in the next 5 minutes is 15.7 / 1000 live births for all neonates. The incidence of asphyxia neonatorum in Indonesia is approximately 40/1000 (Depkes, 2009).

According to the 2012 IDHS, the Infant Mortality Rate (IMR) for newborns in Indonesia was 32 / 1,000 live births (Depkes, 2009). Meanwhile, according to data from the Statistics Indonesia of East Java Province, IMR in 2009 was 31.41 per 1,000 live births, while starting in 2010 it decreased to 29.99 per 1,000 live births, in 2011 it reached 29.24 per 1,000 live births. In 2012 the IMR estimation came 28.31 per 1,000 live births. Over the past three years, the IMR rate decreased, although not significant. One of the causes of infant mortality in Indonesia was asphyxia neonatorum, around 27%. Several facts revealed that 47% of infant deaths die during the neonatal period. In East Java province, the number of babies with asphyxia reached 26.75% (Timur, 2013). In Jombang, the number of babies with asphyxia neonatorum reached 21.4% (Jombang, 2014). In Comprehensive Emergency Services Neonatal Obstetric (PONEK) of

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Jombang Regional Public Hospital (RSUD Jombang), the number of babies who experienced asphyxia in 2012 was 28.9%. In 2013 it increased to 29.2%, while the period from January to March 2014 was 27.7% (RSUD Jombang, 2014). A preliminary study in PONEK RSUD Jombang showed that the incidence of asphyxia neonatorum in 2016 was 295 cases, and in 2015 was 341 cases. For two years, the incidence of neonatal asphyxia fell by 46 cases. There were 98 cases of preterm delivery in 2016.

Preterm delivery tends to the incidence of neonatal asphyxia. From its background, it is necessary to conduct research that analyzes the corticosteroid administration's effect on the incidence of neonatal asphyxia in mother with preterm delivery at PONEK RSUD Jombang.

METHOD

This study was an analytical study using a one-group after only design. The population was all women diagnosed with preterm labor at RSUD Jombang in January-May 2017, as many as 109 cases. Based on the sample size estimate calculation, the minimum number of samples was 41, so there were 82 respondents in this study. The instruments utilized questionnaires and checklists. The bivariate analysis applied the chi-square association test to determine the significance of the two research subjects' hypotheses.

RESULTS

Description of the Characteristics of Respondents of Premature Maternity in RSUD Jombang

Table 1 Characteristics of respondents

Characteristics of respondents	n	%
Age		
< 20 year	11	13.4%
20 – 35 year	56	68.3%
>35 year	15	18.3%
Parity		
1 time	28	34.1%
>1 time	54	65.9%
Gestational Age		
> 30 week	66	80.5%
< 30 week	16	19.5%

Table 1 shows that most respondents are 20-35 years old, multipara, and have a gestational age of more than 30 weeks.

Table 2 Crosstabulation of Asphyxia Neonatorum by Characteristics of Respondents at PONEK RSUD Jombang.

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Charakteristics of respondents	Mild Asphyxia		Moderat Asphyxia		Severe Asphyxia	
	n	%	n	%	n	%
Age						
< 20 year	4	36.4%	6	54.5%	1	9.1%
20 – 35 year	30	53.6%	15	26.8%	11	19.6%
>35 year	6	40.0%	3	20.0%	6	40.0%
Parity						
1 time	25	46.3%	16	29.6%	13	24.1%
>1 time	15	53.6%	8	28.6%	5	17.9%
Gestational Age						
> 30 week	39	59.1%	18	27.3%	9	13.6%
< 30 week	1	6.3%	6	37.5%	9	56.3%

Table 2 describes that 40% of mothers aged > 35 years deliver babies diagnosed with severe asphyxia. At the same time, 56.3% of deliveries with gestational age <30 weeks have severe asphyxia. Besides, primipara mothers tend to give birth to a baby with mild asphyxia at 53.6%.

Table.3 Correlation between Administering Corticosteroids and Asphyxia Neonatorum Incident at PONEK RSUD Jombang.

Charakteristics of respondents	Mild Asphyxia		Moderat Asphyxia		Severe Asphyxia	
	n	%	n	%	n	%
Administering corticosteroids						
Yes	22	53.7%	14	34.1%	5	12.2%
No	18	43.9%	10	24.4%	13	31.7%
$\chi^2 = 4{,}622$; $p = 0{,}009$						

53.7% of respondents with administering corticosteroids gave birth to a baby with mild asphyxia. In comparison, 43.9% of respondents without administering corticosteroids gave birth to a baby with mild asphyxia. The research analysis results showed $\chi 2 = 4{,}622$; $p = 0.009$ (table 3). There was a significant difference between the group with administering corticosteroids and without corticosteroids.

DISCUSSION

Based on the research results in mothers with preterm delivery at PONEK RSUD Jombang, the total number of respondents was 82 mothers. Of this number, almost half of the respondents in the age group> 35 years delivered babies diagnosed with severe asphyxia, namely 40%. The result is in line with research conducted by Lee (2008), which reported that babies born to mothers aged 20-29 years had a lower risk of experiencing death due to asphyxia neonatorum compared to infants of mothers with high-risk age groups (<20 years or> 35 years). There is a tendency of uteroplacental complications that occur in mothers of high-risk age. Physically, mothers aged more than 35 years experience a setback to undergo pregnancy and are a predisposing factor for decreased blood flow to the placenta resulting in impaired placental function. It can result in the asphyxia of the newborn and fetal distress due to lack of oxygenation (Wiknjosastro, 2007).

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This study showed that almost all (56.3%) deliveries with gestational age <30 weeks had severe asphyxia. (Wiknjosastro, 2007) suggests that placental function reaches its peak at 38 weeks of gestation and begins to decline after 42 weeks – decreased estriol and placental lactogen levels. Apart from this, the reduced amniotic fluid results in abnormal changes in the fetal heart. Eventually, the fetus experiences hypoxia, sometimes accompanied by aspiration of meconium and asphyxia neonatorum. This study is in line with research conducted by Mardiyaningrum (2005). Its result showed a significant correlation between gestational age and the incidence of neonatal asphyxia. Another similar study was conducted by Lee (2008) which stated that premature babies had a greater risk of death due to neonatal asphyxia. The risk increased 14.33 at <34 weeks' gestation.

Parity history correlates with the incidence of neonatal asphyxia. This study indicated that a pregnant mother for the first time (primipara) with a diagnosis of preterm labour tended to give birth to a baby with mild asphyxia (53.6%). This condition is possible because the uterine muscles are still stiff. Besides, women who get pregnant for the first time after being married for years show a low conception ability. The most common complication is preeclampsia. Preeclampsia is a hypotonic disorder and stiff birth canal muscles. Impaired blood flow to the uterus reduces due to hypotonic so that there is a decrease in oxygen flow to the placenta and fetus. It causes the birth of babies with asphyxia. Teenage pregnancy is also at risk in pregnancy and childbirth because the uterus is not yet perfect, which will cause premature birth so that the baby experiences homeostatic disorders – especially in the respiratory system – and asphyxia neonatorum.

Most respondents with administering corticosteroid injections delivered babies with mild asphyxia (53.7%) or as many as 22 babies. Meanwhile, almost half of women without corticosteroid injection gave birth to a baby with mild asphyxia, namely 43.9%. This study also explained that only a small proportion of preterm births with administering corticosteroid injection experienced severe asphyxia in babies, namely five respondents or 12.2%. In contrast, preterm delivery incidence without corticosteroid injection showed that nearly half of the baby's respondents experienced severe asphyxia, namely 13 babies (31.7%). Corticosteroid administration to pregnant mothers with a premature risk helps ripen the baby's lungs – suppressing Respiratory Distress Syndrome (RDS). The risk of RDS in term pregnant women is lower because there is already cortisol formation. Administering corticosteroids can reduce Respiratory Distress Syndrome (RDS) incidence to reduce perinatal morbidity in early delivery.

The research analysis results showed $\chi 2 = 4{,}622$; $p = 0.009$. There was a significant difference of asphyxia neonatorum between preterm delivery mothers with and without corticosteroid injection. This study's result is in line with several studies that prove corticosteroids' effectiveness in preventing neonatal asphyxia in preterm delivery. A survey conducted by the National Institute of Health Consensus Conferences and various implementation projects in the UK investigated 685 women with severe

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preeclampsia. A systematic review explained that the corticosteroid administration effectively reduced premature delivery risk in pregnant women with premature babies risk. So corticosteroid administration could prevent the incident of neonatal asphyxia (Yuniar, 2013).

The reason for not giving corticosteroid injections at PONEK RSUD Jombang is that the patient came in the second stage of labor. Besides, the patient has been given corticosteroids at the pre-referral site. Another reason is a possible error in the management procedure for premature delivery. The role of midwives is to prevent preterm delivery. But this contradicts the Indonesian Pediatric Society (IDAI), which alludes to midwives' role in providing corticosteroid therapy, which implementation should not be under the authority of midwives. Midwife roles are detecting and carrying out the referral process. There is a consideration of antenatal steroids (ACS) administration in certain conditions, so it must still be an integrated package to prevent complications and prolong the gestational age with tocolytic administration. Based on the results of the chi-square test analysis, the value of $\chi 2 = 4.622 > \chi 2$ table; $p = 0.009 < \alpha (0.05)$. There was a difference in the incident of asphyxia neonatorum after administering corticosteroids in preterm delivery.

CONCLUSIONS

There is an effect of corticosteroid administration on asphyxia neonatorum in women with preterm labor at PONEK RSUD Jombang. This study's results could be an input for primary health care facilities to prevent neonatal asphyxia. Further research should develop other similar variables and increase the number of respondents.

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