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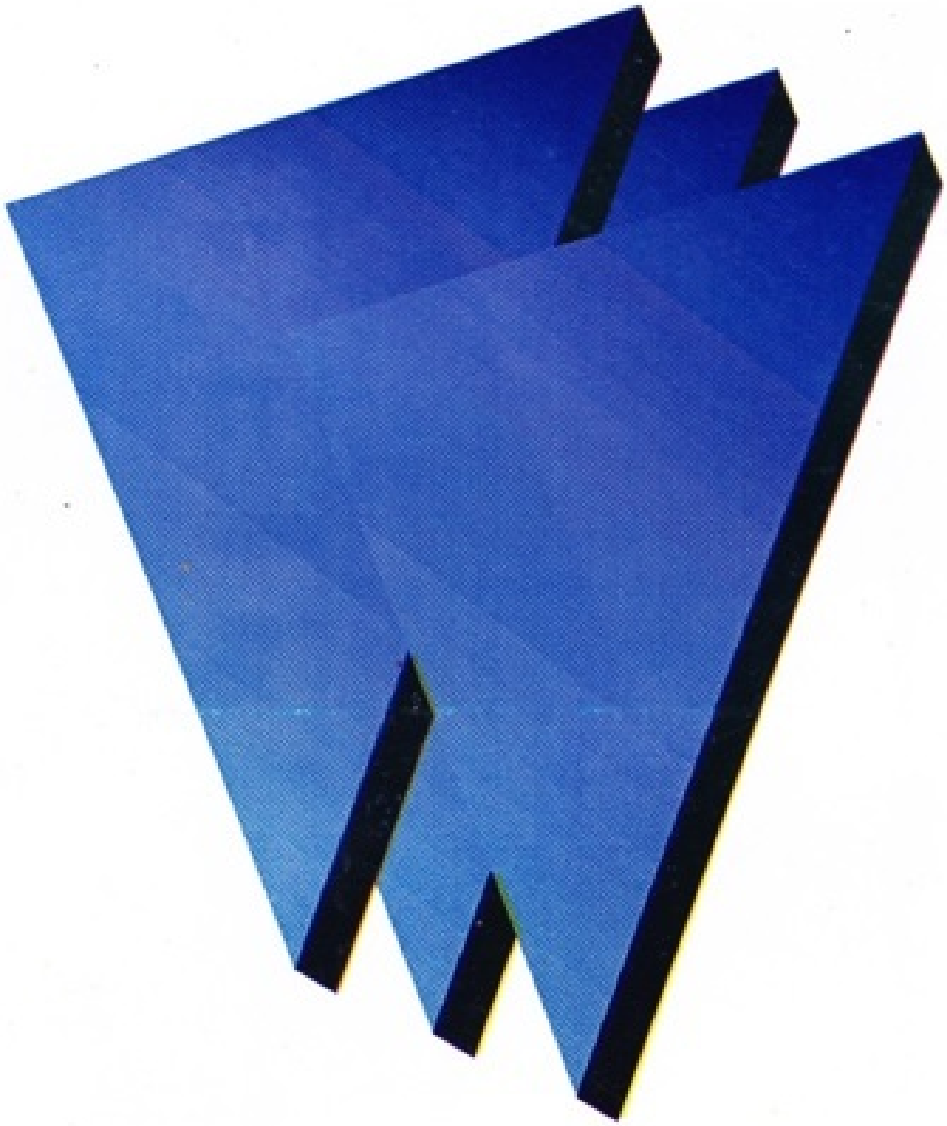

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Original Article

The Effect of Hand Massage on Reducing the Anxiety Level of Pre-Surgery Clients in Tangerang City Regional Public

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ABSTRACT

Surgical procedures are important events in human life which complex and stressful. When hearing the word surgery, patients face situations that can cause fear, worry, helplessness, and anxiety. Surgical procedures may cause psychological and physical problems in patients undergoing surgery. Waiting in the preparation room is the most worrying moment for a patient undergoing a surgical procedure. The patient is faced with a situation where the patient is under a high level of anxiety. This study aimed to determine the effect of hand massage on reducing anxiety levels in pre-surgery clients at Tangerang City Regional Public Hospital. This study used a quantitative design with a quasi-experimental approach; a study provides treatment (intervention) and measures the effects of treatment. The approach technique was a one-group pre-test and post-test. The total number of study participants was 18 people. The study utilized a simple random sampling. The results showed that giving hand massage interventions could reduce anxiety levels by 8.2, from 58.3 to 50.1 after a hand massage. The results of the T-test obtained a p-value of 0.001. It was concluded that there was a significant difference between the level of anxiety before and after giving the hand massage intervention. It is recommended to conduct further research with a different approach.

Keywords : Surgery, Psychological, Physical, Anxiety, Patient.

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INTRODUCTION

Surgical procedures are considered as significant events in readily complex and stressful human life. The word of surgery triggers patients to face a situation that full of fear, worry, helplessness and anxiety. Anxiety experienced is usually related to all kinds of foreign procedures and anesthetic action to be experienced which may threat life safety. Infact, surgery is carried out as an alternative solution to the health problems experienced by patients[1].

In 2017, there were 140 million cases of patients undergoing surgical procedures in all hospitals in the world. Furthermore, in 2019, surgical procedures increased to 148 million cases[2]. Meanwhile, data on surgical patients at Tangerang City Hospital showed that there were 2,380 cases of surgical patients in 2021. Surgery is widely performed to diagnose or treat a disease, disability or injury, as well as treat conditions that cannot be cured with simple actions or medications[3].

According to the American Psychological Association (APA), anxiety is a feeling of tension, fear, nervousness, fear, discomfort, and autonomic activity with various intensities resulting from anticipation of danger or threatening events or something unknown[4]. Anxiety is one of the common problems that

occurs in 60% of patients who should face surgery. The prevalence of preoperative anxiety is reported to be in the range of 12.6-76.7% in the population in Western countries and 39.8-70.3% in Ethiopia[5].

The results of previous studies showed that patients who had to face surgery experienced certain levels of anxiety. A study conducted by Rismawan et al., (2019) which involved 42 preoperative respondents in Tasikmalaya City found that 50% of respondents had moderate anxiety and 28.6% had severe anxiety[1]. Another study involving 74 respondents in Pringsewu Lampung found that 45.9% of patients experienced severe anxiety and 21.6% were anxious about surgery[6]. Furthermore, a study conducted by Palla et al., (2018) concluded that 22.7% of respondents had severe preoperative anxiety and 59.1% of respondents had moderate anxiety[7].

Anxiety in the patient begins when the patient becomes aware of the need for a surgical procedure and culminates on admission to the hospital. Anxiety among patients who will undergo surgical procedures can be due to fear of death, uncertain surgical results, emotional feelings, financial worries, and an unfamiliar hospital environment[5]. Clinical symptoms experienced by patients include reactions of irritability, nervousness, insecurity, feelings of uncontrollable worry, poor concentration, sleeping disorder, headaches, sweating, tingling, tachypnea, tachycardia, and hypertension[4].

The most worrying moment for a patient undergoing a surgical procedure is within the waiting period in the preparation room. The patient usually faces a feeling of anxiety. Various interventions have been suggested to reduce the level of anxiety. Certain non-pharmacological interventions is believed to play a role in overcoming anxiety, such as deep breathing technique, classical music therapy, massage, and also fragrance/aromatherapy[8]. One of the interventions that is easy, cheap but effective for nursing is the hand massage intervention.

Based on a preliminary study conducted by researchers among 15 patients who were scheduled for a surgery in the Surgical Preparation Room of the Tangerang Regional General Hospital revealed that all patients (100%) expressed worry and anxiety regarding surgery. Various reasons were stated starting from misunderstanding, fear of equipment to be used, fear of inappropriate results and fear of death. It is expected that hand massage can increase knowledge which further lead to a decrease in the level of anxiety among pre-operative patients[9].

Surgery is widely performed to diagnose or treat a disease, disability, or injury, as well as treat conditions that cannot be cured with simple actions or medications[3]. Surgery for patients is considered as a scary situation. It is very important to involve the patient in every preoperative process. Surgery is an invasive procedure/action performed to treat, prevent complications, or save the patient's life, so that preoperative management requires the involvement of patients as well as healthcare workers.

Hand massage is a non-pharmacological method for reducing anxiety by improving circulation, relaxing muscles, and relaxing perioperative patients[10]. Hand massage is known as the act of massaging the hands with a five-step massage technique using oil. Massage action can stimulate an increase in the levels of oxytocin hormone and reduce the adrenocorticotrophin (ACTH) hormone[11]. Efforts made in dealing with anxiety problems by anaesthesiologists in the pre-operative phase usually include medical therapy. Meanwhile, interventions performed by nurses do are related to health education/counselling by providing information on operating procedures to be performed. There had been no efforts to deal with anxiety problems by applying massage therapy to the hands or so-called hand massage by nurses[11]. Hand massage can calm the patient through contact/touch which will be integrated through sensory influences that affect the activity of the autonomic nervous system, and the touch will be perceived as a relaxed stimulus. Besides that, hand massage can have a positive impact on vital signs (blood pressure, pulse, respiratory rate)[12]. In addition, hand massage can increase blood flow, parasympathetic system activity, release neurotransmitters and reduce cortisol levels[10]. This study aims to determine the effect of hand massage on the decrease in the level of anxiety among pre-operative patients at Tangerang Regional General Hospital.

METHOD

This was a quantitative study with a quasi-experimental approach which provided

treatment (intervention) and assessed the effects of treatment. A one group pre-test and post-test approach technique was applied by the researchers. The calculation obtained a sample size of 16, plus an estimated dropout of 10% to become 16+2 = 18 respondents. Such dropout is estimated as the possibility of respondent dropping out during the course of study for various reasons.

The study samples were selected using simple random sampling technique. Such sampling method takes samples from members of the population randomly without regard to the strata/levels in the population[13]. The study was carried out in November 2022. The study site was at the Surgical Ward of the Tangerang Regional General Hospital which is located on Al-Hidayah Mosque Street, RT. 005/RW. 003, Kelapa Indah, Tangerang District, Tangerang City, Banten Province. Such study site was chosen was due to the limited number of study topic regarding the effect of hand massage on the anxiety level of ore-operative patients.

The assessment tool applied in this study was a questionnaire about anxiety according to the Zhang Self-rating Anxiety Scale (ZSAS)[14]. ZSAS is a questionnaire that can be used for anxiety screening and assessment of anxiety-related symptoms. The demographic data section aims to identify the characteristics of the respondents which consisted of 4 questions including age, gender, level of education, and employment status. Meanwhile, the anxiety section adopted the anxiety questionnaire from the Zhang Self-Rating Anxiety Scale (ZSAS) which had been translated into Indonesian. The anxiety questionnaire consisted of 20 statements (15 positive statements and 5 negative statements). Scores for positive (favorable) statements can be described as follows: where 1 = never; 2 = sometimes; 3 = part of the time; 4 = almost all the time. On the other hand, scores for negative (unfavorable) statements can be described as follows: 4 = never; 3 = sometimes; 2 = part of the time; 1 = almost all the time.

Univariate analysis is presented in the form of a frequency distribution table along with the percentage of each variable. The calculation was conducted based on the formula explained by (Arikunto, 2016)[15] as follows:

$$P = \frac{F}{N} \times 100\%$$

Information:
P = Percentage
F = Number of observation frequency
N = Number of the entire observation

Bivariate analysis was performed by using a statistical approach of difference test of 2 paired means (paired t test). The paired t-test is a method of testing the hypothesis which involves non-independent/paired data [13]. Even though using the same group of samples, the researchers still obtained 2 types of sample data, namely data derived from the first intervention/treatment and data derived from the second intervention/treatment.

RESULTS

Table 1. Frequency Distribution of Respondents by Age, Gender, Level of Education, and Employment Status.

Variable	Frequency (n)	Percentage (%)
Age		
19-25 years	3	16,7
26-35 years	10	55,5
36-45 years	5	27,8
Gender		
Male	10	55,5
Female	8	44,5
Level of Education		
JHS	4	22,2
SHS	11	61,1
Higher Education	3	16,7
Employment Status		
Government Employee	1	5,5
Private Employee	8	44,5
Self-Employed	4	22,2
Unemployed	5	27,8
Total	18	100

Based on table 1, it was revealed that most of respondents were involved in the age range of more than 26-35 years, as many as 10 respondents (55.5%), were male as many as 10 respondents (55.5%), had the education level of Senior High School, as many as 11 respondents (61.1%), and worked as private employees, as many as 8 respondents (44.5%) of a total of 18 respondents.

Table 2. Frequency Distribution of Respondents by the Level of Anxiety before Intervention.

Level of Anxiety	Frequency (n)	Percentage (%)
Pre-Test		
Mild	5	27.8
Moderate	11	61.1
Severe	2	11.1
Panic	0	0
Total	18	100

Based on table 2, it was found that before hand massage intervention, most of respondents had moderate anxiety, as many as 11 respondents (61.1%), followed 5 respondents with mild anxiety (27.8%) and 2 respondents with severe anxiety (11.1%).

Table 3. Frequency Distribution of Respondents by the Level of Anxiety after Intervention.

Level of Anxiety	Frequency (n)	Percentage (%)
Post-Test		
Mild	8	44.t
Moderate	10	55,5
Severe	0	0
Panic	0	0
Total	18	100

Based on Table 3, it was found that after hand massage intervention, most of respondents had moderate anxiety, as many as 10 respondents (55.5%), and 8 respondents had mild anxiety (55.5%).

Table 4. Effect of Hand Massage on the Decrease in the Level of Anxiety among Pre-Operative Patients at Tangerang Regional General Hospital.

Variable	Mean	Standard Deviation	p-value
Pre-test	58.3	7.2	0.001*
Post-test	50.1	6.9	

*****Significant at $\alpha<0.05$

Based on table 4, it was revealed that hand massage intervention could decrease anxiety levels by 8.2, from 58.3 before intervention to 50.1 after intervention. In addition, the result of the t-test obtained a p-value of 0.001, which indicated that there was a significant difference between the level of anxiety before and after hand massage intervention.

DISCUSSION

Based on the results of the study, it was found that most of respondents were involved in the age range of more than 26-35 years (55.5%). Such finding is in line with a study conducted by Yanti et al., (2021), which found that the majority of respondents who would have surgery were aged 21-30 years by 87.6%[16]. Another study which involved 8 international journals using the literature review method showed that the majority of respondents who would have surgery were aged 20-35 years[17].

Based on the results of the study, it was found that most of respondents were male as many as 10 respondents (55.5%). Another study contrastly found that the majority of respondents were female[17]. However, the result of other study proved that there was no effect

of gender on anxiety among patients[14]. Such finding indicated that gender could not be associated with the level of anxiety among patients.

Further study results revealed that most of respondents had the education level of Senior High School, as many as 11 respondents (61.1%). Such finding is supported by a study conducted by Yanti et al., (2021) which found that most of respondents had the education level of Senior High School[16]. Furthermore, another study similarly showed that the majority of respondents who would have surgery had the education level of Senior High School [17]. Educational level is the variable most frequently observed in a study, even if for descriptive objective only. Researchers argue that a person's level of education can affect knowledge in general. However, it is not specific to health material and efforts to overcome pre-operative anxiety. Curiosity, concern and openness to seek information about surgical treatment, are considered to contribute more significantly than the level of education.

The study findings showed that most of respondents worked as private employee, as many as 8 respondents (44.5%). Different finding was revealed by a study conducted by Yanti et al., (2021) which found that most of respondents were housewives[16]. Various types of work can potentially increase the morbidity and mortality of a disease[18]. A person's employment status can be associated with socio-economic conditions and psychological aspects[19]. Researchers argue that there was no relationship between work when it was associated with pre-operative anxiety specifically[16].

The current study concluded the benefits of hand massage on the decrease in the level of anxiety among pre-operative patients[20]. A study conducted by Li et al., (2020) regarding the benefits of hand massage on the anxiety level among pre-operative patients showed that after hand massage therapy, the average patient thought that it had a pretty good effect[10]. Furthermore, Li et al., (2020) presented the study finding that after hand massage, 78 patients (83.9%) felt more relaxed, 71 patients (76.3%) felt calmer, 23 patients (24.7 %) felt happy, 13 patients (14%) felt sleepy, 9 patients (9.7%) felt a relief in pain and 4 patients (4.3%) felt more energetic[10]. Based on the results of the analysis, it was found that there was a decrease in the anxiety score in the group given massage therapy from the initial score of 4.1 to 2.0. Relaxation can reduce the feeling of tension experienced by individuals so that counter conditioning arises which is able to reduce anxiety[16].

CONCLUSION

It can be concluded that hand massage intervention could decrease anxiety levels by 8.2, from 58.3 before intervention to 50.1 after intervention. In addition, the result of the t-test obtained a p-value of 0.001, which indicated that there was a significant difference between the level of anxiety before and after hand massage intervention. Further study is recommended to apply a different approach.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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Original Article

Effect of Black Sugar Cane Juice on Blood Cholesterol Levels Among Patients with Hypercholesterolemia

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ABSTRACT

In Indonesia, the 35.9% of population had total cholesterol levels of above the normal value, which was a combination of residents in the borderline category (total cholesterol value of 200-239mg/dl) and high category (total cholesterol value of >240mg/dl). On the other hand, 60.3% of population had LDL levels of above the normal value. Based on gender, the number of women with total cholesterol levels of above normal in was higher than men, and the number of people with total cholesterol levels of above normal in urban areas was higher than in rural areas. This study aims to determine the effect of black sugar cane juice on blood cholesterol levels among patients with hypercholesterolemia. This was a Quasi Experimental study with a pre-post test with control group design, conducted in the work area of Sapta Jaya Community Health Center, Aceh Tamiang in June 2022. The sample size of 52 people were assigned into 26 cases and 26 controls. The data collected included administration of black sugar cane juice and blood cholesterol levels. Data were analyzed using the dependent t-test and the independent t-test. Intervention was concluded to have an effect if the p value was <0.05. The dependent t-test analysis obtained mean values of blood cholesterol levels before and after administration of black sugar cane juice in the case group of 234.40 mg/dl and 201.54 mg/dl, respectively, which indicated a decrease of 32.86 mg/dl with a p-value of (0.006) <0.05. Furthermore, the independent t-test analysis in the case and control groups obtained p-values of (0.001) <0.05 and (0.003) <0.05, respectively. In conclusion, there was an effect of black sugar cane juice on blood cholesterol levels among patients with hypercholesterolemia. It is expected that patients with hypercholesterolemia consume black sugar cane juice because it can lower cholesterol levels.

Keywords : Blood Cholesterol Levels, Black Sugar Cane Juice, Hypercholesterolemia.

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INTRODUCTION

The prevalence of hypercholesterolemia according to a doctor's diagnosis was 2.3%, the prevalence of heart failure was 0.3% and the prevalence of stroke was 62.8%[1]. The prevalence of hypercholesterolemia, heart failure, and stroke seems to increase with an increase in age of the respondents. High number of heart disease cases is due to the lifestyle of people who like to consume high-cholesterol foods and sweet foods by 90% of the population of Banda Aceh City[1].

Hypercholesterolemia is one of the most common forms of hyperlipidemia, which is a metabolic disorder characterized by an increase in total cholesterol levels in the blood. Cholesterol levels are said to be increased if the total cholesterol level in the blood is more than 240 mg/dL, Low Density Lipoprotein (LDL) is more than 160 mg/dL, and High-Density Lipoprotein (HDL) is less than 40 mg/dL.2 An increase in blood cholesterol levels increases

the risk of cardiovascular disease[2].

Hypercholesterolemia can increase the risk of atherosclerosis, coronary heart disease, pancreatitis (inflammation of the pancreas organ), diabetes mellitus, thyroid disorders, liver disease & kidney disease. Influential factors of hypercholesterolemia include heredity, consumption of high-fat foods, lack of exercise and smoking habits[3].

Educative and preventive efforts need to be performed. In Indonesian society, the management of hypercholesterolemia includes non-pharmacological therapy called therapeutic lifestyle change (TLC) and pharmacological therapy in the form of cholesterol-lowering drugs. Personal education is also one of the roles of health services in creating changes in lifestyle and eating patterns. Unlike pharmacological treatment, non-pharmacological treatment does not have harmful side effects, so that people prefer non-pharmacological rather than pharmacological treatment. One of the non-pharmacological natural treatments for the management of hypercholesterolemia is herbal therapy[4].

The use of natural ingredients to treat and prevent disease has been widely practiced by people around the world and currently, there is an increase in the intention to conduct studies related to the activities of natural ingredients. Many studies used plants with properties as traditional medicines that had been widely used by the community in treating diseases. Apart from being cheap and easy to obtain, traditional medicines also have fewer side effects compared to synthetic chemical drugs[5].

Sugar cane (Saccharum officinarum L) is a plant grown for sugar and MSG raw materials. This plant is a type of grass which can only grow in tropical climates. Sugar cane juice is in great demand and is widely known as a fresh drink that tastes sweet and is quite economical. Sugar cane contains the octacosanol compound, a type of long-chain alcohol that can lower cholesterol levels in the blood[5]. Octacosanol is a natural, long-chain saturated alcohol found in black sugar cane. Octacosanol is an aliphatic alcohol which has the effect of lowering lipid levels in plasma of both humans and animals. Octacosanol can reduce cholesterol synthesis by inhibiting HMG-CoA reductase. However, octacosanol does not reduce HMG-CoA reductase by more than 50%, thus showing its safety in the case of toxicity[7].

There are many natural ingredients that can lower cholesterol levels, but in this study, the researchers are very interested in black sugar cane since it can be found a lot around, but no one knows the efficacy of this plant. In addition to its availability, such plant has a very economical price with many benefits, one of which is its effectiveness to lower blood cholesterol levels[6]. This study aims to determine the effect of sugar cane juice on blood cholesterol levels among patients with hypercholesterolemia.

METHOD

This was a Quasi Experimental study with pre and post-test control group design. This study intends to assess the data of study subjects before and after being given an intervention. The study samples were selected using purposive sampling technique. The subjects in this study were patients with hypercholesterolemia who met the inclusion criteria in the work area of Sapta Jaya CHC, Aceh Tamiang as many as 52 people. The sample size was calculated using the Slovin formula.

The study variables consisted of administration of 220 ml of black sugar cane juice once a day for 7 consecutive days that was determined using a measuring cup, and blood cholesterol levels as measured using Easy Touch tool. Black sugar cane juice was made by peeling the skin of I kg of black sugar cane, washing it and cutting it and then grinding it to obtain 220 ml of black sugar cane juice. The inclusion criteria included patients aged 40-60 years, regardless of gender, , patients who were still conscious and could be talked to, had no other disease complications, did not take cholesterol medication, consumed black sugar cane juice for 7 days, and those who were willing to be the study samples by signing an informed consent. Researchers assigned the study samples into two groups, namely the treatment group that was administered with black sugar cane juice and the control group without treatment that was administered with plain water as a placebo. All study samples were examined for blood cholesterol levels before and after treatment for 7 days. Data were processed and analysed using the dependent and independent t-test statistical tests with a 95% confidence level ($\alpha = 0.05$).

RESULTS

Table 1. Characteristics of Patients with Hypercholesterolemia by Gender, Age, Level of Education and Occupation at Sukajadi Village, the work area of Sapta Jaya CHC, Aceh Tamiang.

Variable	Treatment (n=52)	Control (n=52)
Gender		
Male	4	7
Female	22	19
Age		
36-45	14	8
46-55	9	18
56-65	3	-
Level of Education		
High (S1/DIII)	7	7
Secondary (SLTA/SMK)	12	14
Primary (SD/SLTA)	7	5
Occupation		
Housewife	10	12
Government Employee	8	2
Self-employed	5	7
Farmer	2	4
Healthcare Worker	1	1
Period of Hypercholesterolemia		
< 12 months	17	17
> 12 months	9	9

Based on Table 1, it can be seen that most of patients with hypercholesterolemia in the treatment group were female by 53.7%, in the adult age category by 63.6%. Meanwhile, most of patients with hypercholesterolemia in the control group had secondary education by 53.8% and were housewives (IRT) by 54.5%. Furthermore, regarding period of hypercholesterolemia, the treatment and non-treatment groups had the same proportion of patients by 50.0%.

Table 2. Mean Blood Cholesterol Levels Before and After Treatment in the Treatment and Control Groups at Sukajadi Village, the Work Area of Sapta Jaya CHC, Aceh Tamiang.

Blood Cholesterol Levels	Group					
	Treatment			Control		
	Mean	Min	Max	Mean	Min	Max
Before	233.35	220	240	235.46	200	240
After	164.81	150	185	238.27	230	245

Based on table 2, it can be seen that the mean blood cholesterol levels before and after administration of black sugar cane juice were 235.35 mg/dl, and 164.81 mg/dl, respectively. On the other hand, in the control group, it can be seen that the mean blood cholesterol levels before and after administration of plain water were 235.46 mg/dl and 238.27 mg/dl.

Table 3. Effect of Black Sugar Cane Juice on Blood cholesterol Levels among Patients with Hypercholesterolemia at Sukajadi Village, the Work Area of Sapta Jaya CHC, Aceh Tamiang.

Group	Cholesterol Levels Before Treatment			Cholesterol Levels After Treatment			p- value
	Mean	N	Std. Deviation	Mean	N	Std. Deviation	
Case	233.35	26	6.591	164.81	26	11.179	.001
Control	235.46	26	8.613	238.27	26	3.935	.003

After calculations for the case and control groups before and after treatment, it was found a difference. In the case group, it was obtained a p value of (0.001) <0.05 with mean blood cholesterol levels before and after intervention of 233.35 mg/dl 164.81 mg/dl, respectively. Based on such finding, it was revealed a decrease in blood cholesterol level in the case group of 68.5 mg/dl. Furthermore, in the control group, it was obtained a p value of (0.003) <0.05 with mean blood cholesterol levels before and after intervention of 235.46 mg/dl 238.27 mg/dl, respectively. Based on such finding, it was revealed that there was no decrease in blood cholesterol level in the control group.

DISCUSSION

The study findings revealed that the mean blood cholesterol levels before and after administration of black sugar cane juice were 235.35 mg/dl, and 164.81 mg/dl, respectively. On the other hand, in the control group, it can be seen that the mean blood cholesterol levels before and after administration of plain water were 235.46 mg/dl and 238.27 mg/dl. The results of the dependent t-test on blood cholesterol levels before and after administration of black sugar cane juice in the treatment group obtained a p value of ≤0.05 at a 95% confidence level. Thus, it can be concluded that there was an effect of administration of black sugar cane juice on blood cholesterol levels. The mean value of blood cholesterol after administration of black cane juice showed a decrease. One way to reduce excess cholesterol levels in the body is by using herbs. One of the herbs that can lower cholesterol levels is black sugar cane which is processed into black sugar cane juice to make it easier to consume, especially to lower the cholesterol levels.

This study confirms that black sugar cane is very good to be given to lower blood cholesterol levels. Black sugar cane is one of the sweetest drinks with quite economical price. Sugar cane contains the octacosanol compound, a type of long-chain alcohol that can lower cholesterol levels in the blood. The existence of Saccharum officinarum L., which is common in the community and easy to obtain, is expected to facilitate education and introduction of Saccharum officinarum L. to the public as an alternative ingredient in reducing dyslipidemia as well as preventing deadly heart disease, especially among those with hypercholesterolemia. According to a study conducted by the National Center for Scientific Research Havana Cuba, octacosanol suppresses the synthesis of cholesterol which is produced in the liver. This can be seen from the regulation of the HMG-CoA-Enzyme reductase which limits the rate of cholesterol synthesis[8].

Long-term observations of octacosanol consumption prove that the compound can lower and control blood cholesterol levels without side effects. Administering octacosanol per day showed a decrease in total cholesterol by 17.5%, and LDL-cholesterol by 21.8%. However, HDL–Cholesterol levels increased by 11.3%[9].

Sugar cane juice not only contains octacosanol, by also a saccharant compound which functions as an antidiabetic. Thus, it is safe for consumption by people with diabetes. Sugar cane juice had also been studied and it was found to contain lots of Vit B2 (riboflavin)[10]. Sugar cane also contains fatty acids which have anti-inflammatory and analgesic effects. This was proven by administering a mixture of fatty acids isolated from sugar cane to rats. Sugar cane has alkaline properties, so it can help fight breast and prostate cancer[11].

A study conducted by Mulyani, NS (2018) observed the effect of black sugar cane juice on blood cholesterol levels in mice[12]. The results of assessments in rat blood showed a significant difference in cholesterol levels between the control group and the case group with a p-value of (0.003). The mean cholesterol level in the case group was much higher (0.000). The study finding showed a significant difference in cholesterol levels between the control and case groups[12].

The study finding is in line with the study conducted by Hidayati, N (2018) is study which was also conducted with experimental animals of mice[13,]. It was found that black sugar cane juice could decrease blood cholesterol levels in mice, with a significant difference between the treatment and control groups[13,14].

A study conducted by Pratiwi N. (2018) observed differences in blood cholesterol levels before and after administration of black sugar cane juice among patients with hypercholesterolemia in outpatient department of Banyuwangi General Hospital, Central Java. From this study, it can be concluded that there

was a difference in blood cholesterol levels before and after administration of black sugar cane juice among patients with hypercholesterolemia in outpatient department of Banyuwangi General Hospital, Central Java [15, 16].

Another study conducted by Puspaningrum, et al (2021) entitled the effect of black sugar cane juice on lowering cholesterol levels showed a decrease in cholesterol levels in the experimental group and the control group by 29.4mg/dL and 16.8 mg/dL, respectively[16]. It can be concluded that the intervention in the experimental group was more effective in lowering cholesterol levels than intervention in the control group with a p value of 0.000 ($p < 0.05$)[17, 20].

CONCLUSION

Black sugar cane juice was effective to lower cholesterol levels among patients with hypercholesterolemia in the work area of Sapta Jaya CHC, Aceh Tamiang. It is expected that this paper can provide information to the public about the benefits of black sugar cane juice for lowering blood cholesterol levels among patients with hypercholesterolemia.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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Original Article

Implementation of Android platform application "PSG Balita" ISO/IEC 25010 standardized to improve nutritional status data for toddler

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ABSTRACT

The need to obtain data and information on nutritional status based on the name by address is required for nutrition reporting. Thus, we should use technological advances to support the quality of toddler nutritional status data. The "PSG Balita" application has ISO/IEC 25010 standards and allows proper recording. This study aimed to measure the effect of implementing an Android-based "PSG Balita" application with ISO/IEC 25010 standards on the quality of toddler nutritional status data. A quasi-experimental research design was conducted in Banda Aceh City in 2021, involving 30 nutritionists at a health center. Data were collected through interviews and observations using a questionnaire that included timeliness, completeness, accuracy, and usefulness. The intervention was conducted through training using the Android-based "PSG Balita" application for one month. Data analysis using the Repeated Measures ANOVA test. Results, the "PSG Balita" application has shown a significant effect in improving the quality of nutritional status data for children under five ($p < 0.05$). It was found that after implementing the application for one month, the aspects of timeliness ($p= 0.000$), completeness ($p= 0.000$), accuracy ($p= 0.001$), and usefulness ($p= 0.002$) could improve the quality of nutritional status data for toddlers. In conclusion, the "PSG Balita" application has made it easier for users to monitor the nutritional status of a toddler, has good accuracy, and allows early identification of the risk of malnutrition. The "PSG Balita" application, which adheres to ISO/IEC 25010 standards, can enhance the accuracy of nutritional status data for young children.

Keywords: ISO/IEC 25010, Nutrition Status, PSG Balita, Data Quality

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INTRODUCTION

Nutrition is an important factor in children's growth and development, and malnutrition can adversely affect children's health and lives[1]. Globally, the problem of nutritional status in toddlers is a very serious issue to be addressed, especially in developing countries such as Indonesia[2]. Data from the World Health Organization (WHO) show that by 2020, approximately 149 million children under five will be stunted or chronically malnourished. Indonesia has one of the highest stunting rates worldwide[3].

Based on Riskesdas (Basic Health Research) data in 2018, Indonesia showed that the prevalence of stunting in children under five was 30.8%, malnutrition or wasting reached 10.2%, and underweight by 17.7% and overweight by 8.0%[4]. Likewise, the Indonesian Nutrition Status Survey (INSS) data report shows that in 2022, the prevalence of stunting was 21.6% (a decrease of 2.8% from 2021), wasting was 7.7% (an increase of 0.6% from 2021), underweight was 17.1% (0.1% from 2021), and overweight was 3.5% (decreased 0.3% from 2021)[5]. Meanwhile, in Aceh Province in 2022, nutritional problems have not

significantly improved. The problem of stunting was very serious (31.2%), and the fifth province had the highest prevalence in Indonesia. Likewise, the prevalence of wasting was 11.3%, underweight was 24.3%, while the prevalence of overweight was only 1.9%[5].

Based on these three nutrition problems, Aceh Province is still struggling to break out of the top five provinces with the highest prevalence of malnutrition in Indonesia. Malnutrition in Aceh Province has become a concern for the central government, local governments, and the community. Several efforts have been made to address this problem, but they have not shown significant results

One of these efforts is to utilize information and communication technology (ICT) in the health sector. The use of ICT is expected to improve the quality of health services and facilitate public access to accurate and reliable health information[6]. One example of using ICT in the health sector is an Android platform application for monitoring growth and development and assessing nutritional status[7,8,9].

However, despite these efforts, undernutrition remains an unresolved problem in Indonesia. Therefore, more in-depth research is needed to evaluate the effectiveness of the "*PSG Balita*" application in improving the quality of the under-five nutritional status data.

Several studies have addressed the impact of ICT-based health applications on healthcare quality. Using health apps can improve the efficiency and quality of healthcare services. However, in another study conducted no studies have specifically evaluated the impact of implementing ISO/IEC 25010-standardized apps on the quality of under-five nutritional status data. However, no study has specifically evaluated the impact of implementing ISO/IEC 25010-standardized apps on under-five nutritional status data quality[10,11].

In previous research, an Android-based application has been developed, namely "*PSG Balita*." It can assist nutritionists at the health center in facilitating data reporting, especially data on the nutritional status of toddlers on indicators of WHZ, HAZ, WAZ, and BAZ[9]. The application meets the ISO/IEC 25010 standard quality test, which shows that the "*PSG Balita*" application is functionally capable of responding to the needs of power (82.5%) and nutrition experts based on the value of functional appropriateness, accuracy, suitability, and reliability provide a score of 78.0%[12].

Furthermore, this application aims to make it easier for nutritionists and policymakers to monitor nutrition problems in their respective areas so that decision-making is right on the target. Therefore, referring to the problems described above, this study aimed to measure the effect of the Android-based "*PSG Balita*" application with ISO/IEC 25010 standards on the quality of nutritional status data for toddlers in Banda Aceh City.

METHOD

This study used a quasi-experimental design with a pretest-posttest design approach, which measures variables in the same group before and after treatment. The research was conducted in Banda Aceh City, Aceh Province, for five months, from June to October 2021.

The sample consisted of Nutrition Executives in the working area of the Banda Aceh City Health Office. The sample size was calculated using the following equation to test a two-sided hypothesis in a population of averages[13]:

$$n = \frac{\sigma^2 (Z_{1-\alpha/2} + Z_{1-\beta})^2}{(\mu_o - \mu_a)^2}$$

The sample size obtained from the calculation of the above equation included 30 nutrition workers. Purposive sampling was used, with the inclusion criteria being a minimum education of Associate's degree in nutrition (D3-Nutrition), as a nutrition manager both at the Health Center and at the Health Office, and willingness to be actively involved until the research was completed.

The "*PSG Balita*" application was developed using a waterfall model approach. The prototype model stages include system requirements, application design and implementation, and application evaluation. The application has undergone expert testing (78.0), and the user needs testing (82.5). Based on the assessment results, it is concluded that the application is based on ISO/IEC 25010 standards. A qualitative study was conducted so that data collection and processing used triangulation, namely comparing interview and observation data, to obtain data consistency, completeness, and certainty.

A quantitative approach is necessary for this study because it aims to measure the value of the quality of data on the nutritional status of children under five. The measured aspects were timeliness, completeness, accuracy, and usefulness. Data collection began with focus group discussions (FGDs) and direct interviews with subjects. The questionnaire consisted of 30 items. Questions on timeliness, completeness, accuracy, and benefits were valid and reliable. Furthermore, quantitative data processing was computerized in several stages: editing (data checking), coding, computer data entry, and cleaning.

The stages of analysis included data reduction, inference testing, data display, and conclusion drawing: plotting/validation—statistical data analysis using the application, namely R statistics. The data in this study were normally distributed ($p>0.05$) based on the Shapiro-Wilk test; thus, the test that can be used is Repeated-Measures ANOVA at 95% CI. This study underwent an ethical review at the Health Research Ethics Commission (KEPK) Poltekkes Kemenkes Aceh, number LB.02.03/014/2021.

RESULTS

Structure and System Model of the "*PSG Balita*" application

The "*PSG Balita*" application provides a visitor feature that can view the front page (home) and try out the features in the application. However, if visitors want to use several other features such as Calculating child nutrition information at the time of the visit (*Anthropometric Calculator*), analyzing *Nutritional Status Survey* data and monitoring toddler growth (*Individual Assessment*), creating a profile. However, the user can no longer register (*Create an Account*) in this updated version. It aims to facilitate and have widespread access to the application.

Process data on the "*PSG Balita*" application using the PHP language integrated into the MySql database[14]. This scheme is called an Entity Relationship Diagram (ERD) design. An entity relationship diagram or ERD is a model that describes the relationship between data in a database based on basic data objects with relationships between each entity. ERD models the structure of data and the relationships between data, using various symbols and notations to describe the relationships between entities[15].

Next, the algorithm design process uses PHP to help the system computation or problem-solving. In algorithmic programming, the activity is often considered as determining the program logic that will be made depending on the database conditions[16]. There are two important algorithms, namely the formula for calculating the nutritional status of toddlers (for all indicators) using the LMS method, and the second is the reference standard used by WHO in determining nutritional status, with the equation LMS[17]. Children's nutritional status was assessed based on each toddler's weight and height data converted into standardized values (Z-score) using the WHO-2005 anthropometric scale[17]. The LMS method, a reference standard used by the WHO to determine nutritional status, is used to calculate the nutritional status of toddlers (for all indicators) with the following equation.[18]

$$Z_{ind} = \frac{\left[{}^{y}/_{M(t)}\right]^{L(t)} - 1}{S(t).L(t)}$$

Wheres:

Z_{ind} : Represents the Z-score value for each indicator, namely WAZ; HAZ; WHZ; BAZ; MUACAZ and HCAZ

y : Measurements of weight (kg); height (cm); BMI (kg/m^2)

M(t) : Absolute median value at the WHO growth standard reference for age or height or BMI

S(t) : Absolute sigma value at the WHO growth standard reference for age or height or BMI

L(t) : Absolute lambda value at the WHO growth standard reference for age or height or BMI

The Minister of Health Regulation Number: 2 of 2020 concerning Child Anthropometric Standards are referenced in the categories and thresholds resulting from the system process in the "*PSG Balita*" application. In evaluating the nutritional status, new categories and thresholds have been added to the MGRS study formulation[19].

Menu View of "*PSG Balita*" Application

The *Anthropometric Calculator* and *Individual Assessment* modules are displayed on the application's first screen. According to nutrition experts, the "*PSG Balita*" application was created using scientific methods and following the laws that govern the monitoring of nutritional status in

Indonesia. This information can be provided in the "*PSG Balita*" application's initial appearance.

In addition, the interface on the *Calculator* menu includes a list of fields for measuring the anthropometry of toddlers, including *Date of Birth*, *Date of Visit*, *Sex*, *Measured Position*, *Odema*, *Weight in kilograms*, *Height in centimeters*, *Head Circumference*, *Upper Arm Circumference* as well as in centimeters (MUAC). The application uses six indicators to determine the nutritional status of toddlers after the anthropometric data has been entered accurately and completely WAZ, HAZ, WHZ, BAZ, MUACAZ, and HCAZ. The Indonesian nomenclature has been used to provide information on all indicators.

Figure 1. View of the "*PSG Balita*" App

As a result of the discussion regarding the Calculator menu feature, it was determined that the dietitian wanted the child's nutritional status to be displayed next to each indicator. As well as labeled following the Minister of Health's Regulation Number: 2 of 2020 regarding *Child Anthropometric Standards*. The expert team believes that if this information can be displayed, other users—like the general public—will find it simpler to learn about the nutritional status of their children.

The Individual Assessment module, which enables users to gather and store longitudinal data for toddlers who are repeatedly examined, is the main feature that has been updated. Anthropometric information makes up the collected data. Nutritionists can track the nutritional status and spot growth issues earlier thanks to integrating the Growth Module (*Individual Assessment*).

As mentioned, this module enables users to gather and store data longitudinally for repeatedly examined toddlers, just as toddlers visit the Integrated Healthcare (Indonesian called a Posyandu) and receive a Growth Chart (known as a KMS in Indonesia). Anthropometric information on toddlers was gathered during various visits. Data can be presented over multiple visits in this module's graphic display to show trends in children's growth. Nutritionists and parents are encouraged to track children's growth using this module.

Application of the "*PSG Balita*" and the Quality of Data on Toddler Nutrition Status

In just one month of implementation, the ISO/IEC 25010-compliant "*PSG Balita*" application has significantly improved the quality of nutrition data, particularly regarding timeliness, completeness, and accuracy.

Table 1. Effect of Implementation of the "*PSG Balita*" Application with ISO / IEC 25010 Standards on the Quality of nutritional status data for Toddlers

	Implementation of the ISO/IEC 25010 Standard "*PSG Balita*" Application			
	Pre - second week		3rd week - 4th week	
	Δ Means ± Deviation	p-value	Δ Means ± Deviation	p-value

Timeliness	2,3 ± 5,49	0,083*	18,5 ± 8,13	0,000
Completeness	11,0 ± 5,98	0,000	22,0 ± 4,10	0,000
Accurateness	12,3 ± 7,86	0,001	7,5 ± 4,44	0,001
Usefulness	2,3 ± 3,02	0,004	6,3 ± 5,82	0,002

Wheres: Δ= Mean difference; *Not significant

The study results (Table 1) show that implementing the ISO/IEC 25010 standardized "*PSG Balita*" application positively impacts the quality of under-five nutritional status data. First, related to timeliness, there was an insignificant improvement in the second week (p= 0.082). Furthermore, in weeks 3rd to 4th, there was a significant improvement (p= 0.000), indicating that the implementation of the ISO/IEC 25010 standardized "*PSG Balita*" application succeeded in improving the adequacy of time in collecting data on the nutritional status of children under five.

Second, regarding the completeness, there was a significant improvement in week 2 (p= 0.000). This improvement continued in weeks 3rd to 4th, with the difference in mean ± deviation increasing positively (p= 0.000). Implementing the ISO/IEC 25010 standardized "*PSG Balita*" application improved the completeness of data on the nutritional status of toddlers. Third, related to the accuracy, there was also a significant improvement in week second (p = 0.001). However, there was a slight decrease in weeks 3rd to 4th, with a mean + deviation difference of 7.5 ± 4.44 (p= 0.001). Nevertheless, implementing the ISO/IEC 25010-standardized "*PSG Balita*" Application still succeeded in significantly improving the accuracy of under-five nutritional status data.

Fourth, there was a significant improvement between the second week and benefits (p= 0.004). Implementing the ISO/IEC 25010 standardized "*PSG Balita*" application successfully increased the advantages of gathering information on the nutritional status of children under five, as evidenced by the continuation of significant improvements in weeks three and four (p = 0.002). Implementing the ISO/IEC 25010 standardized "Toddler PSG" application has positively impacted the quality of under-five nutritional status data, particularly in timeliness, completeness, accuracy, and usefulness, according to the study's findings (Table 2).

This study has demonstrated that using the ISO/IEC 25010 standardized "*PSG Balita*" application improves the timeliness, completeness, accuracy, and usefulness of data on nutritional status in children under five. It is consistent with earlier research demonstrating how information technology can enhance the accuracy and productivity of health data collection.

DISCUSSION

Detecting growth disorders can be done with a growth chart based on the plotting results on the growth chart. However, given the rapid development of information and technology, several applications have been able to perform early detection of growth disorders[20]. Likewise, with this "*PSG Balita*" app, the module that has been integrated into the application can detect toddler growth disorders at each visit to the Posyandu[21]. Thus, growth disorders or the risk of overnutrition can be recognized early, so steps or preventive measures can be taken more quickly and appropriately before the problem becomes more severe for a toddler[22]. It can certainly be utilized more effectively by nutritionists and parents of children under five[23]. The "*PSG Balita*" application has answered nutrition problems at the community and household levels. However, this application has not been able to notify the analysis results on toddler growth[9]. Therefore, it remains a consideration to be able to update and develop it for the better.

Individual Assessment (IA) is like an electronically presented Growth Chart that can evaluate toddlers' growth and development based on age and gender. Five indicators are presented to interpret the growth and development of toddlers: WAZ, HAZ, WHZ, BAZ, MUACAZ, and HCAZ. Data storage is done on the Android smartphone memory, and this is because the application runs offline. Presentation of growth charts refers to the WHO-2005 standard.

Utilization of the "*PSG Balita*" to the Quality of Toddler Nutrition Status Data

This study's results align with previous research, which shows that information technology can improve the quality of health data[24]. In addition, other studies also show that

using information technology in the health sector can increase efficiency, accuracy, and user satisfaction[25]. Research by Lwin et al. shows that using mobile applications in health data collection can improve health workers' data quality and work efficiency[26]. Another study by Corsi et al., showed that information technology in nutrition data collection could improve data quality and reduce errors[27].

Implementing the ISO/IEC 25010 standardized "*PSG Balita*" application can also help improve the quality of under-five nutritional status data by improving data management, reducing data input errors, and accelerating data analysis and reporting. Previous research shows that using information technology in health data management can improve accuracy and speed in data processing[25]. In addition, the ISO/IEC 25010 standard is used as a reference for measuring software quality, including the "*PSG Balita*" application. This standard refers to quality criteria such as functionality, reliability, security, and ease of use. The "*PSG Balita*" application can ensure its quality meets the established standards by adopting this standard.

However, it should be noted that implementing information technology in health data management also has challenges, such as data security and privacy issues, lack of information technology skills among health workers, and high technology implementation costs[28]. In the context of health, using an ISO/IEC 25010 standardized "*PSG Balita*" application can ensure that the data collected on the nutritional status of toddlers is accurate, complete, and useful for health workers in conducting analyses and interventions. It can help improve the quality of child health services at the community level. In the context of Indonesia, improving the quality of data on the nutritional status of children under five is very important because the prevalence of malnutrition is still quite high there, such as stunting (21.6%), underweight (17.1%), and wasting (7.7%)[5].

Nutritionists at health centers must be maximized carrying out their main duties and roles in serving the community. Therefore, they need to conduct information- and technology-based training. In addition, training can aim to provide up-to-date information on nutritional status monitoring applications and increase work commitment through cognitive changes in individual nutritionists at health centers[23]. Using the ISO/IEC 25010 standardized "*PSG Balita*" application can have beneficial effects, enabling more precise and structured data collection. In addition, this application also allows users to collect information about the nutritional conditions of children under five years of age more quickly and easily, including nutritionists. Data entry errors during manual collection can also be reduced using "*PSG Balita*" due to features in the application such as data validation, easy-to-understand data display, and data entry that can be done using a cellphone camera[9].

This study was limited in terms of subjects and implementation time. The subjects consisted of only one group in the city of Banda Aceh, which should be able to represent nutritionists in Aceh Province. Furthermore, since the application was only implemented for one month, nutritionists may not use it sustainably.

CONCLUSION

After implementation by nutritionists, the "*PSG Balita*" application, which has ISO / IEC 25010 standards, has improved the quality of nutritional status data for toddlers in Banda Aceh City. Therefore, applying the "*PSG Balita*" application to nutritionists has improved the quality of nutritional status data, as measured by timeliness, completeness, accuracy, and usefulness.

Suggestions, encourage using the "*PSG Balita*" application to improve the quality of under-five nutritional status data throughout the Aceh Province. It can be done through socialization and training to nutritionists and integrated health post cadres at the village level. Strengthen monitoring and evaluation of the implementation of the under-five nutritional status monitoring program throughout Aceh Province by including data quality indicators as one of the evaluation variables. Therefore, it will help improve the accuracy and validity of the data.

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CONFLICTS OF INTEREST:

I declare that I have no conflicts of interest that could affect the research results or the information I present in this study to the reader. I have no affiliations or financial relationships with organizations, companies, or individuals that could influence or manipulate the research results or the information I present. I aim to provide users with accurate, objective, and useful information without favoring any party.

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Original Article

Application of Consent to Perform Medical Actions (Informed Consent) Doctors in Medical Services at Hospitals in Palu City

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ABSTRACT

This research aims to know how about the implementation Informed Consent is executed on medic al services in the hospitals in the city of Palu appropriated to rule of Minister of Health Number 290/MENKES/PER/III/2008, and to know the barriers which are faced in the implementation Informed Consent on medical services in teh hospitals in the city of Palu. This research is an empirical legal research or non doctrinal research. The techniques of collection of legal materials is done through observations, interviews, and distributing questionnaires to the respondents by purposive sampling method. All data collected were described and analyzed descriptively, by looking the data percentage collected, and showed in teh form of frequency distribution tabel, and then classified the muchly percentage from each respondents, ethical feasibility from the Research Ethics Commission of the Poltekkes of the Ministry of Health Palu Number 005.1/KEPK-KPK/1/2023 . The result showed that the implementation of Informed Consent on medical services in the hospitas in the city of Palu is appropriated to the Rule of minister of health Number 290/MENKES/PER/III/2008 about the lacks of its implementation, that come from medical nurses as well as from patients. Suggestion that given is to make team for applying informed consent in the hospital that consist of specialis surgery, specialis anaesthesi, psykology, and a standart operational.

Keywords: Informed Consent, Medical Services.

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INTRODUCTION

Development in the health sector encourages a socially and economically productive life. The definition of health is an action or a series of actions taken by the government and/or community to maintain and improve the level of public health through the prevention of disease, promotion of health, treatment of disease, and restoration of health. Law Number 36 of 2009 Concerning Health regulates this[1].

One of the actions in the health sector is medical action, where this action is usually carried out by a person who works as a doctor. When a doctor performs an action on a patient, it is not uncommon to take an action which is called a "medical error", although this term cannot be put directly into a legal context, such as an error, because it can be interpreted as (legal) negligence. Meanwhile, according to J. Guwandi, "medical error" is not always associated with sanctions, medical error can be forgiven, even though according to legal standards it is considered severe [2,3].

Medical law recognizes and uses the term "malpractice/medical negligence"; but this is not the same as the term medical error, because one of the benchmarks is the result that arises from the actions of a person. In the medical field, it was previously believed that the consequences of medical action could be separated from the doctor-patient relationship; it's just that now that understanding has been abandoned. Nowadays, there is an understanding that there is a connection with the

way in which health services are provided and the medical treatment is given because it will affect the acceptance or consequences that arise [4,5].

Recent publications related to informed consent in health services show increasing concern about the importance of informed consent[6–9]. Informed consent has been the subject of several analyses from the perspectives of health services, disease states, and the medical community[10–15]. Informed consent is a part that every doctor must carry out correctly, clearly and precisely, because this is a legal protection tool for both doctors and patients, so that if unwanted things happen during the procedure at least the patient has received an explanation correctly and properly and he agreed by signing the informed consent [16].

In the Indonesian Medical Council Regulations concerning guidelines for upholding the discipline of the medical profession in 2011 it is stated that every doctor in carrying out medical actions must obtain approval from the patient or next of kin or guardian or guardian. Philosophical foundation. Informed consent is required because: (1) Demands from patient's autonomy; (2) Protecting the patient's status as a human being; (3) Prevent coercion and deception; (4) Encourage self-criticism of doctors; (5) Assisting rational processes in making decisions (process rational decision-making); (6) Educating the community [5,17,18].

In connection with the implementation of informed consent, it should also be noted that there are 21 expert doctors at Anutapura General Hospital with an average number of operations per month in 2013 of 157 patients; and expert doctors at Undata Hospital totaling 33 people with an average number of operations per month in 2013 of 251 patients.

Based on the description above, the problems to be discussed in this study are as follows: (1) How is the application of informed consent in hospital health services in the city of Palu according to Permenkes 290/MENKES/PER/III/2008. (2) What are the obstacles encountered in applying informed consent to hospital services in Palu City.

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METHOD

Finding hypotheses regarding the incidence and operation of law in society is the goal of this research, which takes the form of empirical studies. This research was carried out at Anutapura General Hospital and Undata Hospital which had applied informed consent in Palu City. The implementation of research i was for 6 months, namely January - July 2014. The population in this study all characteristics related to research variables, while the population unit was specialist doctors at the Undata Regional General Hospital Palu and Anutapura General Hospital Palu, totaling 54 people (21 specialist doctors from Anutapura General Hospital and 33 specialist doctors from Undata Hospital), nurses accompanying 20 specialist doctors and 24 patients. The sample in this study were 20 specialist doctors who performed surgery and 20 assistant nurses, as well as 24 patients at Undata General Hospital Palu and Anutapura General Hospital Palu. The number of this sample already represents the number of specialist doctors in the two hospitals. The sampling technique is purposive sampling. Data types and sources. The interview method used in this study was a structured interview where the researcher prepared questions and asked the respondents. In this study, the authors conducted direct interviews with doctors, patients and nurses. The results that have been obtained are collected, analyzed. ethical feasibility from the Research Ethics Commission of the Poltekkes of the Ministry of Health Palu Number 005.1/KEPK-KPK/1/2023.

RESULTS

Based on interviews with informants, there are certain limitations related to the capacity of the patient and/or patient's family who are eligible to receive and give consent to medical action. Not all patients may give statements, either agree or disagree. The conditions for a patient who may give a statement are:

1. The patient is an adult: here there are still differences of opinion about the age limit for adulthood, but in general a limit of 21 years can be used. Patients who are under this age limit but are married include the criteria for adult patients.
2. The patient is conscious: This implies that the patient is not unconscious, in a coma, or has his consciousness disturbed due to the influence of drugs, psychological pressure,

or other things. Means, patients must be able to communicate naturally and smoothly.

3. The patient is in good sense: So the person most entitled to determine and give a statement of consent to a medical action plan is the patient himself, if he meets the 3 criteria above, not his parents, children, husband/wife, or anyone else. However, if the patient does not meet the 3 criteria mentioned above, he is not entitled to determine and express his approval of the medical action plan that will be carried out on him. In cases like this, the patient's rights will be represented by the family guardian or legal guardian. For example, if the patient is still a child, then those who have the right to give consent are their parents, or their uncle/aunt, or other legal guardian order. If the patient is married, but in a state of unconsciousness or loss of common sense, then the husband/wife is the most entitled to express consent if he/she agrees.
4. Rights of the patient's husband/wife: For several types of medical actions related to couple life as husband and wife, the statement of consent to the medical action plan must involve the consent of the patient's husband/wife if the husband/wife is available or can be contacted for this purpose. In this case, of course the husband/wife must also meet the criteria of "conscious and sane". Several types of medical action, for example actions on the reproductive organs, family planning, and medical actions that can affect the sexual or reproductive abilities of these patients.
5. In an emergency: The process of providing information and requesting approval for a medical action plan may not be carried out by a doctor if the patient's situation is in an emergency. In this condition, the doctor will prioritize actions to save the patient's life. This life-saving procedure must still be carried out in accordance with applicable standards of medical services/procedures accompanied by upholding professionalism. After the critical period has passed and the patient is able to communicate, the patient has the right to receive complete information about the medical action he has experienced.
6. Does not imply impunity: The implementation of this informed consent simply states that the patient (and/or their legal guardian) has agreed to a plan of medical action to be carried out. The implementation of the medical procedure itself still has to comply with medical professional standards. Any negligence, accident, or other form of error that arises in carrying out the medical action can still cause the patient to feel dissatisfied and has the potential to file a lawsuit. Informed consent does state that the patient already understands and is ready to accept the risks in accordance with what has been previously informed. However, this does not mean that the patient is willing to accept any risks and losses that will arise, let alone state that the patient will not claim any losses that may arise. Informed consent does not make a doctor immune to the law for events caused by negligence in carrying out medical procedures.
7. Related to invasive actions: a guardian is needed (a person who according to law replaces another person who is not yet an adult to represent in carrying out legal actions, or a person who according to law replaces the position of a parent); landlady (a person who is obliged to supervise and take responsibility for the personal life of other people, for example the leader of a hostel from a child of nomads, the head of an RT from an immature RT helper).

Based on interviews with patients and doctors it can be concluded that informed consent has several purposes, namely:

1. Protect users of medical services (patients) by law from all medical actions that are carried out without their knowledge, as well as arbitrary actions of medical service providers, malpractice actions that are contrary to patient rights and medical professional standards, as well as misuse of sophisticated equipment that requires a fee tall;
2. Providing legal protection for medical practitioners from unreasonable patient demands, as well as the consequences of unexpected medical procedures, for example against risks of treatment that are unavoidable even though doctors have acted in accordance with medical professional standards.

DISCUSSION

Juridically, Article 1 number 7 Permenkes Number 290 of 2008 confirms that

a competent patient is an adult patient or not a child according to laws and regulations or has/has been married, is not disturbed by physical awareness, is able to communicate normally, does not experience developmental delays (retarded) mentally and do not experience mental illness so that they are able to make decisions freely. Furthermore, Article 7 paragraph (2) of the Minister of Health Regulation Number 290 of 2008 provides other limitations as follows: in the case of a patient who is a child or an unconscious person, an explanation is given to his family or the person accompanying him [19].

"It is a delicate matter to decide whether a patient has more than the minimum acceptable level of understanding, in order to claim that informed consent has been obtained. In my opinion, the threshold is that individuals should feel they are able to make a free decision about study participation. For patients to make choices that are as autonomous as possible, given the circumstances, in an emergency such as acute myocardial infarction, they should be given information that focuses on a few essential aspects of the study, including their right to decline participation. When patients have more severe symptoms, the following choices are faced: either no research is conducted on these kinds of patients; only a low level of understanding is considered sufficient for moral or legal consent in this situation; or patients are included in research without their immediate consent" [20].

The opinions above indicate how complicated it is to decide whether a patient has more than the minimum acceptable level of understanding, to claim that informed consent has been understood. There must be certain standards to determine the level of patient understanding. For patients to make the best possible autonomous choices, it is necessary to know their own situation, for example in an emergency such as acute myocardial infarction, they must be provided with information that focuses on the important aspects of it, including their right to refuse medical action. When patients have more severe symptoms, the choice of medical action needs to be based on the type of patient; understanding at a low level is generally considered sufficient for a moral or legal agreement in such situations [21].

The researcher is of the view that the alternative options proposed by law without including imperative clauses have caused the application of informed consent to be adjusted based on the patient's condition and the doctor's assessment. This will potentially lead to medical disputes in the future if the results obtained in the treatment are not as expected. In other words, there needs to be normative firmness that provides limitations on the act of informed consent [22].

Can: Any person who is capable of giving consent or, in the event that the person is not capable of giving consent, by his or her legal representative, must freely decide to participate in a clinical trial. If the person concerned is unable to write, oral consent in the presence of at least one witness may be given in lieu of written consent[23].

If examined, the conditions put forward by the Minister of Health above regarding the form of informed consent are very restrictive and limitative with the main aim of saving the patient's life. Researchers are of the view that although the form of informed consent is given an alternative according to the patient's condition, it is necessary to emphasize the written character of the informed consent so that it has the strength of evidence that binds doctors and patients.

Researchers also contend that even an oral agreement is acceptable because informed consent is essentially a process of communication between doctors and patients regarding an agreement on a medical action that the doctor will conduct for the patient (there is a full explanation by the doctor). The written informed consent form must be signed in order to reaffirm the previous understanding. A thorough explanation serves to empower the patient to make an informed decision based on his own preferences. As a result, the patient also has the option of declining the suggested medical treatment. Additionally, patients have the right to get a second opinion from the medical professional who is treating them.

Although in its implementation informed consent has received written legitimacy, such agreement cannot be used as an excuse to justify deviant medical treatment. Consent (informed consent) of the patient or his family does not waive legal risks for the emergence of unwanted consequences in terms of medical treatment that is correct and not deviant.

Even though there is such an agreement that if medical treatment is carried out incorrectly to the point of causing unwanted

consequences, the doctor is also still burdened with responsibility for the consequences. Informed consent actually has a dual function. For doctors, informed consent can create a sense of security in carrying out medical actions on patients, as well as being used as self-defense against all possible claims or lawsuits from patients or their families against the risks posed. Whereas for patients, informed consent is a form of respect for their rights by doctors and can be used as a justification for suing or suing doctors as a result of deviations from the doctor's practice from the intention of giving a health service approval letter [22].

It should be noted that the discussion regarding the form of informed consent is closely related to the agreement created between the doctor and the patient. As previously known, in the context of an effort to recover, patients will visit both private doctors and hospitals. In this case, it can be distinguished between patients who have actually entered into an agreement, and patients who have not entered into an agreement. This distinction is made clear in distinguishing from the existence of the agreement, which imposes rights and obligations on the parties entering into an agreement [24].

Based on the results of the study it was known that as many as 3 patients (12.5%) had refused because the information about the medical procedure given was not understood. Meanwhile, from the doctor's point of view, as many as 2 doctors (7.69%) had experienced refusal to take medical action. The researcher is of the opinion that the consent to medical action is strongly supported by the completeness of detailed information regarding all the prerequisites in Article 8 of the Minister of Health Regulation Number 290 of 2008 [19].

Related to this, as many as 19 patients (79.1%) stated that the information obtained was poorly understood because many used medical languages that was foreign to the patient or patient's family; while 100% of doctors stated that the information provided was completely clear. This indicates that it is necessary to establish a standardization of information delivery that can be fully understood by patients. *It is presumed that the person signing the consent form has read and fully understands what it contains. Since there is no recognized way to gauge how much a person understands the provided information, it is very difficult to determine whether this is actually the case. As a result, it is reasonable to suppose that certain misunderstandings do arise (USM Website). Many people sign the consent form without fully understanding what they are doing*[23].

It is assumed that the individual who signs the consent form does so with full understanding of what the consent form says. However, it is very difficult to evaluate because no method has been devised to measure the level of understanding that patients have little knowledge of the information provided. Thus, it can be assumed that there is a degree of misunderstanding that occurs. Many people sign consent forms without being fully aware of what they are signing. Researchers argue that explanations are given in language and words that can be understood by patients according to their level of education and 'maturity', as well as their emotional situation. The doctor must try to check whether his explanation is understood and accepted by the patient. If not, the doctor must repeat the description again until the patient understands correctly. Doctors should not try to influence or direct patients to accept and agree to medical treatment that doctors actually want [25].

Judging from the theory of legal protection, the government has actually attempted to provide protection for legal subjects in the form of legal instruments, both preventive and repressive in nature, especially regarding the implementation of informed consent. In other words, the government applies the function of law, namely the concept in which law can provide justice, order, certainty, benefit and peace.

However, when viewed from the theory of the legal system, there are still many fundamental weaknesses related to the implementation of informed consent, which include weaknesses in terms of legal structure (quality of medical services), legal substance (not yet strictly regulated), and legal culture (level of public awareness and knowledge less about informed consent).

CONCLUSION

Based on the results of the research and discussion, several conclusions were obtained. The application of informed consent in health services in Palu City Hospitals is in accordance with the Minister of Health Regulation Number 290/MENKES/PER/III/2008 concerning.

Approval for Medical Practice, but there are still certain deficiencies in its application, both from health workers as well as from patients. The obstacles encountered in the application of informed consent to hospital services in Palu City consist of the competency aspect of health services where there are still nurses who help to provide information regarding medical actions to be carried out by doctors and the inability of patients or their families to understand the medical information provided. given, also the unit has not been formed and which consists of a special team for the implementation of informed consent

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We certify that there are no conflicts of interest in the conduct of the study, the creation of the articles, or the analysis of the study's findings.

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Original Article

The Effect of Deppamil Dangke in Increasung Upper Arm Circumference and Haemoglobin Levels in Pregnant Women with Chronic Energy Deficiency

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ABSTRACT

The prevalence of chronic energy deficiency in pregnant women in Indonesia is relatively high, requiring some actions to be taken to lower it. This study aims to analyze the roles of deppamil dangke administration in increasing upper arm circumference and haemoglobin levels in pregnant women with chronic energy deficiency (CED) in Enrekang Regency. This research is of the quasi-experimental type with a non-equivalent control group design. The population consisted of 28 CED pregnant women with gestational age >20 weeks using exhaustive sampling technique, there were two test groups involved, namely, an intervention group and a control group, each consisting of 14 samples. The intervention group was given deppamil dangke 6 pieces/day (60 gr) plus government food supplement while the control group was given government food supplement 3 pieces/day (100 gr) with an intervention duration of 18 weeks. UAC and haemoglobin levels were measured before and after the intervention. The results of this study indicated that there was an increase in the size of UAC in both groups but not significantly different as both the intervention and control groups experienced increases in upper arm circumference with the same p value (p = 0.001). But it was significant in increasing the hemoglobin level of CED pregnant women because the intervention group experienced a significant increase with a p value of 0.020 while the control group had a p value of 0.506. Future.

Keywords: Deppamil Dangke, Upper Arm Circumference, Haemoglobin Levels, Pregnant Women with Chronic Energy Deficiency.

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INTRODUCTION

The nutritional problems of pregnant women with chronic energy deficiency (CED) in Indonesia are still highly prevalent[1]. Chronic energy deficiency is a condition of malnutrition that has lasted for a long time, thereby resulting in non-fulfilment of the nutritional needs of pregnant women[2]. A body mass index (BMI) below 18.5 cm and upper arm circumference (UAC) below 23.5 cm are signs of CED in pregnant women[3]. UAC is not an indicator of SEZ but can be used as an indicator of SEZ risk[4]. Research shows that there is a relationship between the size of the upper arm circumference and the baby's birth weight[5]. UAC describes how a person consumes energy and protein in the long term[6]. CED causes pregnant women to be unable to meet the needs of their foetuses and their own due to increased blood volume need for growth[7].

Other studies have shown that there is a

relationship between CED pregnant women and the incidence of anemia[8]. And there are still pregnant women who do not adhere to consuming Fe tablets[9]. The lack of macro- and micronutrients in the womb can affect the condition of the baby before birth[10]. Monitoring pregnant women with CED through education/socialization is important to reduce the prevalence of CED[11]. In the context of Indonesia, one way to overcome CED in pregnant women is to provide food supplements that contain energy and iron for pregnant women[12]. Local wisdom can be incorporated in making innovations in processing food products, which can be used as an alternative to address existing nutritional problems[13].

Enrekang Regency is a producer of animal food products from cow/buffalo milk. One of such products is dangke. It has been reported by previous research that dangke is a superior local food product from Enrekang Regency that contains high nutrients important for the body[14]. Dangke is made using papaya sap and fermented milk starter culture inoculation technology with isolated Lactococcus lactis in a banana leaf wrap[15]. Dangke contains nutrients such as fat, protein, and carbohydrate, as well as water, and it can be used as a basic ingredient for various side dishes, such as grilled dangke, pepes, and even for various cakes and crackers[13]. In an examination by the Makassar Health Laboratory Center in 2022 dangke was reported to contain iron (Fe) at 0.86 µg/g, calcium at 1,281.37 µg/g, carbohydrate at 0.74%, and glucose 0.82%. In another study, it was reported to contain carbohydrate at 19.36%, lactic acid at 0.48%, protein at 24.54%, water at 44.93%, and fat at 8.03% at pH 4.8[14]. Previous research revealed that giving dangke crackers at 100 g/day to anemic pregnant women for 12 weeks could increase haemoglobin levels[16].

Providing supplemental food is one of the strategies to address nutritional problems in Indonesia[17]. Considering that dangke is rich in nutrients needed by pregnant women, it can be processed as a basic ingredient into a supplementary food product in the form of pregnancy cookies called "deppamil dangke", which means cookies for pregnant women in the local language spoken in Enrekang Regency.
Deppamil dangke had gone through an organoleptic test at a public health center in Makassar on 30 pregnant female panelists. Using a human sensory approach, the test was conducted to assess taste, texture, color, and aroma to determine the quality of this product. The results of an analysis using SPSS (Statistical Package for the Social Sciences) show that most pregnant women liked the taste, aroma, texture, and color of deppamil dangke. Thus, it can be concluded that deppamil dangke is to the liking of pregnant women.

This study aims to analyze the roles of deppamil dangke administration in increasing upper arm circumference and haemoglobin levels in pregnant women with chronic energy deficiency (CED) in Enrekang Regency.

METHOD

This research is of the quantitative, *quasi-experimental* type with a *non-equivalent* control group design. It was carried out in Enrekang Regency for 18 weeks from November 2022 to March 2023. The sample was taken by *exhaustive sampling* technique, where the population and sample were the same. The sample consisted of pregnant women with CED and gestational ages of > 20 weeks in the working area of the Public Health Center of Enrekang Regency. The sample of 28 respondents was divided into two groups, namely, an intervention groups and a control group, each consisting of 14 respondents. The intervention group was given 6 pieces/day (60 gr) of *deppamil dangke* plus supplementary food from the government until delivery, while the control group only consumed government-provided supplementary food (100 gr/day) *with an intervention duration of 18 weeks*. UAC and haemoglobin levels were measured before and after intervention. The data were analyzed with the *Wilcoxon* and *Mann-Whitney* tests to see if the intervention had an effect.

The ingredients used were *dangke*, an egg yolk, margarine, palm sugar, cocoa powder, chocolate chips, and wheat flour. The equipment used included an oven, oven trays, baking sheets, a spatula, a digital scale, a cheese grater, and cake molds. The making of the cookies began with pulverizing 100 grams of *dangke* using a cheese grater, followed by mixing it with 1 egg yolk, 100 grams of margarine, 50 grams of palm sugar, 4 grams of cocoa powder until everything was well-mixed. One hundred and seventy-five grams of flour was added then. The dough produced was kneaded well, and then 20 grams of chocolate chips was added to it. The researcher left the

dough for a while to heat an oven to 150 °C for 10 minutes. To do so, the heating system was adjusted up and down. While waiting for the oven to be heated to the desired temperature, the dough was molded into some smaller pieces on a baking tray with a baking sheet separating the dough from the surface of the baking tray. The molded pieces of dough was then baked at 150 °C for 15 minutes. This recipe has been patented by the Ministry of Law and Human Rights with an IPR certificate in 2022. This research has received ethical approval by the commission ethics of Muhammadiyah Univercity health research in Makassar with Number 210/UM.PKE/XI/44/2022.

Table 1. Distribution of Respondent Characteristics.

Respondent Characteristics		Research Respondent Groups				
		Intervention		Control		p-value
		n	%	n	%	
Age	17 - 26 years	7	50.0	0	0	0.008
	27 - 36 years	6	42.9	13	92.9	
	37 - 46 years	1	7.1	1	7.1	
Gestational Age	20 - 24 weeks	6	42.9	10	71.4	0.252
	≥ 25 weeks	8	57.1	4	28.6	
Parity	P 1	6	42.9	2	14.3	0.077
	P 2	5	35.7	6	42.9	
	P 3	2	14.3	1	7.1	
	P 4	0	0.0	5	35.7	
	P 5	1	7.1	0	0.0	
Occupation	Teacher	1	7.1	3	21.4	0.331
	Honorary	0	0.0	1	7.1	
	Housewife	5	35.7	6	42.9	
	Farmer	8	57.1	4	28.6	

**Chi-Square test and Fisher exact test (table 2x2)*

Table 1 shows the demographic characteristics of respondents in the intervention and control groups. In terms of age, there was a difference between the intervention and control groups, where the average age of the intervention group was 26.42 ± 6.29 years and the average age of the control group was 32.14 ± 4.36 years. In the control group, the majority of respondents were in the 27–36 years age category (13 people, 92.9%), while in the intervention group, the majority were in the 17–26 years age group (7 people, 50.0%). In terms of gestational age, the control group was dominated by those with gestational ages of 20–24 weeks (71.4%) and the intervention group was dominated by those with gestational ages of ≥ 25 weeks (57.1%). However, there was no difference in gestational age between the intervention and control groups (p = 0.252). In terms of parity, there was no significant difference between the control and intervention groups (p = 0.077). While the intervention group was dominated by para 1 (6 people, 42.9%), the control group was dominated by para 2 (6 people, 42.9%). Likewise, in terms of job, there was no difference between the intervention and control groups either (p = 0.331). The largest proportion of the intervention group comprised farmers (57.1%), while the largest proportion of the control group did housewives (42.9%).

Table 2. Distribution of Respondent Characteristics According to Energy Intake.

Energy Intake		Research Respondent Group				
		Intervention		Control		p-value
		n	%	n	%	
Pre	<2527 kcal	13	92.9	12	85.7	1.000
	≥2527 kcal	1	7.1	2	14.3	
Post	<2527 kcal	0	0	7	50.0	0.006
	≥2527 kcal	14	100	7	50.0	

**Chi-Square test and Fisher exact test (table 2x2)*

Table 2 shows the distribution of respondents by food intake, where there was no difference between the intervention and control groups prior to intervention (p = 1,000), with both groups being dominated by energy intake of < 2,527 kcal. However, after intervention, 100% of the respondents in the intervention group had an increase in energy intake (> 2,527 kcal), while in the control group only 50% did. There was a significant difference between both groups after intervention (p = 0.006).

Table 3. Changes in the Upper Arm Circumference (UAC) of the Intervention and Control Groups before and after Intervention.

Variables	n	Mean ± SD		Δ (Post - Pre)	p-value
		Pre	Post		
Upper Arm Circumference (UAC)					
Intervention	14	21.71 ± 0.91	24.10 ± 0.90	2.39 ± 1.09	0.001[a]
Control	14	21.46 ± 1.39	23.77 ± 24.10	2.30 ± 1.38	0.001[a]
p-value	14	0.745[b]	0.170[b]	0.627[b]	

[a]*Wilcoxon Test*
[b]*Mann-Whitney U test*

Table 3 shows that, before intervention, there was no difference in UAC between the intervention and control groups (p = 0.745) with an average values of 21.71 ± 0.91 cm and 21.46 ± 1.39 cm, respectively. There was no difference in UAC post-intervention between the intervention and control groups (p = 0.170) either, with average values of 24.10 ± 0.90 cm and 23.77 ± 24.10 cm, respectively. The differences between the posttest and pretest average values of UAC in the intervention and control groups did not appear to be different, where both groups experienced an increase in value with a p-value of 0.001 each.

Tabel 4. Changes in the and Haemoglobin Levels of the Intervention and Control Groups before and after Intervention.

Variables	n	Mean ± SD		Δ (Post - Pre)	p-value
		Pre	Post		
Haemoglobin Levels					
Intervention	14	13.00 ± 0.87	14.39 ± 1.52	1.38 ± 1.72	0.020[a]
Control	14	11.40 ± 1.25	11.74 ± 1.62	0.24 ± 1.04	0.506[a]
p-value	14	0.001[b]	0.001[b]	0.029[b]	

[a]*Wilcoxon Test*
[b]*Mann-Whitney U test*

Table 4. show that, there was no difference in haemoglobin levels between the intervention and control groups, the intervention and control groups were significantly different prior to the intervention, with values of 13.00 ± 0.87 gr% and 11.40 ± 1.25 gr%, respectively (p = 0.001). After intervention, the two groups experienced increases in Hb. The average value of the intervention group was greater after treatment (14.39 ± 1.52 gr%), with an increase of 1.38 ± 1.72 gr%, and so was the average value of the control group (11.74 ± 1.62 gr%), with an increase of 0.24 ± 1.04 gr% (p-values < 0.001 and 0.029, respectively). In respect to haemoglobin levels, the intervention group experienced a significant change after intervention (p = 0.020), but the control group did not (p = 0.506).

DISCUSSION

The Effect of Giving Deppamil Dangke on Increasing the Upper Arm Circumference.

In pregnant women, UAC describes the state of long-term energy and protein consumption. Chronic energy deficiency prevents pregnant women from having adequate nutrient reserves for fetal growth and development[6]. Pregnant women with CED inadequately consume macronutrients such as energy, carbohydrate, protein and fat[18]. However, UAC is not an indicator of SEZ because it cannot change in a short period of time. Therefore, it cannot be used as a benchmark to describe a person's condition at a particular time. However, its value can be used as an indicator of CED risk[4].

Although none of the two groups experienced a statistically significant increase, the administration of *deppamil dangke* and government-provided complementary food had the same effect in increasing UAC due to the improved nutrition taken by pregnant women who experienced CED. This is evidenced by the increase in food intake after intervention among pregnant women who consumed either *deppamil dangke* or government-provided complementary food, which resulted in the increase in their upper arm circumference to the normal limits.

From the data on the distribution of respondents' food intake, it can be seen that more respondents in the intervention group than in the control group had a food intake of < 2,527 kcal. However, the post-intervention results obtained show that everyone in the intervention group experienced nutritional improvements. The control group also had an increase in nutrition intake, but not in the same distribution of the intervention group. Only 50% of the control group had a food intake of > 2,527 kcal post-intervention. This finding mirrors that of a study which found a significant difference in UAC among pregnant women with CED after the administration of government-provided supplementary food[19]. A small number of pregnant women who received the intervention did not reach the normal UAC category, but none of them experienced a reduction in UAC. This might be due to women not regularly taking additional food or them experiencing boredom. Their intake of basic nutrition in terms of both quantity and quality did not meet the standards of balanced nutritional intake. Otherwise, the women were pursuing unhealthy lifestyles[19].

Based on the data gained in the study, the researcher assumed that the occurrence of a stagnated measure of UAC in some of the pregnant women with CED in the intervention group was influenced by the age of the pregnant women. In the intervention group, there were seven people (50%) who were aged 17–26 years and one person (7.1%) who as aged 37–46 years, indicating that several respondents were under 20 years old and one was over 35 years old. The ages below 20 years and above 35 years are risky for pregnancy. The reproductive organs of younger women are not biologically ready for conception. Additionally, younger women have yet to reach maturity psychologically. As a result, the nutrition required by the pregnant women's bodies and the foetuses is unbalanced, which could also lead to malnutrition. On the other hand, the body of a woman older than 35 years needs more energy because the body's system is starting to deteriorate[7].

Pregnant women with chronic malnutrition are advised to consume protein, especially from animal sources[20]. The consumption of *deppamil dangke*, which is high in protein, may not be followed by the intake of other protein-high foods due to the demographic and occupational conditions of the respondents. On average, the respondents in the intervention group were farmers who consumed more greens than meat, fish, or chicken. Enrekang Regency is famous for its agricultural vegetable produce but does not have a sea area, so it derives animal protein from the outside. Chicken and meat are only on the menu on certain occasions, so that the daily diet is dominated by vegetable protein only.

The location where the research was conducted was also diversified. The control group resided in downtown Enrekang, and the individuals within the group, who were dominated by housewives, had an easy access to markets and varied food, which enabled them to increase the intake of more diverse and abundant foods. As found in a research study in Afghanistan, the types of foods consumed in rural and urban areas are clearly different, where urban people tend to have a higher interest in what they consume than do those living in rural areas[21]. Therefore, even though no intervention was given, the control group still experienced nutritional improvements due to their more varied food intake. Parity might also have an effect, considering that the intervention group was dominated by primigravida (42.9%). In the control group, primigravida only accounted for 14.3%. Pregnant women who are pregnant for the first time may have different knowledge than multigravida. Primigravida usually have a higher degree of self-protectiveness and are generally afraid to take varied foods. They may also lack of the experience and understanding to maintain pregnancy[7]. In addition, high parity indicates a higher number of family members. High-parity households usually reduce the consumption of fish, meat, eggs, and milk, which are relatively expensive sources of animal protein[22].

The Effect of Giving *Deppamil Dangke* in Increasing Haemoglobin Levels.

In pregnant women, CED is closely related to the incidence of anemia[8]. where the former is a risk factor for the latter[23]. A prolonged deficiency or inadequate intake of macronutrient and micronutrient will lead to anemia[18;24]. The results of the analysis of changes in hemoglobin levels show that all pregnant women with CED experienced an increase in hemoglobin levels, but the increase was more significant in the intervention group than in the control group. This finding is in line with another study on *dangke*, which found a significant increase in haemoglobin levels among anemic pregnant women[16].

In pregnancy, women experience some physiological changes, including increases in fluid volume and red blood cells as well as decreases in protein nutrition in circulating blood and in micronutrients[25]. The needs of pregnant women increase, especially at the end of the second trimester, when a hemodilution process occurs. This hemodilution process causes an increase in blood volume, which affects the hemoglobin concentration[26]. A deficiency in the amount of hemoglobin results in an obstructed supply of nutrients and oxygen to the foetus, resulting in impaired growth and development of the foetus[25].

One of the macronutrients that plays an important role in increasing hemoglobin levels is protein. Protein is useful as a building and regulatory substance which also has a role in transporting iron to the spinal cord for the formation of red blood cells[27]. Protein also helps the absorption of vitamin C to support the process of red blood cell synthesis[18]. Protein is the main component of globin, which plays a role in the transportation and storage of iron[28]. The absorption of iron in the small intestine is assisted by the proteins transferrin and ferritin[29]. This study is in line with a research finding that there is a significant relationship between protein intake and the incidence of anemia, where the lower the protein intake the lower the hemoglobin level[30].

In addition to protein, iron (Fe) is a vital element that is needed for the formation of haemoglobin[31]. Haemoglobin functions to transport oxygen[24]. In absorbing iron, vitamin C, which functions in iron metabolism, is needed[32]. It has been found that giving Fe to women during pregnancy is not effective enough in increasing Hb levels[33]. So it is still necessary to consume other sources of iron[34]. *Dangke*, a food ingredient sourced from processed cow/buffalo milk, contains high protein and iron[13].

CONCLUSION

From the results of the data analysis conducted in this study, it is concluded that there was an increase in the size of UAC in both groups but not significantly different as both the intervention and control groups experienced increases in upper arm circumference with the same p value. Meanwhile, with respect to haemoglobin levels, the administration of deppamil dangke led to a significant increase in the intervention group, with a p value of 0.020. Future researchers are advised to make other preparations from dangke as highly nutritious local food.

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CONFLICTS OF INTEREST:
The authors declare no conflict of interest.

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Original Article

Relationship Between Diabetes Distress and Quality of Life Among Patients with Type II Diabetes Mellitus

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ABSTRACT

Diabetes Mellitus or commonly abbreviated as DM is a chronic disease commonly found in Indonesia, especially among people in urban areas. It is known to be incurable during the sufferer's life span, so it is called a lifelong disease. Long-term Diabetes Mellitus has a psychological impact on the quality of life of patients. This study aims to determine the relationship between diabetes distress and quality of life among patients with type II Diabetes Mellitus in the work area of Tamanlanrea Jaya Community Health Center, Makassar. This was a quantitative analytical study with a cross sectional design. Study samples were selected using consecutive sampling technique which obtained a total sample of 82 patients. Data were collected using a questionnaire and analyzed using the Chi-square test. The results showed that there was a relationship between diabetes distress and quality of life among patients with type II diabetes mellitus with a ρ value of 0.012. It can be concluded that there was a relationship between diabetes distress and quality of life among patients with type II diabetes mellitus in the work area of Tamalanrea Jaya CHC, Makassar. Future researchers are recommended to involve a larger size of samples to determine additional elements that have an impact on the quality of life among people with diabetes mellitus.

Keywords: Diabetes Mellitus, Diabetes Distress, Quality of Life.

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INTRODUCTION

One of the non-communicable diseases with a very high incidence and prevalence worldwide is diabetes mellitus. Based on data derived from the World Health Organization (WHO), there were 422 million people in the world suffering from diabetes mellitus or an increase of around 8.5% among the adult population and it was estimated that there were 2.2 million deaths due to diabetes mellitus that occurs before the age of 70 years, especially in countries with low and middle economic status[1].

Based on data derived from the Organization of the International Diabetes Federation (IDF) in 2019, diabetes sufferers are predicted to continue to increase to reach 578 million in 2030 and 700 million in 2045 with 463 million (9.3%) people aged 20-79 and 111.2 million (19.9%) people aged 65-79 in the world. Indonesia is ranked third in the number of patients

with DM in the Asian Region with a prevalence of 11.3% after China (116.4 million) and India (77 million). Meanwhile in the world, Indonesia is ranked 7th among 10 countries with the highest number of patients with DM, namely 10.7 million people. Indonesia is the only country in Southeast Asia on the list, so it can be estimated that Indonesia's contribution to the prevalence of diabetes cases in Southeast Asia will continue to increase[2].

In South Sulawesi, the prevalence of diabetes diagnosed by a doctor was 1.6 percent. The highest prevalence of diabetes diagnosed by doctors was found in Pinrang Regency (2.8%), Makassar City (2.5%), North Toraja Regency (2.3%) and Palopo City (2.1%). Based on data derived from Non-communicable Disease Surveillance in the P2PL Field of the South Sulawesi Provincial Health Office in 2017, there were 27,470 new cases of Diabetes Mellitus, 66,780 old cases with 747 deaths[3].

Furthermore, based on data obtained from the Tamalanrea Jaya CHC, Makassar, the number of visitors with DM in 2019 was 218 patients, in 2020 it was 128 patients, and in 2021 it was 483 patients. According to a study conducted by Rahmi et al., (2019), the majority of diabetes mellitus patients experienced diabetes distress by 73.3% among female patients and 61.4% among male patients. As many as 52.5% of patients with type 2 diabetes mellitus had diabetes distress accompanied by an increase in HbA1c levels. The finding of another study revealed that 18.0% of patients with diabetes mellitus had diabetes distress accompanied by an increase in HbA1c values compared to 69.2% of 240 patients with type 2 diabetes experienced diabetes distress[4].

A study conducted by (Muntamah & Wulansari, 2022) revealed that the lower a person's stress, the closer the blood glucose levels of type 2 DM patients to normal level[5]. Diabetes distress will result in physiological and psychological changes. Physiologically, distress will activate the Hypothalamic Pituitary Adrenalaxis (HPAaxis) to increase the production of inflammatory cytokines which will interact with pancreatic cell function thereby inducing insulin resistance and triggering an increase in glucose levels. In addition, the psychological burden caused by poor glycemic control can make patients less willing and motivated to adopt healthy habits and achieve the best health outcomes. In turn, poor glycemic control, increased psychological distress, and poor quality of life can occur[6].

This study aims to determine the relationship between diabetes distress and quality of life among patients with type II Diabetes Mellitus in the work area of Tamanlanrea Jaya Community Health Center, Makassar.

METHOD

This was a quantitative analytical study with a cross sectional approach. This study was conducted at Tamalanrea Jaya CHC, Makassar in November 2021. The population in this study involved all patients with Diabetes Mellitus in the work area of Tamalanrea Jaya CHC, Makassar from January to September 2021, as many as 483 people. Study samples were selected using consecutive sampling technique which obtained a total sample of 82 patients.

The assessment instrument applied in this study was an adopted from the Diabetes Quality of Life (DQOL) standard scale and the diabetes distress Scale (DDS) Questionnaire that measure QoL and the level of diabetes distress in DM 2 patients. To apply the assessment instrument based on the characteristics of the study samples, the researchers performed adaptation in terms of language, content, form and number of answer choices. Based on the form of answer choices, DQOL used the Likert model scale. The questionnaire for the dependent variable on quality of life consisted of 22 questions, wherein number 1-4 involved questions on physical health, number 6-13 involved questions on psychological health, number 14-17 involved questions on social relations, number 18-22 involved questions on the environment. The questions had the criteria of 1 for never, 2 for Sometimes, 3 for Often, and 4 for Always with a total score of 22-88.

Assessment using the DQOL questionnaire was devoted to the quality of life of patients with diabetes mellitus. Bivariate analysis was carried out to determine the relationship between the dependent variable and the independent variable. Bivariate analysis applied in this study was the Chi-square test. This study has passed ethical quality based on the letter number 0352/STIKES-NH/KEPK/XII/2021 which was issued on December 10, 2021 at the Nani Hasanuddin College of Health Sciences, Makassar.

RESULTS

Table 1. Frequency Distribution by Characteristics of Respondents.

General Characteristic	n	%
Age		
36-45 years	15	183
46-55 years	30	36.6
56-65 years	28	34.1
>65 years	9	11.0
Gender		
Male	25	30.5
Female	57	69.5
Education		
Did not Graduate from Elementary School	12	14.6
Elementary School	16	19.5
JHS	10	12.2
SHS	34	41.5
Bachelor	10	12.2
Employment Status		
Employed	45	54.9
Unemployed	37	45.1

Based on table 1, it was revealed that among 82 respondents, 30 respondents (36.6%) were in the age group of 46-55 years, and 9 respondents (11.0%) were in the age group of >65 years. Furthermore, the majority of respondents were female as many as 57 respondents (69.5%) and 25 respondents (30.5%) were male. The data obtained regarding level of education showed that the majority of respondents were graduated from senior high school as many as 34 respondents (41.5%). Based on employment status, 45 respondents (54.9%) were employed and 37 respondents (45.1%) were unemployed.

Table 2. Frequency Distribution of Respondents by Diabetes Distress.

Diabetes Distress	Frequency (n)	Percentage (%)
No	27	32.9
Yes	55	67.1
Total	82	100.0

Based on Table 2, it was revealed that out of 82 respondents, there were 27 (32.9%) who did not experience diabetes distress and 55 respondents (67.1%) who experienced diabetes distress.

Table 3. Frequency Distribution of Respondents by Quality of Life.

Quality of Life	Frequency (n)	Percentage (%)
High	37	45.1
Low	45	54.9
Total	82	100.0

Based on Table 3 it was shown that out of 82 respondents, there were 37 respondents (45.1%) with a high Quality of Life and 45 respondents (54.9%) with a low Quality of Life.

Table 4. Relationship between diabetes distress and Quality of Life among Patients with Type II Diabetes Mellitus.

Diabetes Distress	Quality of Life				Total		p
	High		Low				
	n	%	n	%	n	%	
No	18	66.7	9	33.3	27	100.0	0.012
Yes	19	34.5	36	65.5	55	100.0	
Total	37	45.1	45	54.9	82	100.0	

Based on Table 4 it was revealed that there were 27 respondents who did not experience diabetes distress, of which 18 respondents (66.7%) had a high Quality of Life and 9 respondents (33.3%) had a low Quality of Life. Meanwhile, 55 respondents experienced diabetes distress, of which 19 respondents (34.5%) had a high Quality of Life and 36 respondents (65.5%) had a low Quality of Life. The results of the statistical test using Chi-square obtained a ρ value = 0.012 or ρ <α (0.05). It meant that the alternative hypothesis was accepted. It can be interpretated that there was a relationship between diabetes distress and quality of life among patients with type II diabetes mellitus in the work area of Tamalanrea Jaya CHC, Makassar.

DISCUSSION

Based on the study, it was found that 66.7% of respondents who did not experience diabetes distress had a high Quality of Life. Such finding indicated that there was a relationship between diabetes distress and quality of life among patirnts with type II diabetes mellitus in the work area of Tamalanrea Jaya CHC, Makassar.

Although this study revealed a relationship between diabetes distress and quality of life among patients with type II diabetes mellitus, there were 9 respondents who did not experience diabetes distress but had a low quality of life. Such condition can be influenced by the age factor of respondents, most of whom have entered the late elderly. The study finding is in accordance with a study conducted by Leo & Kedo in 2021, which found that a person's quality of life was significantly influenced by age[7]. Increasing age leads to a decrease in body function and anatomy which results in insulin resistance and impaired blood glucose tolerance. Therefore, physical, psychological, and social problems can arise and ability or body function definitely affects the success of diabetes management and results in the emergence of health problems that decrease the quality of life of patients with DM[7].

Diabetes mellitus is a persistent metabolic disorder. Diabetes mellitus can cause a number of problems that can extend the treatment period and increase treatment costs. Acute myocardial infarction, stroke and peripheral arterial disease are examples of macrovascular problems that can be caused by type 2 diabetes mellitus. Meanwhile, diabetic foot, nephropathy and neuropathy are examples of microvascular consequences of it[8]. Patients' quality of life can be affected by certain problems due to its physical and psychological effects. The chronic nature of the disease and difficulties in managing the disease can have a negative impact on mood and self-esteem, resulting in frustration and sadness, dietary restrictions, and sexual behavior patterns, all of which lead to diabetes distress and a decrease in the patient's quality of life[9].

The study finding is in line with a study conducted by (Sasmiyanto, 2019) which suggested that patients with DM who were able to develop positive psychology would have a positive progress in several aspects of health. Glucose levels will remain stable at a healthy level due to positive psychology. Respondents' view of their overall health will improve as a result of stable blood glucose levels, so that they can live a good quality of life[10].

Furthermore, a study conducted by Irawan et al., 2021 also found that the distress experienced by people with diabetes mellitus was due physical and psychological changes[11]. This study also found that there were 19 respondents who experienced diabetes distress but had a high Quality of Life. Such condition can be influenced by family support. Such finding is in accordance with a study conducted by Ratnawati et al., 2019, which found a significant relationship between family support and the quality of life of the elderly. Family has several informational support functions in the

form of information that can lead to positive individual suggestions, assessment support in the form of guidance, instrumental support in the form of attention and emotional support in the form of attention to the elderly with DM[12].

Based on a study conducted at Tamalanrea Jaya CHC, Makassar, it can be seen that many patients experienced diabetes distress with a relatively low quality of life. As for the causes of distress based on most of respondents were changes in health which led to a decrease in psychological condition as well as worries about the disease and feelings of dissatisfaction with their lives which further resulted in a low quality of life.

The results of this study are in line with a study conducted by Abdurrasyid et al., 2018, which found that the most dominant diabetes distress factors were related to the quality of life after long periods of illness, caregivers, and diabetic self-care. Psychological stress will affect a person's perception towqrds life. A state of diabetes distress indicated a sense of fear of the disease, so that patients with type 2 diabetes might have a feeling of dissatisfaction with the life experienced and it led to a low quality of life. In contrast, patients who did not experience diabetes distress would have a good perception of their lives so as to create a high value of quality of life[14].

A study conducted by Maruf & Palupi, 2021 suggested that there was a significant relationship between stress level and the quality of life among DM patients. Living with diabetes mellitus will indirectly become a source of stress. People with Diabetes Mellitus have a high level of stress and anxiety, because it will change a person's habits and lifestyle, following the treatment that must be undertaken and the possibility of serious complications. Stress triggers physical and mental reactions that may reduce quality of life. Long-term disease was found to have a negative relationship with quality of life, which meant that the longer the disease lasted, the lower the quality of life[15].

According to a study conducted by Fisher & Hessler, 2019 applied diabetes distress to describe the anxiety, worry, fear, and threats that arise during the management of difficult chronic conditions such as diabetes from time to time. Such anxiety includes the threat of complications, possible loss of function, and worry about access to care[16]. Diabetes distress is a normal reaction to diabetes. It is not considered a comorbid disorder or condition and does not reflect a psychopathology. This is simply the emotional impact of diabetes. Therefore, it is recommended that diabetes distress should be managed by health professionals as part of comprehensive diabetes care, not as a 'disease' that needs to be directed to others outside the context of diabetes care[17].

Diabetes-related pressures can take many forms and can be influenced by many factors, such as age, gender, culture, type of diabetes, use of insulin, number of complications, and duration of diabetes[18]. Feelings of helplessness and hopelessness, fear of hypoglycemic episodes or consequences, high levels of “burnout” from never-ending management responsibilities, and anger toward healthcare providers are common[19]. These feelings often lead to distrust, hostility, and missed visits. Based on the varying needs characteristics of Type 1 and Type 2 diabetes, the sources of diabetes pressure vary among people with each type. For example, adults with type 1 diabetes may experience fear of hypoglycemia and feelings of helplessness more than adults with type 2 diabetes who take only oral medications[16].

According to a study conducted by (Anita, 2019), there were many disorders related to depression, anxiety, and stress that overlapped with the discomforts of diabetes, and it is difficult to separate them[20]. A condition known as diabetes distress occurs when a person has different emotional problems that are directly related to the pressures and costs that diabetes brings, as well as worry, irritability, and mild tiredness[21]. Diabetes stress is a normal emotional reaction to a potentially fatal disease. Depression and stress are not the same between people. Distress is conceptually the result of emotional adjustment to the challenges in the management of diabetes[22]. Patients often become concerned when there are multiple requests for lifestyle modifications, believe that they have failed to manage their diabetes when the blood glucose levels, worry about possible complications, and become frustrated when they cannot consistently keep their diabetes under control[23].

A study conducted by (Erda et al., 2020) revealed that there was a significant relationship between stress and the quality of life among elderly people with type II diabetes mellitus[24]. Poor quality of life was due to the patient's perception of the disease in terms of recovery. In addition, the patient felt angry, embarrassed, hopeless, and considered no one in his family

cared about their health, thus affecting the quality of life of the patients. Quality of life is very important since it is closely related to the patient's condition, the severity of the disease, the duration of healing and poor quality of life can even worsen the condition of the disease. The study finding is in line with a study conducted by (Rizqillah et al., 2020) which found that stress played an important role in quality of life among patients with diabetes mellitus. The lower the stress, the higher the quality of life[27].

Distress occurs when there are mental, physical, emotional, and spiritual inabilities to deal with threats. It can affect human physical health as self-perception of situations or conditions in the environment. Perceived stress comes from feelings of fear or anger[28]. Under stressful conditions, the body will take two actions, namely fighting and defending from threats or running and avoiding the dangers that confront as a self-defense mechanism against physical threats. The fight response is triggered by anger and the avoidance response is triggered by fear.

A study conducted by (Nurmaguphita & Sugiyanto, 2018) described diabetes distress as the emotional burden caused by pressure during diabetes self-care and the complications that accompanied it. This emotional burden surely had an impact on the patient himself, his family and health care providers involved in diabetes care29. Diabetes distress resulted in a decrease in health-related quality of life in all domains, namely physical, psychological, social relationships and the environment[20].

Nearly a quarter of patients with diabetes had depression or other diabetes distress symptoms, which reflected the high prevalence of psychological comorbidities in this population. Diabetes distress is the concern of patients regarding the management of diabetes, perceived support, emotional burden, and ability to obtain high-quality medical care[30]. Diabetes distress is defined as emotions that lead to loss of belief in positive outcomes, lack of self-confidence, and inability to make necessary lifestyle adjustments. High level of diabetes distress can affect medication adherence and diabetes management, which can further lead to poor glucose control and ultimately impact disease management and a lower quality of life[31].

According to the researchers' assumptions, diabetes distress is a factor associated with a low Quality of Life in people with Diabetes Mellitus, so that respondents who experience diabetes distress tend to have a low Quality of Life. Thus, it can be concluded that the more distress people with Diabetes Mellitus, the lower the quality of life of people with Diabetes Mellitus. Increased diabetes distress in patients with diabetes is associated with increased fear of diabetes-related events such as complications. Impaired quality of life has been recognized as an important psychosocial outcome in chronic disease. Quality of life has been defined as the personal burden felt by patients in terms of satisfaction, impact, and diabetes-related anxiety.

CONCLUSION

Based on the results of the study and discussion, it can be concluded that there wsa a relationship between diabetes distress and quality of life among patients with type II diabetes mellitus in the work area of Tamalanrea Jaya CHC, Makassar with a ρ value of 0.012. It is expected that nurses always motivate families to continue to support the treatment process of Diabetes Mellitus patients at home by actively monitoring their health development. In additiom, healthcare workers should always increase knowledge, skills and good attitudes in providing services to patients with Diabetes Mellitus in order to reduce the risk of low quality of life among patients with Diabetes Mellitus.

CONFLICTS OF INTEREST:
The authors declare no conflict of interest.

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Original Article

Towards Zero Maternal Mortality: The Role of Policy Makers in Maternal Perinatal Audit Surveillance and Response

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ABSTRACT

The city of Semarang has formed a Maternal Perinatal Surveillance and Response audit committee team. The purpose of this study is to analyze the role of policy actors in the implementation of Maternal Perinatal Surveillance and Response Audit using the policy triangle framework of actors, content, context and process. This research was conducted qualitatively with a case study approach. The selection of informants was carried out purposively. Data collection by in-depth interviews with 6 main informants and 9 triangulation informants. Data were analyzed using thematic analysis, with the inclusion criteria of health workers having more than 3 years' experience in handling maternal death cases. The results showed that the role of AMP-SR actors was optimal at the Health Service and Community Health Centers, the role of AMP-SR actors in hospitals was not optimal. Not all of the contents of the AMP-SR were understood by the midwives at the Health Centers and Hospitals, the identification and notifications were on time, the OVM and RMM reports were not complete, the maternal death assessment had not been all carried out, the responses had not been all followed up. The implementation process is hampered by limited staff and budget, medical devices are not routinely calibrated, the MPDN application has been used but is not optimal. In Conclusion, the role of policy makers is AMP-SR, intervening in reducing maternal mortality and improving the quality of care. Future research is expected to use the mixed method to find out the role of policymakers quantitatively and qualitatively.

Keywords: Maternal Perinatal Audit, Actor, policy makers, Surveillance.

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INTRODUCTION

A global health problem that needs to be addressed immediately is the increasing number of maternal deaths. Globally, it is estimated that 287,000 maternal deaths will occur in 2020 with an overall Maternal Mortality Rate of 223/100,000 KH[1]. In Indonesia the trend of maternal mortality increased in 2019 to 87.93/100,000 KH, in 2020 to 97.61/100,000 KH, in 2021 to 166.5/100,000 KH[2]. In Central Java, maternal mortality has also increased in 2019 by 76.9/100,000 KH, in 2020 by 98.6/100,000 KH, and in 2021 it has increased by 199/100,000 KH[3]. The trend of the maternal mortality rate in the city of Semarang is fluctuating, in 2019 it was 75.8/100,000 KH, in 2020 it was 71.35/100,000 KH, in 2021 it was 95.3/100,000 KH[4].

Global efforts to reduce cases of maternal mortality in the world were carried out by the World Health Organization (WHO) by

formulating a policy on Maternal Perinatal Surveillance and Response (AMP-SR) audits, but in several countries, the implementation of maternal mortality studies has not been carried out according to guidelines and has not been followed up. even the implementation practice is not following the standard[5,6]. The policy guidelines for implementing maternal perinatal surveillance and response (AMP-SR) audits in 2021 issued by the Ministry of Health of the Republic of Indonesia must be used as guidelines and implemented by districts, cities and provinces in Indonesia. Implementation of AMP-SR is an effort to strengthen health in reporting and reviewing maternal and perinatal deaths which includes 4 cycles including: 1) Identification and notification 2) Reporting 3) Assessment, 4) Response and follow-up[7,8]. AMP-SR is also the key to achieving the global target of zero preventable maternal deaths by 2030[9]. Indonesia is a developing country with a relatively high maternal mortality rate and it needs attention from various parties to overcome this problem. Based on a demographic survey conducted, in 2015 the maternal mortality rate reached per 100,000 births[10]. Audit is very important to make effective prevention of maternal death[11].

The implementation of audit policies in districts/cities in Indonesia still found obstacles including sharp downwards blunt upwards, inadequate costs and infrastructure, unavailability of death forms, unavailable SOPs, attitude of executors who ignore orders, and the difficulty of maintaining the confidentiality of AMP[12,13,14,15,16]. Based on the preliminary study it was found that the Implementation of the Maternal Perinatal Surveillance and Response (AMP-SR) Audit in Semarang City had been carried out. However, not all these implementations have been implemented following the guidelines, such as the limited budget for implementation, incomplete form filling, data delays, not all health facilities have carried out audits, limited role of the health office in hospitals, and recommendations for new studies have been partially followed up. The establishment of an audit committee team that has been approved by the Mayor of Semarang does not guarantee that all cases of maternal and child deaths will be reviewed. The implementation of the study in Semarang City in 2019 was 76%[16].

This study only focuses on maternal death audits, using the triangular concept of policy analysis by Walt and Gilson[17]. The health policy triangle is useful for analyzing health policy implementation and decision-making at local and regional levels[18]. In this study the actors involved were identified, their roles, attitudes and responsibilities. The content in this research is the basis of the policy, goals, objectives, and understanding of the contents of the policy. Context is an influencing factor in terms of situational, structural, and cultural elements. The process is reviewed from human resources, budgetary resources, infrastructure resources as well as supporting and inhibiting factors. The purpose of this study is to analyze the role of policy actors in the implementation of Maternal Perinatal Surveillance and Response Audit in the City of Semarang through the framework of a triangular analysis of health policy actors, content, context, and process. The importance of this research being conducted so that it becomes a source of study for policymakers in determining the policy products and rules they will make.

METHOD

This research was conducted using a qualitative design with case studies conducted in Semarang City from October 2022-January 2023. This research involved 6 main informants from the Semarang City health office and 9 triangulation informants from the health centre, Hospitals, and the Indonesian Midwives Association Professional Organization. The main informants consisted of the Head of the health office, the Head of the Community Health Sector, the Sub Coordinator of the Maternal and Child Health Section, and 3 AMP-SR Activity Holders. The triangulation informants consisted of: Obstetrics and gynaecology specialists, the Head of the Velos Kamer (VK) Room, VK Staff, Indonesian Midwives Association Semarang City representatives, Community Health Center coordinating midwife, and 2 Community Health Center Senior Midwives. Selection of informants by purposive sampling. The inclusion criteria were health workers with work experience of more than 3 years, willing to be interviewed, and having been directly involved in handling maternal death cases.

Data collection was carried out by in-depth interviews using a voice recorder, document review and observation using a cellphone camera. Data analysis with thematic

content analysis. Presentation of data with data analysis frameworks, and tables. Ethical approval was obtained from the Research Ethics Committee of the Faculty of Public Health, Diponegoro University, Semarang, Central Java with No. 375/EA/KEPK-FKM/2022. Before the interview, the researcher explained the research objectives and the topics discussed, explained the confidentiality of information, signed informed consent, and then gave permission to record the interview.

RESULTS

There were 15 informants involved in this study consisting of 6 main informants and 9 triangulation informants. The characteristics of the informants are in Table 1.

Table 1. Characteristics of Research Informants.

Characteristics	N=15	%
Age		
20-30	1	6,67
30-40	2	13,33
40-50	6	40
60	5	33,33
> 60	1	6,67
Sex		
Male	2	13,33
Female	13	86,67
Education		
Doctor of health law	1	6,67
Obstetrics and Gynecology Specialist Doctor	1	6,67
Internal Medicine Specialist	1	6,67
Master of Public Health	2	13,33
Bachelor of Public Health	3	20
Diploma 4 Midwifery	5	33,33
Diploma 3 Midwifery	2	13,33
Experience handling cases of maternal death		
3 Years	0	0
> 3 Years	15	100
Audit Committee and Service implementing community		
Management Team	6	40
Internal Reviewer	3	20
Executor at Health Center	4	26.7
Executive at the Hospital	2	13,13

Most of the informants are aged 40-50 years by 40%. Informant education Most diploma 4 midwifery 33.3%. All informants have experience of more than 3 years by 100%. The results of the study show that there are 4 factors that can influence the implementation of AMP-SR in Semarang City, namely actors who play a role in policy, content, context and process. An example of the coding process in the data analysis framework is presented in Table 2.

Table 2. Data analysis framework.

Theme	Category	Sub categories	Code
• **Actor**	• Policy maker	• Mayor • Health Service Team	• Factor Identifications • Person in charge of AMP-SR implementation and decision maker, ensures budget. • The role of the Dinas for hospitals is not yet optimal • Manage the implementation of AMP-SR • Ensuring data completeness. • Schedule operational AMP-SR activities
	• Implementing policies	• Internal Review Team (Professional Organization) • Hospital midwife	• Analyzing death cases, classifying causes of death, preparing recommendations. • Minimizing maternal mortality by implementing substandard care.
		• Health center midwife	• Recording and reporting through the maternal medical record • Delay in reporting, incomplete data. • Identifying and tracking death cases. • Recording and reporting using the Maternal Verbal Autopsy • The midwife was late in reporting, forgot to fill out the MPDN application.
• **Content**	• Basic policy	• AMP-SR Guidelines from the Indonesian Ministry of Health Number 21 of 2021	• Policy base is always changing, must keep up with developments. • Surveillance, case tracking and reporting.
	• Policy objectives	• As a guide in implementing AMP-SR	• Determination of response efforts based on findings of factors that can cause death that can be prevented from the results of the assessment. • Providing outreach in the implementation of AMP-SR has only been carried out by a number of hospitals and health centers
	• Policy Goals	• Public health office • FKTP, FKRTL • Cross sector • Professional Organizations • Health workers	• Policy actors as intermediaries in indicators of reducing maternal mortality • New guideline socialization was carried out only once
	• Understanding of policy content	• Concept AMP-SR	• Not all policy implementers understand the processes of identification, reporting, assessment, and response.
• **Context**	• Situational	• Policy changes for epidemic control	• Implementation of AMP-SR does not match the number of death cases • Low socioeconomic level
	• Structural	• Determination of policy makers in achieving targets in SAKIP, Strategic Plan and RPJMD	• Pressure from outsiders • Political commitment in achieving the target for maternal mortality

	• Culture	• Implementing the culture of implementing AMP-SR according to the guidelines	• Have not implemented no blame yet. Midwives at health Centre and hospitals are sometimes still afraid that if there is a death case, there has been blaming each other
• Process	• Implementation	• Human Resources • Budget Resources • Infrastructure	• Limited number of staff • Not all budget proposals were approved
	• Evaluation	• Monitoring the results of assessment recommendations • Leadership support	• Medical devices are not routinely calibrated • Not all midwives report deaths using the MPDN application. • AMP-SR follow-up evaluation at the hospital only once a year.
	• Supporting factors	• Communication • Coordination dan Internalization	• Training and education of health workers • Monitoring of health center performance reports per month • Monitoring area map based on death cases
	• Obstacle factor	• Staffing	• Not yet built good communication • Collection of supporting data for old assessments • Not all AMP-SR results have been followed up • Adjusting the schedule with the team is not easy • Movement of structural officials is very fast • Employee rotation is uneven • Termination of non ASN employee contracts

Policies will be easy to implement if the implementation takes into account the aspects of actors, content, context and process[19]. Health policy can be carried out through the public and private sectors. Walt and Gilson's policy triangle analysis framework has 4 domains namely actor, content, context and process[20].

Actor

The implementation of the AMP-SR in Semarang City involved the AMP-SR committee which was formed through the Decree of the Mayor of Semarang Number 4418/796 of 2022 concerning the Establishment of the Maternal Perinatal Surveillance and Response Audit Team for the City of Semarang. Identification of actors and the role of actors in the implementation of AMP-SR in Semarang City is shown in the following interviews:

"*The actors involved in the implementation of AMP-SR in Semarang City are the mayor, head of health service, head of public health, sub-coordinator of kia and staff, head of health services, review team from POGI, IDAI, and Indonesian Midwives Association Professional organizations, health center midwives and hospital midwives who have a role to play."* (IU1).

"*The Head of the health service as the person in charge plays a role in forming the AMP-SR committee team, preparing the budget, facilitating implementation, maintaining the confidentiality of information, and following up on recommendations at the health service, hospitals, and health centers. We support and carry out the duties of the head of service."* (IU 3).

The role of the health office for Hospitals related to the implementation of AMP-SR shows that the health office has not played a role in carrying out medical identification, reporting and audits in the Hospital environment. The health office is only limited to monitoring the recommendations on the results of the assessment and carrying out mortality studies at the city level with the AMP-SR Committee Team. The role of the health office for the health Centre shows that the health office is not involved in the identification and surveillance process, but the health office has a role in monitoring reporting, assessing at the city level, and monitoring the follow-up of recommendations. Such as the following statement:

"The health service has not played a role in identifying death cases, reporting and medical audits, because they are carried out by the hospital itself without the presence of the health service, but the health office has played a role in facilitating the study of deaths at the city level and monitoring the results of recommendations". (IT1, IT4)

"The health office has not played a role in the surveillance and identification of deaths at the health Centre, we do it ourselves. After the identification was complete, we reported it through OVM and sent it to the health office. An assessment at the health Centre level should have been carried out, but we have not done it due to limited knowledge, and we are waiting for an assessment to be carried out by professionals at the city level. The health office has a role in reporting through monthly evaluations, city-level reviews and monitoring and evaluation of the follow-up of recommendations usually requested to improve the quality of ANC." (IT 6).

Solutions that can be made from the health office for the continuity of AMP-SR implementation by increasing the role of the health office through monitoring, evaluating reporting, optimizing the role of the review team and developing a more targeted planning strategy. Such as the following statement:

"*We prioritize the implementation of assessments at the health service with a team that has been decreed by the mayor. Our role in hospitals is limited, because medical audits in hospitals are more complex and they usually have a team. We cannot yet require hospitals to carry out medical audits independently, even though this must be done when there is a maternal death. In the future we are trying to optimize our role for hospitals with a review team and improve reporting monitoring* ." IU 3.

Actor is a term to refer to the role of policy actors both individually, groups and organizations who can formally or informally influence policy [21]. Based on the results of the study, it shows that the role of the head of the health service as an actor in the organization is responsible for implementing AMP-SR. The Head of the health office forms an audit committee team to analyze the causes of death, assist in supervision at health facilities, and prepare appropriate recommendations to prevent similar deaths from occurring. If an audit committee is not formed, there will be no team to review when a death occurs, so that the implementation of the AMP-SR is not in accordance with the guidelines and there is a chance of a maternal death with the same cause recurring.

For the continuity of AMP-SR activities, the Head of Service must plan a budget from both APBD and APBN sources a year prior to implementation. The Budget Plan (RAB) can be used as a guide in operational activities. If the budget is not planned every year, it will have an impact on overlapping interests, cannot be physically evaluated how many times it has been implemented, work is not in accordance with the terms of reference, and there are no detailed job descriptions. The head of the health service must also maintain the confidentiality of patient information in carrying out audits, to maintain a code of ethics and as a guarantee of patient health confidentiality. The head of the health office also plays a role in ensuring that the results of the assessment must be followed up, although not all facilities have followed up on the recommendations.

The role of the leader in implementing audit results has great leverage that will bring about organizational change by involving the roles of all stakeholders in health planning, because strong and effective leaders can improve service performance[22]. The results of other studies show that staff internalization is also used by stakeholders to show acceptance, approval and ownership in carrying out

program implementation to achieve success[20]. Health professionals, managers and policy actors must also play a critical role more effectively in various health contexts to make better strategies and decisions[23, 24].

Content

The content in this study consists of the basic policies used for the implementation of AMP-SR, goals, objectives and understanding of the contents of the policy. The basic policy for implementing AMP-SR is the AMP-SR Guidelines for 2021 which are contained in Permenkes Number 21 of 2021, these guidelines refer to global guidelines from WHO. In Indonesia, these guidelines have been revised several times. Following are the results of interviews with informants:

"*The basis for the AMP-SR guidelines refers to the Ministry of Health which adopted global guidelines from WHO, but guidelines in Indonesia have been revised approximately 4x.* …" (IU 3, IU 4).

The purpose of this AMP-SR implementation guideline is to serve as a reference in carrying out maternal and perinatal death audits to formulating recommendations in the form of responses to prevent future deaths due to avoidable causative factors. Like the following statement:

"*The purpose of this AMP-SR guideline as a reference in the implementation of AMP-SR includes identification and reporting, assessment, surveillance, and finding response efforts based on preventable causes of death, so that no deaths from the same cause occur. The results of the AMP-SR in Semarang City have an impact on reducing cases of maternal mortality from 21 cases to 15 cases in 2022*." (IU 2, IU 3).

The targets of the AMP-SR policy actors in Semarang City are Mayors, heads of health Services, program managers for maternal and child health, leaders and implementers at first-level health facilities, advanced health facilities and hospitals, professional organizations, individual and group health workers. Like the following statement:

"Submission of socialization of the implementation of AMP-SR has been for all targets, through participatory learning in the dissemination of results both from health facilities, professional organizations and across sectors."(IU3).

Understanding of the contents of the AMP-SR policy shows that most of the health office team already understand the AMP-SR concept, but policy implementers at the health centre and Hospital levels do not yet understand the AMP-SR concept.

"*The health office has received 3 outreach and training from the Ministry of Health regarding the implementation of AMP-SR, especially the AMP-SR concept which consists of 4 cycles. For the AMP we are used to doing it, for surveillance and response this has been running, we are trying to compile recommendations on the results of the assessment which must be followed up by the hospital and health center, then we issue a circular letter. For socialization to health Centre and Hospital only once, and MPDN training 2 times." (IU 3, IU 4).*

"I was invited to outreach once. MPDN training twice, so I don't really understand the 4 AMP-SR cycles. I understand that identification of death cases and notifications are trying to be timely, for OVM reporting it is sometimes late. Our difficulties in filling in OVM sometimes still have different perceptions among midwives in writing down the causes of death." IT 6, IT 8

"*I was only invited to the hospital once, for 4 cycles I didn't really understand. Identification and death notifications were timely, our RMM reports were often late, and we were usually asked for confirmation by the review team if we wrote reports that were incomplete and had different perceptions. For our study there was a medical audit team, and for the response to the results of the study from the health office there was no feedback.*" IT 4.

Most of the informants only attended the socialization once so they did not understand the 4 concept cycles in AMP-SR. The health office needs to provide training in filling out OVM and RMM for community health center midwives and hospital midwives.

The Indonesian government has published guidelines for Maternal Perinatal Audit since 1994, these guidelines were updated in 2010 with the main objective of auditing maternal deaths as part of district and city government performance accountability. In 2016 the Government of Indonesia issued guidelines for surveillance of maternal deaths with a focus on strengthening the surveillance and case tracking components. In 2021 the Government of Indonesia issued guidelines on maternal surveillance and response audits with a focus on strengthening the response and following up on the results of the assessment by involving the role of policy actors at the national, provincial, district/city and community health service levels. In 2022 the guidelines will be revised again to improve the latest forms[8].

The AMP-SR guidelines adopted by the Government of Indonesia are global guidelines from WHO. Several countries have implemented Maternal Perinatal Surveillance Audit and Response as a benchmark for reducing preventable deaths[25,26,27]. Surveillance and response to maternal deaths is a strategy in various countries to collect accurate data and what can be done to prevent similar deaths in the future[28].

AMP-SR learning is on target, involving people from various sectors. The results of the delivery of socialization learning this assessment can provide motivation for health workers [29], while the lack of feedback from management can hinder the sustainability of the follow-up implementation of the recommendations[30].

Context

The context of AMP-SR policy implementation can be influenced by situational, structural factors including social, political, and cultural factors. Following are the results of interviews with informants:

"The study was not carried out due to changes in the refocusing budget and almost 70% of the budget was to focus on handling the global outbreak so there were only a few studies" (IU2,IU3).

Structural factors that can influence the implementation of AMP-SR socially, namely when the midwife at the health center asked about the chronology of death, some people considered it unethical, so the Midwife needed to take an approach to obtain information on death. Like the following statement:

"There is social stigma, most of the families are sad and reluctant to answer, so the information obtained is incomplete, we approach first." (IT 8, IT 9).

Political factors that can affect the implementation of AMP-SR are the commitment of regional heads to achieve the target for the Maternal Mortality Rate set out in the stipulated RPJMD. Like the following statement:

"Regarding politics, we are sometimes worried that if we don't achieve the maternal mortality rate, there is a kind of pressure because it has become a political commitment that we must be able to achieve the targets in the Strategic Plan, SAKIP, and RPJMD." (IU1, IU2, IU3).

The cultural factors applied in the implementation of AMP-SR are no name, no blame, no shame, and no projusticia. However, the no blame culture has not been successfully implemented. Like the following statement:

"We still find midwives who feel afraid when a case of maternal death is confirmed, we do not present the midwife in the study". (IU3,IU4).

"Every time a pregnant woman dies, we are afraid of being scolded, judged, sometimes blaming each other between the health Centre and hospital midwives." (IT 6).

The application of the No blame culture has not been successfully implemented because there are still midwives who are afraid if there is a case of maternal death in the health facility where she works. The results of the study show that the study of maternal mortality in the city of Semarang from year to year is not carried out 100% due to budget availability, besides that due to situational refocusing of the budget to focus on handling outbreaks. This is not in accordance with the guidelines from the Ministry of Health which require that all maternal deaths be assessed. Several studies show the same thing, in several countries not all cases of maternal death are reviewed due to budgetary constraints[31,32,33,34]. Midwives' efforts

to overcome social factors through a family approach to obtain chronological information on death. Tracing cases in the community is important, because it includes social autopsies in the form of case intervention.[35] The political factor in the implementation of the AMP-SR shows that there is political pressure in achieving the target of reducing the Maternal Mortality Rate. Several studies state that to achieve success in MPDSR there must be political pressure in the form of political commitment and political priorities in implementing it[25,29,36].

The culture of no name, no shame, and no projusticia in the implementation of AMP-SR in Semarang City has been successfully applied, but no blame has not been successfully implemented because there are still midwives who are afraid if there is a death case. Health workers are afraid that if a maternal death occurs, when the leadership calls it a homicide, the midwife cannot speak openly about the causes and circumstances of the maternal death.[37] The same thing is also found in other Regencies and Cities in Indonesia which have implemented culture in the implementation of AMP-SR[12,38].

Processes

The implementation of AMP-SR is viewed from the perspective of human resources, budgetary resources, infrastructure, activity evaluation, supporting factors and inhibiting factors. The study of maternal death cases in the city of Semarang has complied with the guidelines from the Ministry of Health, but not all maternal death cases have been studied. Like the following statement:

"*For implementation, we always follow the guidelines for fulfilling the 4 cycles in the AMP-SR, but due to considerations such as budget and time availability for the review team, it has not been implemented 100%. For infrastructure facilities in reporting deaths already using the MPDN application*" (IU 2, IU 3, IU4).

The health office has carried out an evaluation related to the recommendations of the assessment results. However, not all hospitals are willing to follow up on the recommendations. Evaluation for *health Centre* is more routine, while in hospitals it is done less frequently. Like the following statement:

"*The health office has sent the results of the assessment recommendations to be followed up by hospitals and health centers. For hospitals so far not all the recommendations have been followed up, those that have been followed up are usually related to administration such as SOPs and work procedures. In terms of training, certified doctors on duty, completeness of medical equipment and buildings for blood banks have not been followed up by all hospitals. (IU3, IU4)*

"*Evaluations at the health centre are carried out more often than evaluations at the hospital, the hospital is only once a year, the monthly one is the health centre." (IT4, IT5).*

Factors supporting and inhibiting the implementation of AMP-SR in Semarang City, as in the following statement:

"Supporting factors are the political commitment of the regional head as contained in the RPJMD indicators and training support for AMP-SR." (IU2).

"The inhibiting factors in terms of health personnel are the rotation of officials and staff, and not all budgets are approved. For infrastructure related to medical devices, they are rarely calibrated, so they are not valid." (IU 3, IU 4).

The results showed that in 2019 there were 18 cases of maternal mortality, only 13 cases (72%) were reviewed. In 2020 with a total of 17 maternal deaths, only 12 cases (70%) were studied, in 2021 the number of maternal deaths was 21, only 4 cases (19%) were studied. In 2022 the number of deaths is 15, only 9 cases (60%) are studied.

Budget limitations focused on allocations for handling outbreaks in 2020 and 2021 have resulted in the review not being 100%, whereas in 2022 it has proposed 14 times, but only agreed 8 times and even then, it must be shared with perinatal. The budget used by the health service, hospitals and community health centers comes from the regional budget. Support from budget sources is very important for facilitation in supporting MPDSR activities [39], conversely, budget shortages can hamper the implementation of MPDSR[40].

Death reporting data from OVM and RMM is very important because it can

determine the quality of the assessment, the case studies show that data collection, analysis, and synthesis is the first step in using data for decision making and taking action[41].

CONCLUSION

The findings of this study indicate that the role of policymakers in implementing Maternal Perinatal Surveillance and Response Audit in hospitals is still limited because it does not require hospitals to conduct medical audits with the consideration that each hospital has different resource conditions. Maternal Verbal Autopsy, Maternal Medical Record reporting filled out by midwives still found differences in perceptions. This difference in perceptions should be followed up by policymakers as soon as possible and formulate appropriate steps to fill the gaps in these differences. Delays in submitting and filling out incomplete Maternal Verbal Autopsy and Maternal Medical Record reports can affect the quality of the assessment. It is recommended that policymakers make an audit design that is disseminated to all health workers to avoid differences in perceptions among health workers.

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CONFLICTS OF INTEREST:
The authors declare no conflict of interest.

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Original Article

Effects of Educational Videos to Increase Knowledge, Attitudes, and Sleep Quality of Pregnant Women with Chronic Energy Deficiency

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ABSTRACT

Lack of knowledge and attitudes is factor in the unresolved problem malnutrition pregnant women. The purpose of this study was to analyze the effectiveness of nutritional education media and sleep quality to increase knowledge and attitudes of chronic energy deficiency pregnant women towards nutrition and sleep quality. The research used is quantitative, while the design uses a combination of research and development and quasi-experimental methods with pre-posttest design controls. The sample was 63 pregnant women who experienced chronic energy deficiency (CED). Sampling technique by means of total sampling. Data analysis showed that knowledge increased significantly after being given the video intervention (mean=57, SD=14.53), the control group was lower, namely mean=9.1, SD=20.24, attitudes increased in the intervention group (mean=65.0, SD=20.47), control group (mean=2.96, SD=20.56), sleep quality in the intervention group increased with an average mean=0.68, SD=1.69, control group mean=0.000, SD=0.894. The p-value of the Mann-Whitney test results for the variables of knowledge, attitudes, and sleep quality is 0.000 < (0.005), this shows that there are differences in knowledge and attitudes before and after the educational animated video. In Conclusions, education using animated videos on nutrition and sleep quality is effective in improving the nutritional status of pregnant women. These results imply the need for educational media designs with more attractive models and innovations with more intensive promotion methods. It is hoped that future research can examine more deeply the relationship between other factors that influence chronic energy deficiency in pregnant women, such as sleep patterns and family support.

Keywords: Educational Videos, Knowledge, Attitudes, Sleep Quality, Pregnant Women.

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INTRODUCTION

Malnutrition or chronic energy deficiency problems (CED) in women have an impact on adverse pregnancy outcomes including maternal death, complications of childbirth, premature birth, and intrauterine growth retardation. [1,2,3] Indonesia ranks fourth after India with a prevalence of 35.5%. The results of the Indonesian Ministry of Health's Basic Health Research in 2018 showed that the prevalence of chronic energy deficiency problems (CED) in pregnant women (aged 15-49 years) was still quite high, namely 17.3%.

The target percentage of chronic energy deficiency pregnant wome can decrease by 1.5% annually.[4] The city of Ternate, North Maluku province is part of the Indonesian region with chronic energy deficiency problems (CED) in pregnant women as much as 24.0%. Data on 34 provinces in Indonesia showed that the North Maluku region had not yet reached the target for achieving the lowest CED pregnant women (9.7%).[5] Meanwhile, data from the Kalamata Health Center in Ternate city in 2022, which was the research location, showed that out of 316 pregnant women who came to check their pregnancies, 63 pregnant women, or 19.9% experienced CED. Chronic energy deficiency (CED) is a nutritional problem caused by insufficient food intake for a long time. Pregnant women with CED generally can result in disruption of fetal growth and development such as the occurrence of stunting, and brain and metabolic defects which result in infectious diseases in adulthood.[6,7]

Methods that maximize referral systems and optimize education through various delivery methods, from digital modes to traditional face-to-face nutrition education in pregnancy classes and community-based health services, are essential for responsible health professionals to play a central role in the provision of nutrition education prenatal.[8] Video education provides significant evidence of increasing knowledge of patients of various age groups and disease groups.[9] Videos can be given for a certain period so that they can change attitudes, behavior, and healthy living habits.[10] The Indonesian government, especially the North Maluku province from 2020 to 2024, is targeting improving the quality of health services as a promotive and preventive effort through innovative use of educational media technology.[5]

Despite the level of knowledge and the state of good socioeconomic status, there are still pregnant women who still choose food according to their wishes without regard to good nutritional content. [11] A research study at the University of New England described pregnant women who experienced malnutrition or acute malnutrition during the prenatal period as a result of an imbalance in norepinephrine, dopamine, and serotonin levels, causing symptoms such as disturbed sleep patterns, anxiety, and anorexia.[12] This psychological problem affects the weight of pregnant women thereby increasing the risk of babies born with low weight.[13] Poor sleep quality in pregnant women with socioeconomic status results in complications such as preterm labor, low birth weight, preeclampsia, perinatal death, and spontaneous abortion.[14]

Currently, all sectors, including health, are conducting many experiments using WhatsApp, as a mobile communication tool that is widely used to support video information.[15] Health promotion and education efforts using tablet devices and video content are acceptable and appropriate for pregnant women in urban and rural areas.[16] Therefore, the criteria for nutritional animation video content and sleep quality in this study were short duration, attractive appearance, and easy-to-understand language. The video material contains a combination of the benefits of implementing balanced nutrition and sleep quality in an effort to overcome the problem of chronic energy deficiency (CED).[17] Animated videos on nutrition and sleep quality can be a widely used nutritional education facility, especially in line with the increase in health promotion digital technology programs in Indonesia.[18]

There is no previous research that examines the effect of using animated video education with content combining the impact of nutrition and sleep quality on pregnant women who experience chronic energy deficiency (CED), especially in the Kalumata Health Center area, Ternate city, North Maluku, eastern Indonesia. The city of Ternate is an example of the application of video educational media because the internet infrastructure is well-developed. Educational video animations on nutrition and sleep quality attract the attention of pregnant women, families, and health workers and have been well received. Previous research conducted in the Jambi area of western Indonesia showed that nutritional animation video interventions increased pregnant women's knowledge from 97% to 100% [19] and research at the Bau-Bau Health Center in Central Sulawesi has been shown to increase the knowledge, attitudes, and behavior of pregnant women.[20] However, there are differences between the two studies and this study, namely the media analysis test without a control group and a combination of material between nutrition and sleep quality. Another study explained that knowledge of nutrition and dietary diversity through antenatal care

nutrition education increased in the intervention and control groups, but the knowledge was higher in the intervention group.[15]

The purpose of this education is to analyze the effect of educational interventions on nutrition videos and sleep quality to increase knowledge and attitudes that have an impact on handling the problem of chronic energy deficiency (CED) in the working area of the Ternate city health center as a determining factor in efforts to reduce maternal and child mortality in Indonesia. The integration of educational videos on nutrition and sleep quality is used in digital-literacy-based online maternal and child health (MCH) media applications in the Ministry of Health in eastern Indonesia, North Maluku region.

METHOD

Study Design

The research method is quantitative research, while the research design uses a combination of research and development (R&D) and quasy-experimental methods with pre-test and post-test design controls. This study used non-probability sampling, namely the consecutive sampling technique, which is a sample research design by including all the subjects who came and met the selection criteria sequentially until the required number of subjects was met so that the number of samples related to the needs of researchers could be obtained.[21] Educational media interventions on nutrition videos and sleep quality were designed according to the results of Focus Group Discussion (FGD) in collaboration with the North Maluku regional health office and the City of Ternate among other stakeholders.

The use of video is based on a predetermined schedule, the intervention is divided into three phases for three weeks six (6) times. The intensive phase in the first week is carried out twice through pregnant women classes, and the independent phase in the second week through the WhatsApp messaging application is monitored through the WhatsApp application group. Furthermore, the third phase is called the strengthening phase in the third week through two home visits. The evaluation through the post-test is carried out in the fourth week at the Integrated Healthcare Center. The population in this study used total sampling, namely all pregnant women in their first, second, and third trimesters experiencing chronic energy deficiency (CED) in the Kalumata Health Center area of Ternate City based on secondary and primary data from October to December 2022. The ethical clearance was obtained from Hasanuddin University with number 13591/UN4.14.1/TP.01.02/2022.

Participant and Recruitment

The design of animated video media to increase the knowledge and attitudes of pregnant women about nutrition and sleep quality in this study was 63 pregnant women who experienced chronic energy deficiency (CED). In carrying out the research activities, all cadres and midwives in the research area were assisted and the division of the intervention and control groups was based on the location of the Integrated Healthcare Center, which was divided into the southern and western the Integrated Healthcare Center for the intervention group with a total of 32 respondents (n=32) and the northern and eastern Integrated Healthcare Center for the control group numbered 31 respondents (n = 31). The intervention group was given animated video education and the control group was given no animated video education. Pregnant women who are not willing to continue the research process are not counted as intervention and control participants.

Measurement of knowledge, attitudes and sleep quality of the control group was carried out twice, namely at the class meeting for pregnant women for the pre-test and the fourth-week post-test at the Integrated Healthcare Center through a questionnaire. For four weeks pregnant women are only given the MCH book from the Kalamata Health Center health worker.

Course Content

Animated video educational material in this study, explaining the types of food that are economical and nutritionally balanced, signs and symptoms, the impact of undernourished pregnant women (LBW and stunting), the benefits of supplementary feeding, how to maintain sleep quality in pregnant women and impact of undernourishment on sleep quality. The content of the video also explains the use of cheap food but in accordance with the principles of balanced nutrition and the benefits of supplementary feeding as a form of

government program to address CED problems. The video also contains the importance of activity and maintaining sleep patterns, in order to improve the quality of sleep for pregnant women in relation to handling CED. This is related to a research study which explained that malnutrition can occur due to someone's ignorance in accessing their food, or choosing foods that are less or not nutritious because of their ignorance. Pregnant women who have knowledge about eating patterns that are good for consumption will apply them to their daily lives where it becomes their habit to regulate their eating patterns.[22]

The intervention schedule was carried out for four weeks starting with a pre-test through a nutrition questionnaire that had been tested for validation and reliability. Assessment of sleep quality was measured using the PSQI questionnaire.[23] Video interventions with a duration of 5 minutes are carried out twice a week.[20]

No	Activity Stages	Activity		Method	Media/ AIDS	Time Allocation
		Fasilitator	Participant			
1	Opening	• Greet and introduce yourself • Convey the aims and objectives of the meeting • Presenting today's learning objectives • Delivering today's lesson plan. • Conducting pre-tests	• Listening • Answering pre-test questions	Lecture	Question naire	15 minutes
2	Material Presentation	• Playing an animated video (through the LCD screen), contains about: • Types of food that are economical for the nutrition of CED pregnant women • Signs and symptoms, the impact of malnourished pregnant women (LBW and stunting) • Benefits of Supplementary Feeding • How to maintain sleep quality in pregnant women • The impact of insufficient food intake on sleep quality • Provide opportunities for participants to ask questions that are not understood.	Listen Discussion	Video based learning with mentoring techniques	Animation videos, LCD projectors and laptops, video monitoring books	5 minutes
3	Closing	• Provide conclusions from the material that has been presented • Closing with thanks	Listen	Lecture		2 minutes

Figure 1. Media Intervention Procedure Video and content.

Data collection and tool development

The nutrition and sleep quality videos have passed a validation test by material experts and the media based on the National

Professional Certification Agency (BNSP) assessment standards. The test results show the suitability of the material with basic competencies, indicators, research objectives, theoretical review, formulated problems, various levels of respondents' understanding, and images used according to the material. The language used in the video is straightforward, spelling appropriate, and sentence structure accurate. The grammar used in the video is easy for respondents to understand. Selection of sentence vocabulary, the accuracy of words in terms and sentences is consistent. The use of language in video material is necessary because it is a useful tool for stimulating the senses of hearing and sight so that it is easier to receive and understand the messages conveyed by the presenters.[24]

Nutritional Knowledge and Sleep Quality

Measuring tools for knowledge and attitudes about understanding nutrition and quality based on questionnaire questions that have passed the validation and reliability test stages on different samples with valid statistical test results. Questions about the knowledge test consisted of 10 nutritional question items containing exposure factors to nutrition education media, the definition of effects and symptoms of CED in pregnancy, food variety, balanced nutrition, benefits of local food, and supplementary feeding programs. The question items about attitudes are divided into positive and negative questions. Each question has a good category if the score is>80% of the answers are correct and less if <80% of the answers are correct. Assessment of sleep quality uses a standardized questionnaire, namely the Pittsburgh sleep quality index (PSQI) questionnaire.

Process Evaluation

In the intervention group after being given video six times within one month. Respondents were given a post test using a questionnaire. Measuring knowledge with the Guttman scale, point 0 if the answer is wrong and 10 if the answer is right. Attitudes were measured using a Likert scale and divided into positive and negative attitude questions (strongly disagree, disagree, agree and strongly agree). The results of the PSQI questionnaire are scores <5 for good sleep quality and scores >5 for poor sleep quality. Meanwhile, in the control group the evaluation was carried out after four weeks using the same questionnaire and questions as the intervention group.

Statistical Analysis

Data analysis program is used to process the data. Data processing used univariate analysis to determine the characteristic frequency distribution in the intervention and control groups using the chi-square and Fisher tests and bivariate analysis to see differences in the effectiveness of animated video media on pregnant women's attitudes towards nutrition education and sleep quality between the intervention and control groups between the results the mean (mean) and standard deviation (SD) pre-post test using the Wilcoxon test. The Mann-Whitney test is used as a non-parametric test to measure differences in control variables between the intervention and control groups before and after measurement.

RESULTS

63 respondents (n = 63) agreed to do this research, as an intervention group and a control group. The intervention group was conducted in the first week at the class meeting for pregnant women, starting with answering the questionnaire (pre-test) and then continuing with a 5-minute video presentation. The study in the control group was conducted separately at different locations and times with the same pre-test questionnaire but without video.

Table 1. Frequency Distribution Based on the Characteristics of Pregnant Women with CED in the Intervention and Control Groups.

Characteristics	Intervention (32)		Control (31)		Total		p-value
	n	%	n	%	n	%	
Age of Pregnant							0.006**
No Risk	25	78,1	31	49.2	56	88.9	
At risk	7	21,9	0	0.0	7	11.1	

Gestational Age							0.216*
Trimester I	26	41,3	19	32,3	45	71.4	
Trimester II	4	6,3	8	25,8	12	19,0	
Trimester III	2	3,2	4	41,9	6	9,5	
Parity							0.215*
Primigravida	26	81,3	19	61,3	45	71.4	
Multigravida	4	12,5	8	25,8	12	19.0	
Grandemultigravida	2	6,3	4	12,9	6	9,5	
Education							0.026**
Tall	25	39,7	30	47.6	55	87.3	
Low	7	11.11	1	1.6	8	12.7	
Income							0.009*
≥ UMR	2	6,3	10	67,7	12	19.0	
< UMR	30	93,8	21	32,3	51	81.0	

Descriptive statistics are used to summarize the distribution of socio-demographic characteristics of CED pregnant women according to control variables. The chi square test was conducted to compare the characteristics of the intervention group and the control group. The results of the analysis used fisher** and chi square tests, the results obtained were p values <0.005 for the characteristics of age (p=0.006) and income (p=0.009), while the results obtained for p values> 0.005 for parity (p=0.215), education (p=0.026) and income (p=0.009). Thus, the characteristic frequency distribution in the intervention and control groups, namely age and income, has no relationship with the incidence of CED in pregnant women, while gestational age, parity and education have no characteristic differences between the control and intervention groups.

Tabel 2. Average analysis of differences in knowledge and attitudes of pregnant women with pre-test and post-test nutritional animation videos and sleep quality in the intervention and control groups in the Kalumata Health Center Working Area in 2022.

Variable	Intervention				Control			
	Pre-Test	Post-Test	Δ	p-value	Pre-Test	Post-Test	Δ	p-value
	Mean ± SD	Mean ± SD			Mean ± SD	Mean ± SD		
Knowledge	35.0 ± 11.35	92.81 ± 9.91	57.8 ± 14.53	0.000	22.5 ± 12.37	32.0 ± 12.40	9.41 ± 20.24	0.020
Attitude	31.8 ± 20.23	96.88 ± 5.31	65.0 ± 20.47	0.000	40.2 ± 14.53	43.19 ± 20.07	2.96 ± 20.56	0.540
Sleep Quality	5.38 ± 0.942	4.69 ± 0.965	0.69 ± 1.09	0.002	5.87 ± 0.499	5.87 ± 0.718	0.000 ± 0.894	1.000

**Wilcoxon Test*

Table 2. showed that before the pre-test intervention the average knowledge difference was (Mean=35.0) with a standard deviation (SD)=11.35, then it increased after being given video education the average (mean) was 92.81 with SD=9.91 (post-test) . The results of the p value between pre and post in the intervention group showed a difference, namely a p value of 0.000 <0.005 (α). Meanwhile, in the control group there was no significant difference between the pre and post test results, namely the p value 0.020 > 0.005 (α). Thus, there was a significant effect on the intervention group before and after being given nutritional animation video education and sleep quality compared to the control group.

Attitudes in the intervention group before the intervention average difference (Mean = 31.8) with SD = 20.23 (pre-test), after the intervention there was an increase in attitude with an average post-test result of 96.88 with SD = 5.31. The results of the statistical test showed that there were differences in the results of the pre and post-test after being given

educational animation videos on nutrition and sleep quality with a p-value of 0.000 <0.005 (α). In contrast to the control group, the average difference in knowledge from the pre-test results was 40.2, and the average post-test results were 43.19 with SD = 20.07. So, there is no significant difference between the pre and post-test results in the control group with a p-value of 0.540 > 0.005 (α). Therefore, there was a significant change in attitude between the intervention group and the control group after being given video education on nutrition and sleep quality.

The results of sleep quality before the pre-test intervention based on the pSQI questionnaire averaged 5.38 with a standard deviation (SD) = 0.942, then sleep quality changed well after being given video education with an average of 4.69 with SD = 0.965 (post-test). The results of the p-value between pre and post-in the intervention group showed a difference, namely a p-value of 0.002 <0.005 (α). Meanwhile, in the control group, there was no significant difference between the pre-and post-test results on sleep quality, namely the p-value of 1,000 > 0.005 (α). Thus, there was a significant effect on sleep quality in the intervention group before and after being given nutritional animation video education and sleep quality in the control group.

Sleep has been defined as a state of the brain that is important for maintaining energy and restoring bodily functions.[25] Sleep quality has a major impact on health [26], and is considered a leading public health problem.[27] Concept analysis by Qi et al. [28] showed that sleep quality is determined by five components: (1) sleep efficiency, the ratio of total sleep time to total time in bed; (2) sleep disturbances; (3) sleep latency, which is defined as the time it takes to go from being awake to sleeping; (4) sleep duration within 24 hours; (5) and wake time after sleep onset, or in other words, the total wake time from sleep onset to wake up. Good sleep quality is a predictor of overall physical and mental health, well-being, and vitality. [29,30] However, poor sleep quality is determined by negative subjective perceptions of sleep, sleep onset time, short sleep duration, and difficulty combining sleep and daytime activity [31], which have been associated with psychiatric disorders such as depression, anxiety, and cognitive difficulties, with reduced physical health, premature ageing, and lower work efficiency. [32]

Table 3. The Effect of Nutrition Animation Video Education and Sleep Quality in Chronic Low Energy Pregnant Women on differences in knowledge and attitudes between Intervention and Control.

Variable	Intervention Δ	Control Δ	p-value
Knowledge	57.8 ± 14.53	9.41 ± 20.24	0.000
Attitude	65.0 ± 20.47	2.96 ± 20.56	0.000
Sleep Quality	0.68 ± 1.09	0.000 ± 0.894	0.002

**Mann Whitney Test*

Tabel 3. obtained an asymp.sig (2-tailed) value of 0.000 <0.05, it can be concluded that there is a significant difference in knowledge, in the intervention group with an average difference of 57.8 with SD = 14.53 while the control group has an average difference of 9.41 with SD = 20.24. Attitudes in the intervention group averaged 65.0 with SD = 20.47 and differed in the control group with an average of 0.67 with SD = 2.10. The results of this study explained that there was an effect of the use of nutritional animation video education and sleep quality on knowledge and attitudes in the intervention group compared to the control group.

The statistical test results showed that there was a significant difference in sleep quality of 0.002 <0.05, in the intervention group with an average value difference of 0.68 with SD = 1.09 while the control group averaged 0.000 with SD = 0.894. The results of this study explained that there was an influence of the use of nutritional animation video education and sleep quality on sleep quality in the intervention group compared to the control group.

In this study, the distribution of characteristics consisting of gestational age, parity, and education had no relationship with the occurrence of chronic energy deficiency (CED) in pregnant women. Meanwhile, the age factor (p=0.006) and income (p=0.009) had a relationship with the occurrence of CED problems in pregnant women. The data obtained differs from research conducted at the Southern Ethiopian Zone Gona Hospital which examined the prevalence of malnutrition and related factors among pregnant women, namely average monthly income, mother's educational

status, nutrition education and counseling, and very low parity. affect the nutritional status of the pregnant woman.[33] The difference is that not all factors can cause CED problems. This is due to the condition of gestational age, number of children, and educational status who are not at risk of experiencing chronic energy deficiency problems (CED). The problem of sleep quality cannot be resolved on average in pregnant women, especially pregnant women who experience chronic energy deficiency. Therefore, the need for health services with strategies to deal with poor sleep quality problems is important for women, especially pregnant women, because they are prone to stress and depression during pregnancy.[34]

Measurement of upper arm circumference (Muac) in early pregnancy is used as an approach to assess pre-pregnancy nutritional status. This is due to the difficulty of obtaining data on body weight before pregnancy so that the mother's Muac measured at the first ANC in the first trimester is considered the closest. In pregnant women who are detected to have CED, efforts that can be made are adding more food portions or more frequently than before pregnancy and getting more rest, as well as carrying out regular antenatal checks, to monitor adequate weight gain. Monitoring of mothers with CED can be done by monitoring weight gain by weighing their weight every month. The ideal weight gain during pregnancy is 10-12 kg, with a distribution of 1 kg in the first trimester, 3 kg in the second trimester, and 6 kg in the third trimester.[35]

The results of this study describe the use of video education can have a significant effect on increasing knowledge, attitudes, and quality of sleep in the assessment before and after the intervention of pregnant women who experience chronic energy deficiency at the Kalumata Health Center, Ternate City.

CONCLUSION

There was a significant effect on the effects of nutritional video educational media and sleep quality in the intervention group of pregnant women who experienced chronic energy deficiency, compared to the control group, which did not have educational video interventions, only maternal and child health book guides from midwives, which is the standard health service program in Indonesia. The results of this study are proof that nutritional animation video education and sleep quality are feasible and implemented in the work area of the Ternate City Health Center. It is hoped that future research can examine more deeply the relationship between other factors that influence chronic energy deficiency in pregnant women, such as sleep patterns and family support

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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Original Article

Effects of Counseling on the Quality of Life of MDR Lung TB Patients

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ABSTRACT

Research shows initiatives to combat the TB virus. Patients with MDR-Lung Tuberculosis are worried about their quality of life, according to recently completed research in Indonesia. Patients with MDR-TB may benefit from counseling to enhance their quality of life. Study aims to analyze effect of counseling on changes in the quality of life of MDR-TB patients. A quasi-experimental design with a randomized pretest and posttest control group is used in this kind of research. 38 patients from the Undata Palu Hospital who were randomly chosen between May and November 2022 made up the study's samples. The data were then analyzed using the Wilcoxon test, the Mann Whitney test, and the two mean difference tests. Each participant receives counseling sessions seven times over the course of a six-month period. Counseling using the SOWAN approach is supported by observation, well-being, action, and nursing. The research ethics number for this study is 0011.7/KEPK-KPK/IV/2022 This research received a research ethics number 0011.7/KEPK-KPK/IV/2022 from the Research Ethics Commission of the Ministry of Health Poltekkes Palu. The result of this research show it has been shown that counseling MDR lung TB patients at Undata Palu Hospital improves their quality of life to the point that ongoing counseling is necessary for MDR lung TB patients and can reduce the occurrence of MDR TB.

Keywords: MDR-TB, Quality of Life, Counseling Model.

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INTRODUCTION

Even if efforts to control the DOTS approach have been made, tuberculosis remains one of the major public health issues in the world. Research in a number of nations, including India, Zambia, Peru, Morocco, Uganda, and Vietnam [1–9], demonstrates efforts to control the TB disease. According to recent research conducted in Indonesia, patients with MDR-Lung TB have concerns with their quality of life[10–17]. Counseling is useful for improving the quality of life of MDR-TB patients[18–27].

There are an estimated 10.4 million new TB cases (incidents) in 2017, of which 5.9 million (56%) are among men, 3.05 million (34%) are women, and 1 million (10%) are children. Data are available for 202 nations and regions, which account for more than 99% of the world's population. 1.2 million (11%) of all new TB cases were among people living with HIV. India, Indonesia, China, Nigeria, Pakistan, and South Africa have the highest prevalence rates, accounting for 60% of all new cases. The success of TB control in the six countries will determine global advancement[28]. TB is a significant issue in

Indonesia. According to TB, TB/HIV, and MDR-TB (Multi-Drug Resistant) indices, Indonesia has a significant burden. Indonesia was the second-largest contributor to TB cases worldwide, behind India, according to the 2014 tuberculosis prevalence survey. The prevalence of TB with bacteriological proof is 759 per 100,000 people aged 15 and older, compared to 338 per 100,000 people in the Palu region[29].

A significant public health issue, TB medications represent a threat to the advancement of TB treatment and control. Antibiotics are misused in chemotherapy for TB patients who are susceptible to the treatment, which leads to the development of drug resistance. In general, places with inadequate TB control programs are where drug resistance develops. A drug-resistant TB patient can spread the disease to others. According to WHO estimations, there were approximately 480,000 cases of MDR-TB in 2013 with a 150,000 case annual death rate. After heart disease, stroke, diabetes, and hypertension, TB is the sixth most common cause of mortality. According to estimates, between 2002 and 2020, 2 billion people will be infected with tuberculosis, of those, 5 to 10 percent will acquire the disease, and 40 percent of those already ill will survive[30].

Tuberculosis needs special treatment to prevent transmission and higher mortality. In addition, the treatment phase for MDR-TB sufferers is longer compared to cases of pulmonary TB that are not resistant to Anti Tuberculosis (OAT) drugs. Drug resistance is a problem in tuberculosis management strategies and is currently a global public health problem that requires follow-up efforts. Basically, this resistance results from the treatment of inadequate TB patients as well as transmission from OAT-resistant TB patients[31].

Proper identification and diagnosis of MDR-TB patients can help in the care and recovery of MDR-TB patients. Long treatment will be very tedious for patients by consuming OAT for approximately 2 years, so the support from the next of kin will provide life support for MDR-TB patients so that this affects medication adherence and quality of life. Counselingor psychotherapy can be used in dealing with MDR TB patients. This technique can be chosen to meet the needs of a case, use systematically from a broader range of interventions to deal with specific problems such as MDR-TB patients so that patients have a good quality of life and improve their health status[32].

Principally, complete individual counseling, interviews carried out are all stages of counseling starting from the stage of relationship development, the preparation of counseling problem models, the preparation of counseling objectives for strategy implementation and follow-up or evaluation[33]. The quality of life of MDR-TB patients is greatly influenced by several factors, but studies on the quality of life of patients who are also seen from changes in conversion are still lacking. The implementation of counseling in Indonesia has been running for more than 30 years, however, the problems that occur in the world of guidance and counseling now are not much different from the problems that occurred in the past society. Often the guidance and counseling programs that are organized are ignored and not even desirable.

One of the factors causing the above problems occurs because the patient does not understand the disease makes the various counseling and guidance programs unattractive and not needed by the patient. For that reason, before we discuss more in guidance and counseling we need to discuss the problems in organizing the counseling program and the problems regarding counseling itself. Guidance and counseling program problems need to be done to improve the quality of life of patients by using modules or guidelines for guidance counseling. Therefore, this study aims to look at the effect of counseling on changes in thequality of life of MDR-TB patients.

METHOD

A quasi-experimental design with a randomized pretest and posttest control group is used in this kind of research. 38 patients from the Undata Palu Hospital who were randomly chosen between May and November 2022 made up the study's samples. The data were then analyzed using the Wilcoxon test, the Mann Whitney test, and the two mean difference tests. Each participant receives counseling sessions seven times over the course of a six-month period. Counseling using the SOWAN approach is supported by observation, well-

being, action, and nursing. The research ethics number for this study is 0011.7/KEPK-KPK/IV/2022 This research received a research ethics number 0011.7/KEPK-KPK/IV/2022 from the Research Ethics Commission of the Ministry of Health Poltekkes Palu.

RESULTS

The results of research conducted at the Undata Hospital in Palu from May-November 2022, the number of MDR Pulmonary TB patients as many as 38 patients, obtained the following results:

Table 1. Characteristics of MDR Lung TB Patients.

Variable	n	%
Groups		
Interventions	20	52,6
Controls	18	47,4
Sex		
Males	21	55,3
Females	17	44,7
Ages (years)		
20-30	6	15,8
31-40	13	34,2
41-50	8	21,1
51-60	11	28,9
Education		
Elementary	8	21,1
Junior High School	5	13,2
Senior High School	17	44,7
Higher Education	8	21,1
Profession		
Housewives	12	31,6
Civil Servants	5	13,2
Private jobs	21	55,3
Earning		
Enough	29	76,3
Less	9	23,7
Smoking Habit		
Smoking	12	31,6
Not smoking	26	68,4
Total	**38**	**100**

MDR Lung TB patients from the intervention group were 20 (52.6%) patients and from the control group were 18 (47.4%) patients. MDR Lung TB patients are male as many as 21patients (55.3%) while female patients are 17 patients (44.7%). Most MDR pulmonary TB patients came from the age group of 31-40 years as many as 13 (34.2%) patients and the least of the 20-30 years age category were 6 (15.8%) patients. The highest level of education in pulmonary TB patients is SMA as many as 17 patients (44.7%) and the least number of SMPis 5 (13.2%) patients. Most MDR pulmonary TB patients have private sector work in 21 (55.3%) patients, and the fewest are PNS 5 (13.2%) patients. Patients who had the highest income were 29 (76.3%) and low income were 9 (23.7%). Patients who had the habit of smoking were 12 (31.6%) and not smoking 26 (68.4%).

Table 2. Mann Whitney Test Results from Post-test Intervention and Quality Control Groups for MDR TB Patients.

Two groups independent test	Sig.
Interventions and controls Groups	0,001

Table 2 explains that the p-value (0.001) is smaller than 0.05, so there is a significant difference between the quality of life of MDR TB patients who are counseled with the control group, so it can be concluded that the counseling given has an influence on the quality of life of MDR TB patients.

Table 3. Results of the Wilcoxon Quality of Life Test for the MDR TB Patient Intervention Group.

Two groups dependent test	Sig.
Quality of life	0,001

Table 3 explains that the p-value (0.001) is smaller than the value of 0.05, so there is a significant difference between the quality of life of MDR TB patients before and after being given counseling, meaning that counseling given to MDR TB patients has a good influence on the quality of life.

Table 4. Wilcoxon Quality of Life Test Results Based on Domain Intervention Groups for MDR TB Patients.

Two groups dependent test	Sig.
Domain One	0,007
Domain Two	0,001
Domain Three	0,001
Domain Four	0,001

Table 4 explains that the p-value of the four domains of quality of life for MDR TB patients is smaller than the value of 0.05, so there is a significant difference between the quality of life of MDR TB patients before and after being given counseling, meaning that counseling given to MDR TB patients has a good influence on quality of life-based on the four domains of quality of life.

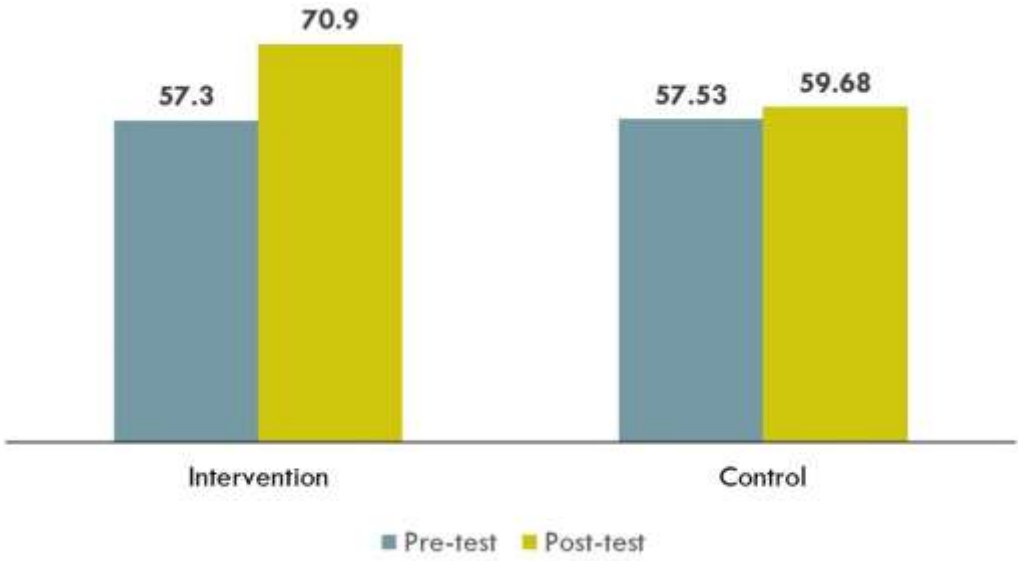

Figure 1. Graphic Comparison of Mean Quality of Life of MDR-TB Patients before and after counseling.

DISCUSSION

Because it is linked to social and economic issues, the TB problem in Indonesia is still challenging to control. It is brought on by poverty, malnutrition, endurance, slum living conditions, inadequate health facilities, delay or lack of TB program fees, and many other factors. Men are more likely than women to be MDR Lung TB patients because men are at higher risk. Male patients smoke more frequently than female patients, which worsens a variety of health issues, including lung ailments. TB affects many productive ages and raises the community's mortality rate, particularly in underdeveloped nations. The age at which a person is ready to work or generate something for both themselves and others is known as the productive age. Patients with MDR pulmonary TB over the age of 40 may become unproductive or even a burden to their families if they get pulmonary TB at that time.

Due to the stigma associated with the illness, certain nations, including Bangladesh, Vietnam, and Thailand, have different notification policies for pulmonary TB in men and women. Women avoid using health care because they fear receiving a negative assessment from the community. Men are more likely than women to smoke, which increases the risk of developing pulmonary TB. Smoking decreases the lungs' ability to fight off bacteria, which can make TB symptoms worse. Passive smokers who breathe in cigarette smoke will also be more susceptible to TB infection[34].

In Indonesia, TB is a serious public health concern. Poverty difficulties and public health issues are interrelated. At least about 1.3 billion people in the world are poor people, those who have to live on less than 1 US $ per day. The relationship between disease and poverty can be like vicious cycles. Because it is poor, a person will be malnourished, live in an unhealthy place, and cannot properly maintain health. Income is a measure that is often used to look at economic conditions in a group of people. The better the socio-economic conditions of the community the higher the percentage of people who use health services. The use of health services will improve one's health status so that it improves the quality of life[35].

The findings indicate that family income has an impact on TB patients' quality of life and is frequently linked to a decline in physiological function. Although the government provides free MDR-TB treatment as part of a program, patients and/or their families are still responsible for other costs associated with the sickness and treatment (such as missed income, transport to medical facilities, laboratory tests, emergency management, etc.). In India, one-third of MDR-TB patients are compelled to leave school or start working to help support their families. Patients and their families may occasionally need to sell home belongings, borrow money, or a portion of their savings to pay for medical expenses. Patients have the option of stopping their treatment and going back to work. Patients could decide not to continue their treatment and instead go back to work[36].

A person's view of their situation in life in relation to their objectives, aspirations, standards, and worries is referred to as their quality of life. This perception is influenced by the cultural environment and values in which they live. This is a broad notion that influences a person's physical health, psychological condition, dependency level, social connections, personal views, and relationship with future environmental aspirations[37].

Counseling is a form of psychotherapy that is used to help a patient overcome the psychological problems he faces. Counseling is a process where someone who has difficulty is helped to feel and then act in a way that is more satisfying to him, through interaction with someone who is not involved, namely the counselor. The counselor provides information and reactions to encourage clients to develop behaviors to relate more effectively to themselvesand the environment[38].

The duration of counseling is between 8 to 10 meetings which are usually held 2 or 3 times a week with a meeting time of 30 to 60 minutes, which depends on the dynamics of counseling that occurs. In helping to alleviate problems with the client (counseling usually the counselor will do a good schedule between 8 to 10 meetings that will be held for several weeks to produce a productive counseling[39].

A distinct concept is health-related quality of life (HRQoL), which describes how people's symptoms and medical issues affect their quality of life. Since health is the primary concern, HRQoL is favoured over quality of life in the context of health. Health status is referred

to as HRQoL, which is viewed as an increasingly complicated continuity in patient outcomes, biochemical and physiological parameters, symptoms, and perceptions of general health[40].

A person's view of his or her place in life as seen through the cultural lens and value system of the society in which they reside is referred to as their quality of life. This concept is related to an individual's focus, expectations, level of living, enjoyment, and sense of purpose in life. This is a broad notion that encompasses one's relationship to the environment, as well as their physical and psychological well-being, level of freedom, social relationships, and personal views[41].

A patient's perspective of his or her situation in life, which encompasses four categories, namely the physical, psychological, social, and environmental domains, is referred to as the quality of life of MDR-TB patients. These four domains consist of various factors that are closely related. The physical domain consists of an assessment of his needs in therapy, how far physical pain prevents him from doing activities, vitality in daily activities, work, satisfaction in sleep and ability to get along with the surrounding environment. While the psychological domain consists of accepting one's own condition, assuming that he is meaningful or dissatisfied with himself and in the social domain only consists of support from friends, sexual conditions and satisfaction with personal relationships. Environmental domain how far the patient is comfortable with his environment. Regarding his health, availability of information, finance, recreation and so on.

There are many things that cause poor quality of life in MDR-TB patients so that only 18% contribute to smoking history and medication adherence to the quality of life of MDR- TB patients. Microbiological factors, clinical factors, health worker factors, patient behavior factors or other disease factors are some of the causes of poor quality of life of MDR-TB patients.

Limitations experienced by the study while conducting this research include, the measurement of quality of life is only done at the end of the study, not done at the beginning of the study, retrospective data retrieval is conducted so this research is vulnerable to information bias, some respondents have difficulty in increasing information back that has occurred In the past, records in the hospital status book were still incomplete, so many respondents' addresses were rather difficult to trace, the number of samples in this study was limited, so as to reduce the level of precision in the study results.

CONCLUSION

Counseling MDR Lung TB Patients at Undata Palu Hospital has an impact on enhancing the quality of life of MDR Lung TB Patients in Palu Undata Hospital such that ongoing counseling is required for MDR Lung TB Patients and can lower the incidence of MDR TB.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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Original Article

Knowledge Regarding Management of Hypertension among Teachers at State Senior High School in Paccerakang Village

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ABSTRACT

The high rate of hypertension causes the high mortality rate. Hypertension can cause various complications, especially if the high incidence of hypertension is associated with a lack of knowledge about proper management of hypertension. This study aims to describe knowledge about management of hypertension. This was a quantitative descriptive study. The population in this study was all teachers at State Senior High School in Paccerakang Village who had hypertension with a total population of 50 people. 50 samples were selected using total sampling technique. Data were collected using a questionnaire and were analyzed using univariate analysis. The study findings were categorized into good, moderate and poor. The results of the study revealed that 52.5% of respondents had a poor level of knowledge regarding management of hypertension. Poor level of knowledge can be seen from the answers of respondents who stated the inappropriate management of hypertension. Based on the results of the study, it was found that more than half of respondents had a poor level of knowledge. Thus, there should be further efforts which involved coordination with the local Community Health Center to provide health education about hypertension management for State SHS Teachers in Paccerakang Village.

Keywords: Hypertension, Knowledge, Hypertension Management

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INTRODUCTION

Hypertension is a chronic disease with a high mortality rate. However, patient adherence to treatment is still low. Low patient adherence can be caused by several factors, one of which is patient knowledge regarding hypertension[1]. Hypertension refers to an abnormal blood pressure that can be measured in at least three different situations. Generally, if the blood pressure is more than 140/90 mmHg, the person is considered to have high blood pressure[2]. Based on Kurnia A. prediction, in 2016 the prevalence of hypertension worldwide among adults will reach 29.2%[3]. Based on Basic Health Research in 2018, the prevalence of hypertension in Indonesia was 34.1%, with the highest prevalence in South Kalimantan by 44.1%, the lowest prevalence in Papua by 22.2%[4]. The number of cases of hypertension in Indonesia was 63,309,620, while the death rate due to hypertension in Indonesia was 427,218[5]. The prevalence of hypertension in South Sulawesi was 31.68%. The prevalence of hypertension among women was 36.9%, higher than in men by 31.3%. Furthermore, the prevalence in urban areas was 34.4%, slightly higher than in rural areas by 33.7%[6]. This prevalence will continue to increase with age. Based on data by Regency/City, the highest prevalence of hypertension was found in Makassar City by 290,247 cases, then Bone Regency by 158,516 cases, and the third highest was in Gowa Regency by 157,221 cases, and the lowest prevalence was in Barru Regency by 1,500 cases[7].

Hypertension is a serious chronic disease that can damage organs. Nearly 1 billion people or 1 in 4 adults suffer from high blood pressure. Many factors cause hypertension, such as poor lifestyle, environment, education,

experience, and the lack of public knowledge about the treatment that must be performed for people with hypertension. Therefore, it is very necessary for people with hypertension to have knowledge about management of hypertension at home, since this will affect their health status[8].

Surely, patients with hypertension should have knowledge regarding hypertension, especially knowledge about how to manage the disease in order to achieve optimal health status. With proper treatment or management, high blood pressure can be controlled and the risk of recurrence can be reduced. Combined with lifestyle changes and anti-hypertensive medication, blood pressure can usually be maintained within a range that does not damage the heart and other organs[9]. Good knowledge is a domain for the formation of good behavior. The results of a study conducted by Laili, (2021) showed that 27.37% of patients had good level of knowledge and 72.63% of patients had a moderate level of knowledge[10]. Further finding was also obtained from a study conducted by Suaib M, (2019) that the high prevalence rate of hypertension did not only occur at the national and international levels, but also in the Paccerakang area. Based on the data derived from the Paccerakang Center, there were 2,599 outpatients with hypertension in 2020. Based on these data, Community Health hypertension ranked first out of the top 10 types of diseases in the Paccerakang area[11]

Based on a preliminary study conducted by researchers among 10 teachers with hypertension at the State Senior High School in Paccerakang Village, it was found that 8 teachers said that hypertension should be treated by taking medication when symptoms were felt, while 2 other teachers said that hypertension treatment was carried out by taking medicines and maintaining a healthy lifestyle. Proper management of hypertension among hypertensive patients is very crucial. Knowledge is needed to manage such disease, and it is expected that hypertensive patients can treat and prevent recurrence of hypertension through good knowledge and understanding with the aim of creating optimal health conditions. This study aims to describe knowledge about management of hypertension.

METHOD

This was a quantitative descriptive study. The population in this study was all teachers at State Senior High School in Paccerakang Village who had hypertension with a total population of 50 people. 50 samples were selected using total sampling technique. The current study was conducted at State SHS in Paccerakang Village on December 1, 2022. Data were collected using a questionnaire and were analyzed using univariate analysis.

RESULTS

Table 1. Frequency distribution of knowledge regarding management of hypertension.

Knowledge	Frequency	%
Good	6	7.5
Moderate	20	40
Poor	24	52.5

Based on table 1, it was found that a small number of respondents had a good level of knowledge. Furthermore, almost half of respondents had a moderate level of knowledge and most of respondents had a poor level of knowledge regarding management of hypertension among teachers with hypertension at State SHS of Paccerakang Village in 2022.

Table 2. Analysis on knowledge regarding pharmacological treatment of hypertension.

Knowledge	Frequency	%
Good	7	10
Moderate	10	15
Poor	33	75

Based on table 2, it was found that a small number of respondents had a good level of knowledge, some respondents had a moderate level of knowledge and most respondents had a poor level of knowledge regarding pharmacological treatment of

hypertension among teachers with hypertension at State SHS of Paccerakang Village in 2022.

Table 3. Analysis on knowledge regarding non-pharmacological treatment of hypertension.

Knowledge	Frequency	%
Good	21	42.5
Moderate	14	27.5
Poor	15	30

Based on table 3, it was revealed that the majority of respondents had a good level of knowledge, almost half of respondents had a moderate level of knowledge and almost half of respondents had a poor level of knowledge regarding non-pharmacological treatment of hypertension among teachers with hypertension at State SHS of Paccerakang Village in 2022.

DISCUSSION

Knowledge is the result of human sensing, or the result of observation related to objects through their senses (eyes, nose, ears and so on). Production of knowledge through sensing time is influenced by the seriousness of attention and response to objects. Most of a person's knowledge is obtained through the sense of hearing (ears) and the sense of sight (eyes). A person's knowledge of objects has different seriousness or responses[12].

The knowledge questionnaire applied in this study only assessed the basic knowledge that a hypertensive patient must have in terms of distinguishing between normal and high blood pressure, lifestyle, symptoms experienced, frequency of drug use, complications, and distinguishing which foods that should be limited in consumption or not consumed at all which can be determined primarily from the salt content[13]. Proper management of hypertension among hypertensive patients is very crucial. Knowledge is needed to manage such disease, and it is expected that hypertensive patients can treat and prevent recurrence of hypertension through good knowledge and understanding with the aim of creating optimal health conditions According to Notoadmojo, (2012), a person's knowledge can be developed through various factors such as experience, level of education and sources of information[15].

The results of the study showed that most of respondents had a poor level of knowledge so that it significantly affected the level of community ability in the management of hypertension. Lack of information obtained either from social media or lack of exposure to sources of information is the cause of the lack of knowledge. The study finding regarding respondents' knowledge on pharmacological treatment showed that most of them had a poor level of knowledge. Hypertension is often referred to as the "silent killer" because people with hypertension often have never experienced health problems due to their condition or any symptoms for many years. Without realizing it, people with hypertension will experience complications in important organs in the body, such as the heart, brain and kidneys[16].

Hypertension is very closely related to lifestyle so that it takes a long time to treat it through lifestyle modifications for a long time accompanied by drugs[17]. Various efforts can be tried to overcome hypertension, including controlling blood pressure by administering medication. Pharmacological treatment is in the form of administration of antihypertensive medication such as diuretics, beta-adregenic blockers or beta-blockers, vasodilators, calcium channel blockers and angiotensin converting enzyme (ACE) inhibitors[18].

Experience shows that the longer a patient has an illness, the higher the tendency to consider the symptoms that appear as normal so that patients tend not to take treatment because they are considered normal symptoms and they take medication if the symptoms are felt to be severe. The result of the study on patient knowledge regarding non-pharmacological management of hypertension was found to be good for the majority of respondents. The intended treatments include lifestyle modification, a low-salt diet, a reduction of alcohol consumption, smoking cessation, exercise, and hypertension medication. One component that influences self-care for people with hypertension is self-efficacy. People with hypertension who have good self-efficacy can

treat hypertension well, for example through adherence to taking anti-hypertensive drugs[19]. Various efforts can be tried to overcome hypertension, including controlling blood pressure by administering medication. In addition, non-pharmacological treatment methods can be applied in the form of lifestyle modifications, losing body weight, limitation of sodium consumption, modification of low-fat diets, alcohol and caffeine restriction, relaxation method, and smoking cessation[20].

CONCLUSION

It can be concluded from this study that among teachers with hypertension at State SHS of Paccerakang Village in 2022, the majority of respondents had a poor level of knowledge regarding the management of hypertension, had a poor level of knowledge regarding pharmacological treatment of hypertension, and had a good level of knowledge regarding non-pharmacological treatment of hypertension. Based on the results of the study, it was found that more than half of the respondents had a poor level of knowledge. Thus, there should be further efforts which involved coordination with the local Community Health Center to provide health education about hypertension management for State SHS Teachers in Paccerakang Village.

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CONFLICTS OF INTEREST:
The authors declare no conflict of interest.

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Original Article

The Effect of Deppamil Dangke to Pregnant Women with Chronic Energy Deficiency on the Outcome of Newborn Babies in Enrekang Regency

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ABSTRACT

Chronic energy deficiency (CED) tends to occur in pregnant women and carry detrimental effects, especially on the women during labour and on the fetus. Therefore, it is extremely important to increase nutritional intake during pregnancy for optimized newborn outcome. There are a variety of ways to treat CED, one of which is to provide additional food during pregnancy. This study aims to determine the effect of Deppamil Dangke to pregnant women with CED on the outcome of newborns. This research method used a quasi-experimental design conducted for 18 weeks in Enrekang Regency, with a population of 28 pregnant women > 20 weeks gestation who then used a exhaustive sampling technique where the sample was divided into two consisting of 14 intervention samples and 14 control samples. The results of the study were tested using Mann Whitney showing the value of ρ > α (0.05), which means that there was no difference in the outcome of newborns between the intervention group and the control group. Conclusion. Consuming Deppamil Dangke did not have a direct effect on the outcome of newborns, even though the difference was not significant, but the average outcome of newborns in mothers who consumed Deppamil Dangke + PMT was in the normal category.

Keywords: Deppamil Dangke, Chronic Energy Deficiency, Outcome of Newborns.

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INTRODUCTION

Data from the Inter-Census Population Survey (SUPAS) show that the maternal mortality rate (MMR) increases from year to year. It is indirectly caused by chronic energy deficiency (CED) in pregnant women. CED is ranked the 10th of cases in pregnant women in South Sulawesi with a percentage of 13.8%[1]. In 2021, 513 pregnant women with CED (14%) and 171 births with low birth weight (LBW) (5.46%) were recorded in Enrekang Regency[2].

Nutrition is an important concern in pregnant women as it determines the quality of growth and development of the foetus and greatly affects birth and neonatal period[3,4].

Therefore, it is critical to increase macro- (i.e., carbohydrates, fats, and proteins) and micro-nutrients (i.e., iron, vitamins, and minerals) during pregnancy[3,5]. One of the government's efforts to achieve this end, and therefore deal with the CED problem, is to provide supplementary food for pregnant women[6].

Previous research has revealed that the administration of government-provided supplementary food to pregnant women with CED for 90 days resulted in an increase in upper arm circumference (UAC) of 23.5 cm, which indicates an increase in nutritional status[7,8]. However, some pregnant women were found not to consume the government-provided supplementary food due to boredom, which affected their level of compliance in consuming the product[9].

South Sulawesi is a host of a variety of food products spread across several regencies. Among such regencies, Enrekang Regency produces food products of good quality. The regency produces a traditional food product naturally from fresh bovine milk with a strong milk aroma named dangke[10].

According to a 2017 study, dangke contains 44.93% water, 8.03% fat, 24.54% protein, and 19.3% carbohydrate[11]. Dangke can be further processed into crackers for pregnant women's consumption. It was reported that 100 g of dangke crackers contain 9% protein and 8 mg of iron[12]. Another laboratory test conducted on January 6, 2022 showed that 100 g of dangke contains iron (Fe) at 0.86 µg/g, calcium at 1,281.37 µg/g, carbohydrate at 0.74%, and glucose at 0.82%[13].

This research was conducted as an innovation based on the local wisdom of Enrekang Regency, where dangke was used as an ingredient of an additional food product for pregnant women. This food is called Deppamil Dangke, which in the regional language of Enrekang Regency means Dangke-based cakes for pregnant women. In 100 g of Deppamil Dangke, 41.69% carbohydrate, 10.34% protein, 26.10% fat, 0.77% crude fiber, 46.32% glucose, vitamin A at 473.21µg/g, vitamin C at 294.26µg/g, iron (Fe) at 22.46µg/g, and calcium at 1,202.41µg/g are contained as a source of calories for pregnant women [14].

Deppamil dangke has been tested on 30 pregnant panellists, and the results showed that 63.3% of them strongly liked the taste, 53.3% strongly liked the texture, 50% strongly liked the colour, and 46.7% strongly liked the aroma. It was thus concluded that Deppamil Dangke is well-liked by pregnant women and is highly suitable to be used as a supplementary food product and an intervention material for pregnant women with CED in comparison to government-provided supplementary foods.

This study aims to determine the effect of Deppamil Dangke to CED pregnant women on the outcome of newborns in Enrekang regency.

METHOD

This study using a quasi-experimental design for 18 weeks at some public health centres in Enrekang Regency. The population in this study consisted of all pregnant women with CED who were pregnant for > 20 weeks. A sample of 28 respondents was selected by *exhaustive* sampling. The variables studied were the newborns outcome consisting of birth weight, birth length and newborns hemoglobin level.

The respondents were then divided into two groups: 14 pregnant women were assigned to an intervention group, and 14 pregnant women were assigned to a control group. The respondents in the intervention group were asked to consume six pieces of *Deppamil Dangke* a day until just before delivery, and the respondents in the control group were asked to consume three pieces of government-provided supplementary food a day. An examination of labour outcome was conducted by checking the haemoglobin level of the baby after cutting the umbilical cord using Easy Touch GCHb and measuring the weight and length of the baby after early breastfeeding initiation (EBI). Data were analyzed in a descriptive way then to determine the effect of *Deppamil Dangke* was carried out bivariate analysis using the *Mann Withney* alternative test.

The study has obtaining approval ethics by The Health Research Ethics Committee of the Muhammadiyah Faculty of Health University Medicine and Science Makassar number 209/UM.PKE/XI/44/2022.

RESULTS

Table 1. Distribution characteristics of respondents.

Characteristics of Respondents		Sample Group				Total	
		Intervention		Control		f	%
		f	%	f	%		
Age	17-20 years	3	100.0	0	0.0	3	100.0
	21-24 years	2	100.0	0	0.0	2	100.0
	25-28 years	5	62.5	3	37.5	8	100.0
	29-32 years	1	14.3	6	85.7	7	100.0
	33-36 years	2	33.3	4	66.7	6	100.0
	> 36 years	1	50.0	1	50.0	2	100.0
Gestational Age	20-24 Weeks	6	37.5	10	62.5	16	100.0
	≥ 25 Weeks	8	66.7	4	33.3	12	100.0
Work	Farmer	8	66.7	4	33.3	12	100.0
	Housewife	5	45.5	6	54.5	11	100.0
	Honorary Teacher	1	20.0	4	80.0	5	100.0
Parity Group	Parity 1	6	75.0	2	25.0	8	100.0
	Parity 2	5	45.5	6	54.5	11	100.0
	Parity 3	2	66.7	1	33.3	3	100.0
	Parity 4	0	0.0	5	100.0	5	100.0
	Parity 5	1	100.0	0	0.0	1	100.0
Birth Weight Category	<2500 gr	0	0.0	4	100.0	4	100.0
	2500-4000 gr	14	60.9	9	39.1	23	100.0
	>4000 gr	0	0.0	1	100.1	1	100.0
Birth Length Category	<48 cm	4	50.0	4	50.0	8	100.0
	48-50 cm	10	55.6	8	44.4	18	100.0
	>50 cm	0	0.0	2	100.0	2	100.0
Infant Hemoglobin Levels	<19.3 gr/dl	1	14.3	6	85.7	7	100.0
	19.3-33 gr/dl	13	61.9	8	38.1	21	100.0
Energy Intake	Pre						
	< 2527 cal	13	52.0	12	48.0	25	100.0
	≥ 2527 cal	1	33.3	2	66.7	3	100.0
	Post						
	< 2527 cal	0	0.0	7	100.0	7	100.0
	≥ 2527 cal	14	66.7	7	33.3	21	100.0

Table 1 shows the characteristics of respondents by age group. It is shown in the table that in the 17–20 years *age group* more respondents were in the intervention group (100%) than in the control group (0.0%), in the 21–24 years age group more respondents were in the intervention group (100%) than in the control group (0.0%), in the 25–28 years age group more respondents were in the intervention group (62.5%) than in the control group (37.5%), in the 29–32 years age group more respondents were in the control group (85.7%) than in the intervention group (14.3%), in the 33–36 years age group more respondents were in the control group (66.7%) than in the intervention group (33.3%), and in the > 36 years age group the numbers of respondents in both the intervention group and the control group were equal (50.0%). The characteristics of respondents according to gestational age. In the groupof pregnant women with gestational age of ≥ 25 weeks, there were more respondents in the intervention group (66.7%) than the control group (33.3%), and in the 20–24 weeks gestation age group, there were more respondents in the control group (62.5%)

than in the intervention group (37.5%). The characteristics of respondents according to work. According to the table above, in the farmer group there more respondents in the intervention group (66.7%) than in the control group (33.3%), in the housewife group, the numbers of respondents in the intervention group and the control group were almost equal (45.55% vs 54.5%), and in the honorary teacher group there were more respondents in the control group (80.0%) than in the intervention group (20.0%). The characteristics of respondents according to parity. In the para 1 group there were more respondents in the intervention group (75.0%) than in the control group (25.0%), in the para 2 group there were more respondents in the control group (54.5%) than in the intervention group (45.5%), in the para 3 group there were more respondents in the intervention group (66.7%) than in the control group (33.3%), in the para 4 group there were more respondents in the control group (100.0%) than in the intervention group (0.0%), and in the para 5 groupthere were more respondents in the intervention group (100.0%) than in the control group (0.0%).

The characteristics of respondents according to birth weight. In the < 2,500 g birth weight group more respondents were in the controlgroup (100.0%) than in the intervention group (0.0%), in the 2,500–4,000 g birth weight group more respondents were in the intervention group (60.9%) than in the control group (39.1%), and in the > 4,000 g birth weight group more respondents were in the control group (100.0%) than in the intervention group (0.0%). The characteristics of respondents according to birth length. In the 48–50 cm birth length group more respondents were in the intervention group (55.6%) than in the control group (44.4%), in the < 48 cm birth length group the numbers of respondents were equal in the intervention group and the control group (50.0%), and in the > 50 cm birth length group more respondents were in the control group (100.0%) than in the intervention group (0.0%). The characteristics of respondents according to the infant haemoglobin level. In the < 19.3 gr/dl haemoglobin level group more respondents were in the control group (85.7%) than in the intervention group (14.3%), and in the 19.3–33 gr/dl haemoglobin level group more respondents were in the intervention group (61.9%) than in the control group (38.1%). The characteristics of respondents according to energy intake before and after intervention. Before intervention, the group of mothers who had energy intake of < 2,527 cal had more respondents in the intervention group (52.0%) than in the control group (48.0%), and the group of mothers who had energy intake of ≥ 2,527 cal had more respondents in the control group (66.7%) than in the intervention group (33.3%). After intervention, the group of mothers who had energy intake of < 2,527 cal had more respondents in the control group (100.0%) than in the intervention group (0.0%), and the group of mothers who had energy intake of ≥ 2,527 cal had more respondents in the intervention group (66.7%) than in the control group (33.3%).

Analysis of the Effect of *Deppamil Dangke* on Delivery Outcomes

The analysis of the effect of *Deppamil Dangke* on labour outcomes was conducted using the Mann- Whitney Test with the consideration that the sample used was non-random. Thus, the assumption for a parametric statistical test was not fulfilled.

Table 2. The Effect of *Deppamil Dangke* on the Baby's Birth Weight, Birth Length, and Haemoglobin Level.

Variables	Sample Groups				Statistical Test	
	Intervention		Control		U Count	ρ
	Mean	SD	Mean	SD		
Birth Weight	2,911.79	295.990	2,926.29	606.927	90.500	0.730
Birth Length	48.36	1.082	48.71	2.164	92.000	0.775
Hemoglobin Level	22.450	1.7145	21.421	2.7502	81.000	0.434

Table 2 show that the average birth weight of the intervention group was 2,911.79 ± 295.990 g, while the average birth weight of the control group was 2,926.29 ± 606.927 g. The average birth length of the intervention group was 48.36 ± 1.082 cm, while the average birth length of the control group was 48.71 ± 2.164 cm. Lastly, the average infant haemoglobin level of the intervention group was 22.450 ± 1.7145 g/dl, while the average infant haemoglobin level of the control group was 21.421 ± 2.7502 gr/dl.

Furthermore, the statistics obtained from the Mann-Whitney Test show the following:

1. There was no difference in birth weight between the intervention group andthe control group, with a p-value of > 0.05 (0.730). This indicates that the *Deppamil Dangke* did not have any direct effect on the baby's birth weight.
2. There was no difference in birth length between the intervention group and the control group, with a p-value of > 0.05 (0.775). This indicates that the *Deppamil Dangke* did not have any direct effect on the baby's body length.
3. There was no difference in infant haemoglobin level between the intervention group and the control group, with a p-value of > 0.05 (0.434). This indicates that the *Deppamil Dangke* did not have any direct effect on the baby's haemoglobin level.

Based on the data analysis results, it was found that the *Deppamil Dangke* did not have any effect on delivery outcomes. Although the difference was not significant, the average outcome of newborns in mothers who consumed *Deppamil Dangke* + government-provided supplementary food was in the normal category.

DISCUSSION

The Effect of *Deppamil Dangke* on Birth Weight.

The average birth weight of babies whose mothers consumed *Deppamil Dangke*, 2,911.79, was in the normal category (2500–4000 gr), with an SD of 295.990 cm. This was because the combination of *Deppamil Dangke* and government-provided supplementary food contains 225 g of carbohydrate, 25 g of protein, 1,638 mg of calcium, and 33 mg of iron, which is high enough to help meet daily nutritional needs. Previous research showed that adequate consumption of carbohydrate, protein, and iron in pregnant women is associated with an increase in birth weight. According to that study, adequate consumption of carbohydrate and protein in pregnant women can increase birth weight by 64.4 grams and 64.6 grams, respectively, while adequate consumption of iron in pregnant women can increase birth weight by 76.6 grams[15].

In general, nutritional intake during pregnancy, including the intake of carbohydrate, protein, and iron, can affect the growth and development of the foetus, and it is reflected by, among other things, birth weight. Several studies have shown that low carbohydrate intake can increase the risk oflow birth weight or premature birth, while adequate protein intake can help increase the baby's growth and birth weight[16]. On the other hand, iron deficiency during pregnancy can cause anaemia in pregnant women and affect the baby's birth weight[17].

The importance of carbohydrate and protein intake in pregnancy is primarily associated with healthy foetal growth and good birth weight. Adequate carbohydrate intake can help provide energy for foetal growth, while protein helps build quality baby muscles and body tissues. Meanwhile, iron is important to help form red blood cellsin infants and prevent iron deficiency in pregnant women, which can cause low birthweight or birth defects.

The Effect of *Deppamil Dangke* on Birth Length.

The average birth length of babies whose mothers consumed *Deppamil Dangke*, 48.3 ± 1.082 cm, was categorized as normal as *Deppamil Dangke* and the government-provided supplementary food contains enough nutrition to help meet pregnant women's daily nutritional needs. Several studies have been conducted to determine the relationship between the intake of carbohydrate, protein, and iron in pregnant women and the baby's birth length. A study

showed that protein and iron intake in the third trimester of pregnancy has a significant relationship with the baby's birth length[18]. Subsequent studies have shown that iron intake in pregnant women has a significant relationship with birth length, especially in women with iron deficiency. Still some subsequent studies showed that sufficient iron intake in pregnant women is positively related to the baby's birth length, but no significant relationship was found between carbohydrate intake and the baby's birth length[19–21].

The Effect of *Deppamil Dangke* on Infant Haemoglobin Level.

The average haemoglobin level in babies whose mothers consumed *Deppamil Dangke* and the government-provided supplementary food was influenced by the content of *Deppamil Dangke*, which is high enough to help meet pregnant women's daily nutritional needs. Adequate nutritional intake of carbohydrate, protein, and iron in pregnant women has been reported to have a positive effect on the haemoglobin level of the baby. This is because adequate nutrition can help the optimal formation of red blood cells in the foetus in the womb.

Haemoglobin is a protein contained in red blood cells that carries oxygen throughoutthe body. Inadequate nutritional intake in pregnant women can cause anemia, which can reduce haemoglobin levels in the baby.

Several theories explain the relationship between nutritional intake in pregnant women and the baby's hemoglobin level. One theory is that adequate nutritional intake in pregnant women can increase the production of erythropoietin, a hormone that stimulates the formation of red bloodcells. In addition, adequate nutrition can also increase the absorption of iron from food and increase the availability of iron for the formation of red blood cells[22,23].

Previous research showed that sufficient intake of carbohydrate, protein, and iron in pregnant women can increase the haemoglobin level of the baby. A study found that pregnant women who consume adequate amounts of protein have a lower risk of giving birth to babies with low haemoglobin levels[24]. Other studies have shown that pregnant women who consume sufficient amounts of carbohydrate and iron also have a lower risk of giving birth to babies with low haemoglobin levels[25].

There are also studies finding no significant relationship between nutritional intake in pregnant women and the haemoglobin level of the baby. A study showed that protein and iron intake in pregnant women is not related to the baby's hemoglobin level, but sufficient consumption of carbohydrate[26].

In general, although study results vary, adequate intake of carbohydrate, protein, and iron in pregnant women is important to prevent anemia and it can affect the baby's hemoglobin level.

CONCLUSION

Based on the results of the study and discussion, it is concluded that consuming Deppamil Dangke didn't have a direct effect on the outcome of newborns, although the difference was not significant, the average outcome of newborns in mothers who consumed Deppamil Dangke + government-provided supplementary food was in the normal category.

Further research needs to be carried out using a larger sample to determine the effect of Deppamil Dangke on delivery outcomes, especially on the baby's birth weight, birth length, and haemoglobin level. It is also recommended that health workers, especially those in the work area of Enrekang Regency, make Dangke an ingredient and develop Deppamil Dangke as a carbohydrate-, iron-, and protein-rich government-provided supplementary food, which has been proven to be able to increase food intake in pregnant women, especially those with CED, so that the nutrition of pregnant women can be increased and the birth outcome can be optimal.

CONFLICTS OF INTEREST:
The authors declare no conflict of interest.

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Original Article

Risk Factors for Stunting in Toddlers in Gowa Regency

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ABSTRACT

Stunting is a nutritional problem faced in various parts of the world, especially in poor countries and developing countries. Prevalence of Stunting in Indonesia based on the results of the Indonesian Nutrition Status Study (SSGI) in 2019 was 27.7% and in 2021 it was 24.4%. In South Sulawesi, the prevalence of Stunting based on SSGI results in 2021 is 27% while the prevalence of Stunting in Gowa Regency is 33%. The Objectives of this study to Investigating the correlation between stunting and parenting, nutrient intake, infectious diseases, and environmental sanitation. This research method is observational and analytical with a case-control research design. The number of samples was 38 consisting of 19 working toddler mothers who had Stunting toddlers as a case group and 19 working toddler mothers who had non-Stunting toddlers as a control group. Research results show a foster-pattern connection with Stunting (p= 0,012), there is a connection between protein nutrient intake and stunting (p= 0,020), there is a connection between fat nutrient intake and stunting (p= 0,017), there is a connection between carbohydrate nutrient intake and stunting (p= 0,007). It was concluded that the Stunting incident in toddlers aged 24 to 59 months was related to foster patterns and nutritional substance intake but was not related to infectious diseases and environmental sanitation.

Keywords: Environmental Sanitation, Infectious Diseases, Nutritional Intake, Stunting.

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INTRODUCTION

Stunting is a nutritional problem faced in various parts of the world, especially in poor countries and developing countries[1]. Indonesia is ranked the fifth largest in the world for *stunting* prevalence [2]. The prevalence of *stunting* from year to year is still high because it is still far above the threshold set by WHO which is 20%[3]. Prevalence of *Stunting* in Indonesia based on the results of the Indonesian Nutrition Status Study (SSGI) in 2019 was 27.7% and in 2021 was 24.4%. In South Sulawesi, the prevalence of *Stunting* based on SSGI results in 2021 is 27% while the prevalence of *Stunting* in Gowa Regency is 33%[4].

According to WHO, the short-term impact of *stunting* can lead to an increased incidence of pain and *death*, not optimal cognitive or intelligence, motor, and verbal development, and increased health costs[5]. The long-term impact of *stunting* is non-optimal posture as an adult, increased risk of degenerative diseases, decreased reproductive health, not optimal learning capacity and performance during the school period, and not maximal productivity and working capacity[6,7].

One factor associated with the Stunting incident is the parenting, where good parenting will have an effect on the child's growth process

associated with normal nutritional status, and vice versa if the parenting is bad, the toddler will be at risk of developing Stunting[8]. Nutrition intake is one of the direct causes that can affect the nutritional status of toddlers. Nutrition intake is closely related to the Stunting incident because when intake of nutrients is insufficient, it can lead to an imbalance in intake, so it can persistently lead to Stunting nutritional problems[9]. Toddlers who have a history of infectious disease have a bigger chance of experiencing Stunting than children who have no history of infection disease because it can cause a long-term effect of height growth deficit. Bad environmental sanitation can lead to Stunting, if the child's living environment is not optimal, which blocks housing, contractions, garbage disposal, water supply, and others, then the child's health condition will be impaired, as well as the growth of toddlers[10].

Handling Stunting through specific interventions such as actions for the first one thousand days and short-term in the health sector such as immunization, supplementary feeding for pregnant women and toddlers, monitoring the growth of toddlers at health pos, iron-folate tablet supplements for pregnant women, promotion of exclusive breastfeeding[11], complementary feeding. While sensitive interventions aimed at the general public such as clean water supply, sanitation facilities, various poverty reduction, food security and nutrition, food fortification, education of nutrition, gender equality[12,13, 14].

A working mother is a woman who is married and has children and has the task of being a housewife and working outside the home for ≤ 8 hours/day[15]. 96% of working mothers said they did not get enough time to be with their children. Working mothers when returning from the office, the majority of 94% was not to be close to their children for various reasons such as being tired of having worked, wanting to do a task, and having limited time. Working mothers are aware of the fact that the child is not getting the mother's attention properly [16] Objectives of this study to Investigating the correlation between stunting and parenting, nutrient intake, infectious diseases, and environmental sanitation.

METHOD

This type of research is observational analytics with a *case-control* research design using Odds Ratio (OR). The research was conducted in the working area of Pallangga Health Center, Gowa Regency. The causative variables are parenting patterns, nutrient intake, infectious diseases, and environmental sanitation of working toddler's mother and the result variable is Stunting, which aims to compare the case group, namely stunted toddlers with the control group and toddlers who are not stunted. Cases and controls were *matched* against the work of the mother (working mother) and the same age range of toddlers (24-59 months). The samples in the study were working toddler mothers, who had *stunting toddlers* as a case group and working toddler mothers who had *non-stunting* (normal) toddlers as a control group. Usia toddlers 24 - 59 months (Age criteria have been matching). The sample size is calculated using formulas for *case-control* research. The number of samples was 38 people, consisting of 19 working mothers with stunting toddlers as the case group and 19 working mothers with non-stunting toddlers as the control group. Determination of the sample using the *purposive sampling* technique. The collection of data on parenting, infectious diseases, and environmental sanitation was done by interviews using a questionnaire, and data on the nutrient intake was obtained using the 24-hour food recall method. Retrieval of data about stunting is done by the method of measuring anthropometry using height index/age. Measurement of height using Microtoise and weight using Digital Scales. Statistical analysis using *chi-square* test with 95% confidence degree ($\alpha = 0,05$). To find out the degree of connection using the *odds ratio* (OR), where *the Odds Ratio* (OR) compares *the Odds* in the case group with the control group. This study was approved by the Research Ethics Commission of Makassar Health Polytechnic, No: 0227/ KEPK-PTKMKS/V /2021.

RESULTS

Table 1. Characteristic of subject.

Variabel	Categories	Case		Control	
		n	%	n	%
Mother Education	high school	5	26,3	8	42,1
	Universities	14	73,6	11	58,0
Ethicity	Bugis	11	58,0	12	63,0
	Makassar	8	42,0	7	37,0
Mother Age	25-30 y	11	58,0	8	38,0
	31-35 y	5	26,3	1	5,2
	36-40 y	3	15,7	10	52,6
Mother occupation	Civil Servant/Military/Police	3	15,7	4	21,0
	Private Employees	9	47,3	6	31,5
	Contract Workers/Interns	7	36,8	9	47,3

Mother education: The majority of mothers in the case group had attended universities, with 73.6% having higher education. In the control group, 58.0% of mothers had a high school education. Mother occupation: In the case group, 15.7% of mothers were employed as civil servants, military personnel, or police officers (PNS/TNI/Polri), while 47.3% worked in the private sector. In the control group, these percentages were 21.0% and 31.5% respectively.

Table 2. The Correlation between Parenting, Nutrient Intake and Stunting in Gowa Regency.

Variabel	Categories	Case		Control		*P*	OR	CL
		n	%	n	%			
Parenting	Good	2	10,5	9	47,4	0,012	7,650	1,370-42,713
	Less	17	89,5	10	52,6			
Protein intake	Good	4	21,1	11	57,9	0,020	5,156	1,234-21,554
	Less	15	78,9	8	42,1			
Fat Intake	Good	3	15,8	10	52,6	0,017	5,926	1,287-27,283
	Less	16	84,2	9	47,4			
Carbohydrate	Good	3	15,8	11	57,9	0,007	7,333	1,583-33,967
intake	Less	16	84,2	8	42,1			
Infectous	Good	17	89,5	16	84,2	0,631	0,627	0,092-4,259
Diseases	Less	2	10,5	3	15,8			
Environmental	Good	17	89,5	16	84,2	0,631	0,627	0,092-4,259
Sanitation	Less	2	10,5	3	15,8			

Based on the data from Table 02, it was observed that in the case group, the lack of parenting pattern was found in 17 individuals (89.5%), while in the control group, it was present in 10 individuals (52.6%). The chi-square test yielded a p-value of 0.012, indicating a significant correlation between parenting and stunting in toddlers of working mothers in Gowa Regency. The odds ratio (OR) value of 7.605 suggests that parenting is a risk factor for stunting. Additionally, the study found a significant correlation between protein intake and stunting (p=0.020), fat intake and stunting (p=0.017), as well as carbohydrate intake and stunting (p=0.007) in toddlers of working mothers. The OR values of 5.156 for protein intake, 5.926 for fat intake, and 7.333 for carbohydrate intake indicate that these nutrient deficiencies are risk factors for stunting. However, no correlation was found between infectious diseases or environmental sanitation and stunting in the study population.

DISCUSSION

The study highlights several important points. Firstly, the research shows that parenting practices play a crucial role in the occurrence of stunting in toddlers. This emphasizes the significance of paying attention to good parenting practices that support the growth and development of children. Secondly, there is a relationship between the intake of protein, fat, and carbohydrates and the occurrence of stunting. This underscores the importance of providing nutritionally rich and balanced food to prevent or address stunting in toddlers. Thirdly, the study reveals that stunting in toddlers is not associated with infectious diseases or specific environmental conditions. Other factors such as parenting practices and nutrient intake have a more significant impact. Lastly, these findings have policy implications and can contribute to the development of child health policies and stunting prevention programs. Recognizing the importance of good parenting practices and adequate nutrient intake can help reduce the incidence of stunting in toddlers.

Parenting is one model of nutritional intervention, accompanying other intervention packages such as zinc supplementation and micronutrient supplementation in pregnant women. Parenting is part of nutrition education and the strengthening of interventions targeting children[17]. Effective parenting improves both macro and micronutrient intake. Nutrient intake can be enhanced by improving parenting models related to children's food choices. If parenting is already good and there is support in terms of the availability of animal-source foods or sufficient protein, it will contribute to efforts in preventing stunting[18,19]. Infant formula, enriched with protein, is crucial for growth, as well as the appropriate content of fats and carbohydrates to meet the maximum growth needs. If there is inadequate intake of these macro nutrients, it can lead to growth failure. If this condition persists, it can result in a generally shorter stature in children[20,21].

The nutritional status of toddlers is influenced by family parenting patterns because toddlers are still completely dependent on the family to fulfill their food intake and health care. The quality of food is very dependent on the child's parenting style applied by the family. Healthily parenting in feeding, providing nutritious food, and managing the portion spent will improve the nutritional status of children. Good food for toddlers must meet the requirements for adequacy of energy and nutrients according to age, a balanced menu pattern with varied food ingredients, children's eating habits and tastes, the shape, and the portion of food that is adapted to the child's condition, and pay attention to personal and environmental hygiene[22].

In this study, working mothers generally have less parenting to their toddlers, because of the lack of time and attention given to the toddler, the mother's work will greatly affect the mother's interaction with toddlers, working mothers have approximately 8 hours outside the home to work so that time for parenting is given to other family members. This interaction between mothers and toddlers is an important part of the toddler's development process. Lack of parenting for toddlers can result in stunted toddlers because most toddlers born have good nutritional status but because the parenting provided by parents is not good growth is stunted results in stunting[23].

One of the factors that influence the growth and development of children is nutritional intake. Lack of nutrition in food causes impaired child growth which will affect the development of the whole body. Malnutrition can be caused by a lack of nutritional intake, an imbalance between input and the need for the necessary nutrients. In this study, the lack of nutritional intake of toddlers is related to the condition of the working toddler mother because it can cause the child to pay less attention than the mother because the toddler child is very dependent on the caregiver (mother) or other family nods. Working mothers of toddlers are not able to give full attention to their children the busyness and burden of work borne resulting in a lack of attention in preparing diverse food dishes that are suitable for toddlers[24].

This study found no association between infectious diseases and stunting in children under the age of five. However, conducted research that suggested a connection between infectious diseases and the incidence of stunting in toddlers. Children with a history of infections are at three times higher risk of experiencing stunting.

The results of this study differ from other studies that strongly associate infectious diseases with stunting. It can be explained that

although this study did not show a correlation between stunting and infectious diseases, it does not mean that infectious diseases can be disregarded. This is because the sample diversity in this study was not robust enough to detect that relationship[25]. Infectious diseases result in the energy needed for growth being diverted and used to fight the body against infection as well as lower defenses and interfere with immune function[26]. In this study, toddlers generally do not suffer from infectious diseases even though the toddler's mother works because the toddler's mother routinely pays attention to the child's health if sick and routinely gives worm medicine[27]. Environmental sanitation can have an impact on children's growth and development, lack of good environmental sanitation has an indirect impact on the health of toddlers which can ultimately affect their nutritional status[28].

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CONFLICTS OF INTEREST:
The authors declare no conflict of interest.

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Original Article

Hypnotherapy Intervention Can Reducing Anxiety and Cortisol in Pregnancy

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ABSTRACT

Pregnant women can experience anxiety during pregnancy. To enhance mental health during pregnancy, interventions related to the relation of the mental body are important. The goal of this research was to determine the effect of hypnotherapy on anxiety and cortisol. The present sample consists of 60 primiparous women with single and regular pregnancies, 18-28 weeks gestation, and a randomized control trial. The group consists of the monitoring group (n = 30) and the hypnotherapy group (n = 30). Intervention with hypnotherapy was performed twice for 7 weeks. Assessment of anxiety at baseline and after 7 weeks of intervention by PASS and blood cortisol. Hypnotherapy intervention and quality treatment obtained by the hypnotherapy community; standard care received by the control group. The result show that The hypnosis in pregnancy intervention could significantly decrease anxiety at the lower level than control group (m=21.07 ± SD=11.98 vs m=34.00 ± SD=17.35),. The hypnotherapy in pregnancy intervention could significantly decrease cortisol lower than control groups (m=14.64, ± SD=5.53 vs m=21.51, ± SD=8,83). The conclusion is intervention with hypnotherapy may enhance pregnant women's mental health, as shown by reducing anxiety and cortisol. Hypnotherapy is an intervention that needs to be provided during pregnancy in midwifery programs to improve the health of mothers and babies.

Keywords: Hypnotherapy, Pregnancy, Anxiety, Cortisol.

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INTRODUCTION

Physical, psychological, hormonal, and social changes occur during pregnancy, raising the risk of emotional distress and psychiatric illness during this time in a woman's life [1]. The term ‘anxiety’ may encompass a wide variety of Everything from clinical diagnosis to self-report symptom measurements to more generic stress indicators are all included[2]. Approximately 20–25% of women currently experience anxiety as they prepare to become mothers[3,4], of which 10−20% will have depressive episodes[3]. Pregnancy was associated with an estimated 35% greater anxiety rate[5] Increased anxiety symptoms have been noted in 8–9% of postpartum women and 15–16% of pregnant women[5]. According to other research, prenatal anxiety is believed to affect 25% of pregnant women in the first trimester and 21% of pregnant women in the third trimester[6]. Anxiety in pregnancy forms a U pattern, anxiety in early and late pregnancy is higher than mid-pregnancy. Anxiety during pregnancy for example, childbirth, baby's and mother health[7].

The only factor associated with the depressive symptoms and anxiety trajectory group was the stress of pregnancy. Most pregnant women show a stable emotional

status, but some pregnant women experience greater levels of anxiety and depression symptoms associated with more stress during pregnancy[8]. The amount of stress is significantly related to the high anxiety and depression during pregnancy[9]. Anxiety that occurs is body image, self-concern, fret about the acceptance of pregnancy, a baby, attitude toward medical personnel and childbirth. Parity also predicts both overall pregnancy-related anxiety and worry about delivery. There is an important moderating effect on acceptance of pregnancy which indicates that young mothers have low opinions of their parents' self-efficacy in taking their pregnancy on board. The results show that parental equality and self-confidence can be danger factors for moms who are experiencing anxiety associated to pregnancy for the first time[10]. Severe anxiety in pregnancy is about 22% of pregnant women and has a detrimental impact on the mother and newborn[7,11]**.** Pregnancy stress, such as anxiety, is known to raise the risk of a number of developmental consequences, including reduced gestation, constrained fetal growth, and higher emotional and behavioral issues in the offspring[12].

The Hypothalamic-Pituitary-Adrenal (HPA) axis and the Autonomic Nervous System (ANS) are activated by stressful life events and stress experienced in daily life[13]. Compared to healthy pregnant women, those with high levels of anxiety have higher cortisol/DHEA-S indices[14]. The stress hormones corticotrophin-releasing hormone (CRH), adrenocorticotropic hormone (ACTH), and glucocorticoids are released when a woman is under stress. These hormones influence fetal brain development by passing through the placenta[15]. Linear changes in pregnancy anxiety and nonlinear changes in pCRH during pregnancy are independent risk factors for shortened gestational length[16]. A well-known stress hormone is cortisol. Physical and psychological stressors cause the adrenal cortex to release it, and higher amounts are seen 20 minutes after the stressors[17]. High levels of anxiety and long-term stress are linked to an improved maternal response of the hypothalamic-pituitary-adrenal axis, as well as an increase in the release of cortisol from the adrenal glands and CRH from the placenta[18]. Additionally, the difference between pregnant women with high levels of anxiety and pregnant women who do not experience significant levels of anxiety may be seen in the cortisol/DHEA indexes, which demonstrates and validates the effects of anxiety during pregnancy[19]. Numerous pieces of evidence, including those showing an increase in basal cortisol levels and hyperresponsiveness of the adrenal cortex after psychosocial stress, have repeatedly shown that glucocorticoid receptor function is disrupted in anxiety disorders[20].

Other authors have focused their studies on evaluating other interventions such as family psychosocial and psychological intervention, hypnosis, high feedback in antenatal ultrasound appointments or mind-body interventions to prevent mental health problems in mothers during the transition to parenthood[21].

Complications in pregnancy, childbirth and puerperium can be prevented by encouraging mental health. In order to promote growth and development, healthy mental health also promotes fetal/infant experiences. Hypnothetrapy is one of the inner body link treatments conducted to improve mental wellbeing during pregnancy. Hypnotherapy is a successful intervention and there are no harmful side effects[22].

To the researcher's knowledge, hypnotherapy intervention studies in pregnant women that test mental wellbeing using anxiety biomarkers do not exist. This study aims to determine the effectivity of hypnotherapy, to anxiety and and cortisol levels.

METHOD

This study used a randomized, open-label, controlled trial. Participants were expecting mothers who came to the Kediri City health center's health facility. Pregnant girls who were qualified participating in our study were recruited: pregnant with gestational age 18-28 weeks, age 18 years, stable, singleton pregnancies, able to read and write, willing to offer written consent, willing to attend 7-week hypnotherapy sessions, husband works in 1 area. Exclusion criteria were collected from all individual participants participating in this research: psychological conditions, inability For study participation, informed permission is required.

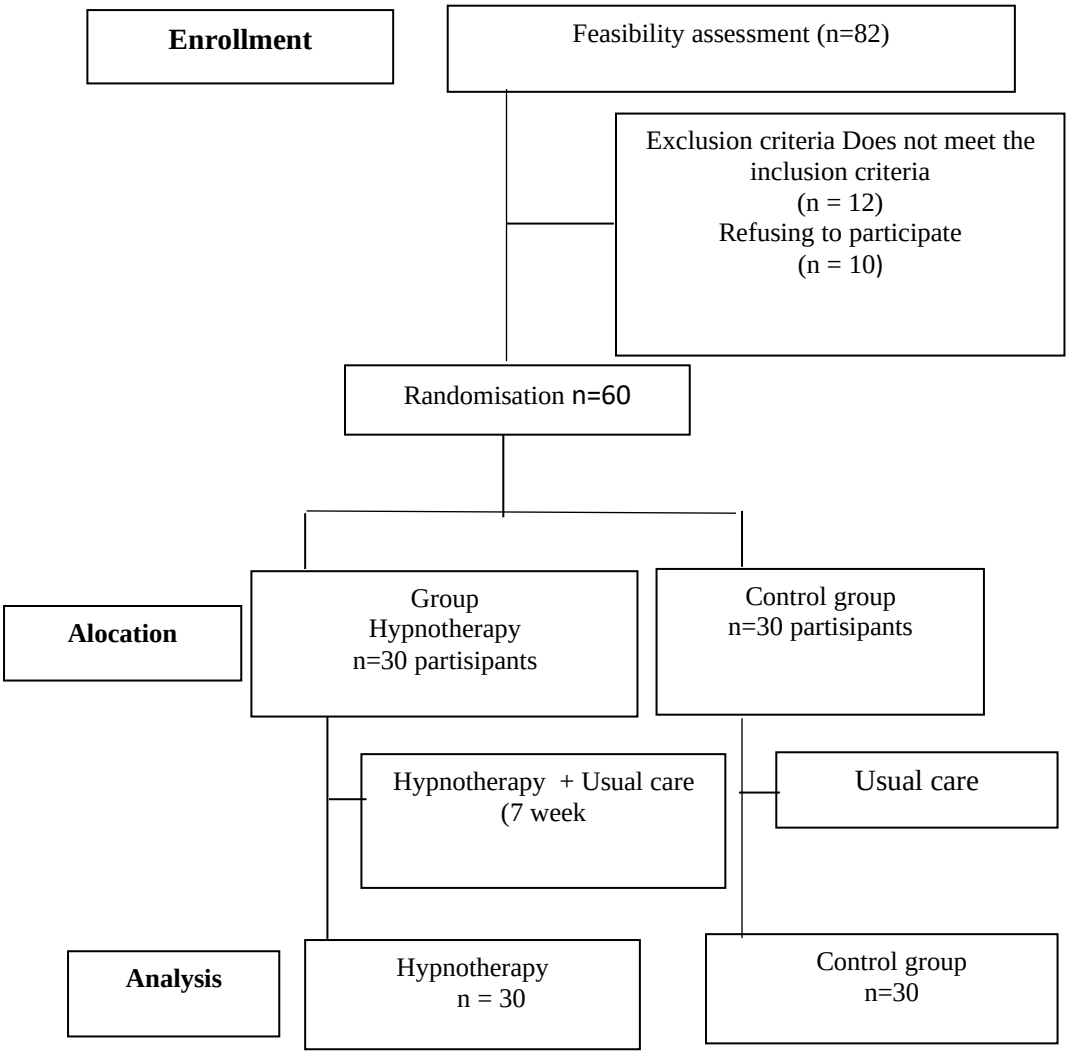
The study topics n = 60 were split into 2 classes, namely 1. The intervention group for hynotherapy (n=30) and the monitoring group

(n=30). Periodic quality treatment was offered by both classes. The independent variables in this study of hypnotherapy and the dependent variables were anxiety and blood cortisol.

The research permit was granted by the research ethics committee of the Poltekkes Kemenkes Malang, Reg.No.:427/EPK-POLKESMA/2022. Information on the research, including its goals, advantages, hypnotherapy courses, effects, was given to all qualified participants and they could stop at any time if desired. A written research approval sheet will be issued if participants are willing to take part in the study. The participants were then split randomly into two groups. 1 The participants were told to come back for a baseline test a week later. At the first meeting at 7 am, participants who met the inclusion criteria were asked to come and were sent a message not to eat breakfast first because they had to complete the state-trait anxiety inventory (STAI) questionnaire and blood cortisol.

For 7 weeks, the hypnotherapy group underwent intervention and routine treatment from the public health center and the control group was supported by the public health center with routine care. Hypnotherapy courses are held for 2 hours once a week. Education, hypnotherapy sessions, breathing exercises, visualization, relaxation, and regular affirmations constitute the hypnotherapy training program. A conference was held again at 7 a.m. after the 7th week then the two groups again filled out the state-trait anxiety inventory (STAI) questionnaire and blood cortisol.

For this analysis, the final sample size was 60 participants, with 30 in the comparison group and 30 in the intervention group, respectively. The participant flow diagram of the consolidated reporting trial criteria (CONSORT) is illustrated in Fig. 1



RESULTS

Tabel 1. Baseline characteristics

	Group						p-value
	Intervention group (HP)			Control group			
	N	Mean/%	SD	n	Mean/%	SD	
Age	30	24,37	2,41	30	25,33	3,17	0.479[a]
Gestation Age	30	22,67	4,12	30	23,40	4,02	0.882[a]
Educational Level	30			30			0.661[b]
Low	2	6.7%		1	3.3 %		
Middle	20	66.7%		23	76.7%		
High	8	26.7%		6	20%		
Work Status	30			30			0.038[b]
Employed	10	33.3%		18	60%		
Unemployed	20	66.7%		12	40%		
Income	30			30			0.184[b]
Low	8	26.7%		6	20%		
Midlle	19	63.3%		12	40%		
High	3	10%		12	40%		
Anxiety (STAI)	30	35.47	13.781	30	37.40	22.27	0.015[a]
Cortisol	30	29.42	6.129	30	26.66	5.34	0.032[a]

Test description: t.test[a]. chi square[b]

Table 1 show that the subject characteristics were different and not statistically significant: age (p=0.47), gestational age (p=0.88), educational (p=0.66), work status (p=0.03), income (p=0.18), anxiety (p=0.01), cortisol (p=0.03). The data for analysis is homogeneous.

Table 2. Differences before and after pregnancy hypnoteraphy intervention regarding anxiety levels and cortisol levels in the hypnoteraphy pregnancy group.

Variable	Pretest	Posttest	p-value
	Mean (SD)	Mean (SD)	
Anxiety (STAI)	35.47(13,78)	21.07(11,98)	<0.001
Cortisol	29.42 (6.12)	14.64(5,53)	<0.001

Test description: uji paired T-test

Table 2 show that the study revealed that there was a substantial difference in anxiety and cortisol level following pregnancy hypnotherapy, namely a decrease in anxiety levels (p=0,000), and a decrease in cortisol levels (p=0,000).

Table 3. Differences before and after being given standard care (class of pregnant women) regarding anxiety levels and cortisol levels in the control group.

Variabel	Pretest	posttest	p-value
	Mean (SD)	Mean (SD)	
Anxiety (STAI)	37,40 (22,27)	34,00 (17,35)	0.010
Cortisol	26,66 (5,34)	21,51 (8,83)	0.022

Test description: paired T-test

Table 3 show that the results of the control group analysis showed that there were no significant differences in the levels of anxiety (p=0,010), and cortisol level (p=0,022).

Table 4. Differences before and after anxiety levels and cortisol levels in the control group and hypnoteraphy pregnancy group.

Variable	Hypnotherapy	Control	p-value	Hypnotherapy	Control	p- value
	Pretest	Pretest		Posttest	Posttest	
	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	
Anxiety (STAI)	35.47 (13.78)	37.40 (22.27)	0.68	21.07 (11.98)	34.00 (17.35)	0.001
Cortisol	29.42 (6.12)	26.66 (5.34)	0.06	14.64 (5.53)	21.51 (8,83)	0.001

Test description: independent T-test

Table 4 show that the results of the t test analysis showed that there was a significant difference in the effects of pregnancy hypnotherapy intervention and control group, anxiety (p=0,001), and cortisol level (p=0,001).

The subject characteristics were different and not statistically significant: age (p=0.47), gestational age (p=0.88), educational (p=0.661), work status (p=0.03), income (p=0.18), anxiety (p=0.01), cortisol (p=0.03). The data for analysis is homogeneous. The mean age in the intervention group (m=24.37; SD=2.41) and in the control group (m=25.33; SD=3.17). The highest level of education in the intervention group was the middle level (66.7%) and the middle level in the control group (76.7%). Employment status in the intervention group the majority did not work (66.7%) and the control group the majority worked (60%). The majority of the income in the intervention group was middle (63.3%) and the control group was middle (40%) and high (40%). The mean anxiety in the intervention group (m=35.47; SD=13.78) and the control group (m=37.40, SD=22.27). Average cortisol levels in the intervention group (m=29.42; SD=6.12) and the control group (m=26.66; SD=5.34) (Table 1).

The study revealed that there was a substantial difference in anxiety and cortisol level following pregnancy hypnotherapy, namely a decrease in anxiety levels (p=0,000) pretest and posttest (m=35,47, SD=13,78 vs m=21,07,SD=11,98), and a decrease in cortisol levels (p=0,000) pretest and postest (m=29,42, SD=6,129 vs m=14,64, SD=5,53) (Table 2). This shows that there was a significant reduction in anxiety and cortisol levels in the group that received the hypnotherapy intervention for 7 weeks.

The results of the control group analysis showed that there were no significant differences in the levels of anxiety (p=0,010 pretest and posttest (m=37,40, SD=22,27 vs m=34,00, SD=17,35) and cortisol level (p=0,02) pretest and posttest (m=26,66, SD=5,34 vs m=21,51, SD=8,83) (Table 3). This shows that in the group that received standard care for 7 weeks there was a decrease in anxiety and cortisol levels although not significantly.

The results of the t test analysis showed that there was a significant difference in the effects of pregnancy hypnotherapy intervention and control group, anxiety (p = 0,001) pretest intervention group vs control group (m=35.74; SD=13,78, vs m=37.40; SD=22.27) and posttest (m=21.07; SD=11.98, vs m=34.00; SD=17.35), and cortisol level (p=0,001) pretest intervention group vs control group (m=29.42; SD=6.12, vs m=26.66; SD=5.34) and posttest (m=14.64; SD=05.53 vs m=21.51; SD=8.83) (Table 4).

DISCUSSION

The effect of the efficacy of pregnancy hypnotherapy on anxiety and cortisol was investigated in this study. Standard treatment was offered by the control group. The key results of this study showed that in the second trimester of pregnancy, intervention hypnotherapy could decrease anxiety and cortisol levels in pregnancy. Intervention given over 7 weeks include weekly education and hypnotherapy, plus visualization, relaxation and breathing results in lower anxiety and cortisol outcomes in the intervention group than in the control group.

This research was conducted on primigravida women aged between 24-25 years and the majority income is middle. This is a factor that causes anxiety during pregnancy. Anxiety that existed before pregnancy can also increase anxiety during pregnancy. This is in line with a study which said that primiparity and previous anxiety can increase anxiety and stress in pregnancy. Similar studies suggest that the reported risk factors for prenatal anxiety and depression include young age, low level of education [23]. Prenatal stress was also found to be associated with low monthly per capita household income, while anxiety was related to concerns about fetal abnormalities, safe delivery, abnormal conditions during labor/cesarean section and labor pain [24]. However, there are other studies that are not in line with the results of this study which say that sociodemographics (age, income level and obstetric factors (parity) have not been identified as having a relationship with anxiety [25].

Pregnancy is the initial research to demonstrate apparent relationship between hair cortisol levels during pregnancy and the maternal life course SES. The findings imply that maternal SES may have generational effects beginning in childhood through

disruption of pregnancy and fetal HPA when pregnant[26].

During the first trimester, psychological symptoms during pregnancy, particularly anxiety, have been shown to follow a 'u' pattern with more symptoms, decreasing symptoms in the second trimester and increasing again in the third trimester. During the antenatal phase, hypnotherapy and relaxation therapy have been shown to help reduce the occurrence of psychological symptoms during pregnancy [27].

Maternal anxiety and cortisol level correlated significantly in each trimester, maternal cortisol in reducing anxiety's effects[19]. Cortisol levels and anxiety unique to pregnancy were greater in primaries than multiple paragraphs, with pregnancy-specific anxiety modulating the relationship relationship cortisol levels and parity [28].

Six of the Nine research found hypnosis to have considerable benefits for reducing stress[29]. Hypnotherapy (using recordings) for 2 weeks can reduce stress, fatigue and improve well-being give a feeling of calm, confident, increase self-empowerment[30], help reduce anxiety, pain and improve quality of life[31] Hypnotherapy gives clients a feeling of relaxation and comfort [32].

Hypnosis changes the activation of the dorsal anterior cingular cortex (dACC) and dorsolateral prefrontal cortex (DLPFC). Examination using functional magnetic resonance imaging (fMRI) under resting conditions, demonstrated greater functional connectivity between the DLPFC, dACC, anterior insula, amygdala, and ventral striatum. This region is involved in detecting, integrating, and filtering relevant somatic, autonomic, and emotional information so as to reduce stress. These changes in neural activity underlie focused attention, increased somatic and emotional control, and a lack of self-awareness[33].

Other research findings show that mothers choose to use hypnosis during pregnancy and childbirth, so they can play an active role, improve their birth experience and reduce the use of analgesia, manage pain, be more confident, and calm[34].

In terms of lowering PMR, hypnosis is more effective than exam anxiety among medical trainees. Hypnosis can change the attentional bias toward stimuli that are dangerous, but cannot progressively muscle relaxation (PMR)[35]. A promising strategy for lowering hospital anxiety in cancer patients' children is hypnotherapy [36]. Electromyography (EMG) amplitude shocks produce increased frontal brain activity areas; amplitude using Somatosensory Event-Related Potentials (SERPs) exhibited comparable outcomes. Electroencephalographic (EEG) oscillation activity is positively related to a reaction to hypnosis. The EEG findings revealed a larger amplitude for the heavily hypnotized subject in hemisphere on the left. During hypnosis, the insula and anterior cingulate cortex (ACC) showed decreased activity[37].

This study is in line with previous research that hypnotherapy can alleviate stress, anxiety[38], improves well-being, improves stress control[39]. Hypnotherapy helps to resolve anxiety, stress and pain, and improves life quality. Hypnotherapy is a safe and reliable therapeutic approach used in medical procedures. Hypnotherapy is a very effective, non-addictive medication which has many advantages in reducing stress and anxiety during pregnancy for pregnant women. For use of medical management and enhancing mental wellbeing, the use of hypnotherapy as an alternative tool is suitable. A healthy, relaxed, and more empowering intervention is hypnotherapy.

Other analyses have also postpartum outcomes and maternal mental health have both been demonstrated to be related. health, and potential growth of infants [(28)]. exposure of children to inadequate mother mental health in utero have a greater chance of exhibiting poor birth results. Poor maternal final trimester mental health of pregnancy is connected to lower birth results (low birth weight and premature birth)[40].

Maternal well-being during pregnancy has not been measured by a variety of studies performed. This research underscores the treatments in hypnotherapy They are important for improving mental health and the well-being of women. First the small number of participants, which affects the second generalization, the regularity of the participants to come to the exercise so that the researcher must visit the homes of participants who are unable to attend class, are the drawbacks of this analysis. How effective hypnosis is techniques in terms of both psychological and physical parameters of wellbeing (depression, immunity, quality of

life) and more varied parity ought to be tested In subsequent studies.

The implication of this research is that hypnotherapy is important to be applied in health services, especially midwifery, on a regular basis to improve the mental health of pregnant women in having a healthy pregnancy so as to avoid pregnancy complications.

CONCLUSION

To our knowledge, this is the first research using the biomarkers of cortisol to determine mental health pregnancy. This study showed that hypnotherapy treatments administered during pregnancy can minimize stress and anxiety during pregnancy, decrease blood cortisol. This illustrates that during pregnancy, hypnotherapy intervenes and enhances mental wellbeing and women's happiness. This study forms the foundation for future studies to assess the mental wellbeing and quality of life impact of hypnotherapy during pregnancy. From the beginning of pregnancy, the provision of intervention offers greater benefits for improving mothers' mental health and psychological well-being while facing late pregnancy.

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CONFLICTS OF INTEREST:

The authors declare no conflict of interest.

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Original Article

The Effect of Lactation Education on Self-Efficacy of Breastfeeding Mothers

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ABSTRACT

Factors that affect the success of breastfeeding are the intentions for breastfeeding and the self-efficacy of the mother. Mothers with high breastfeeding intentions and self-efficacy are more likely to exclusively breastfeed in one week and four months after delivery than those with low self-efficacy. This study aims to determine the effect of lactation education on the self-efficacy of breastfeeding mothers. The study design was the quasi-experiment, pre-test, and post-test with a control group design. Samples of mothers (gestational age ≥28-32 weeks) were divided into 3 groups: 1) those who received lactation and modification modules (n = 21), 2) a group that only received modification modules (n = 21), and 3) a group that only received the maternal and child health books (n = 20). Data were collected using questionnaires, self-efficacy measurements were performed before lactation education was performed, and after 6 months of age. The result showed at initial measurement results (t0), the median self-efficacy score of respondents was between 60-79, while the median self-efficacy score of the mother at the final measurement (t1) was between 60-88. The highest score increase occurred in group 1, then group 3. The median test result showed there was a difference in self-efficacy between the three groups (p= 0,002). This finding means that lactation education with modification modules may increasing self-efficacy of breastfeeding mothers. This can be seen in group 1 which has the highest self-efficacy score and also has the highest percentage of exclusive breastfeeding percentage of all groups. Lactation education improves the self-efficacy of the mother and also increases the duration of exclusive breastfeeding. Future research can measure the mother's self-efficacy for the duration of breastfeeding.

Keywords: Lactation Education, Self-Efficacy, Breastfeeding

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INTRODUCTION

Breast milk is the preferred food for all infants and breastfeeding remains the simplest healthiest and least expensive feeding method that fulfills the infant's needs[1]. Exclusive Breastfeeding contributes to the health and well-being of mothers; it helps to space children, reduces the risk of both ovarian and breast cancer [2] and is one of the most natural and best

forms of prevention medicine. The target of breastfeeding (0-6 months) in 2014 is 80%, but the implementation of exclusive breastfeeding is still a concern. The percentage of exclusive breastfeeding in infants 0-6 months in Indonesia in 2012 and 2017 was only 48.6% and 61,33 [3].

The results of basic health research (Riskesdas), the percentage of early initiation of breastfeeding was less than 1 hour as much as 29.3% in 2010, and increased to 41.3% in 2013. Based on Indonesia Health Demographic Survey data, exclusive breastfeeding in Southeast Sulawesi Province was 32.45%[3]. According to Kendari City Health Office Report, the percentage of exclusive breastfeeding from 2010 to 2013 continued to decline, 52.2% (2010), 52.4% (2011), 51.53% (2012), and 40.07% (2013).

Factors that affect the success of breastfeeding are the intention for breastfeeding and the self-efficacy of the mother. According to [4], mothers with high breastfeeding intentions and self-efficacy are more likely to exclusively breastfeed in one week and four months after delivery than those with low self-efficacy. Breastfeeding Self-efficacy (BSE) specifically influences breastfeeding success by providing the motivation and confidence to persevere through common challenges during breastfeeding such as difficulties at first breastfeeding, concerns about milk production, and when the mother returns to work. Breastfeeding Self-efficacy (BSE) is a predictor of breastfeeding that can potentially be modified[5].

It is important to improve self-efficacy primarily after delivery because disclosure of difficulty in early breastfeeding is associated with the ineffectiveness of exclusive breastfeeding. There is a high prevalence of depressive symptoms (PDS) among new mothers, and most do not breastfeed for recommended time periods. Increased PDS screening during prenatal and postpartum visits and promotion of lactation support services may better address the high rates of PDS and suboptimal breastfeeding behavior [6]. These findings suggest that mothers who suffer from depressive symptoms may experience less confidence in their ability to breastfeed. This association may be particularly relevant for the purpose of screening procedures for depression and unsatisfactory breastfeeding during the postpartum period.

Research on health education shows that antenatal education and counseling are helpful in breastfeeding [7]. It is important to provide accurate prenatal education for mothers, families, and health workers in the long term, focusing on the benefits and methods of breastfeeding [8]. This study aims to determine the effect of lactation education on the mother's self-efficacy of breastfeeding mothers.

METHOD

The study design was the quasi-experiment, pre-test, and post-test with a control group design. Located in Public Health Centers (Puskesmas) in Kendari (Puskesmas Poasia, Puskesmas Mekar and Puskesmas Puuwatu). The study was conducted from June 2015 to April 2016. The study population was pregnant women in the third trimester who were followed until they gave birth. Sampling by clustering was carried out in 3 working areas of the Community Health Centers which represented all Community Health Centers in Kendari City.

The number of samples was determined according to the sampling criteria, totaling 62 people. Samples of mothers (gestational age ≥28-32 weeks) were divided into 3 groups: 1) those who received lactation and modification modules (n = 21), 2) a group that only received modification modules (n = 21), and 3) a group that only received the maternal and child health books (n = 20).

The research variable that was measured was the self-efficacy of pregnant and breasfeeding women. The initial measurement was carried out before the lactation education intervention was given (during pregnancy) and the second measurement after the intervention was completed (after the mother gave birth, and after 6 months of age).

Data were collected usin.g questionnaires, measuring self-efficacy uses a questionnaire which consists of 20 closed-ended questions with 5 alternative answers, namely not sure, a little sure, quite sure, very sure and really sure. Assessment is supportive (favorable) is given a value of 1-5.

This study received ethical approval from the Hasanuddin University Health Research Ethics Committee with No. 1659/H4.8.4.5.3.1/PP36-KOMETIK/2015.

RESULTS

The characteristics of the respondents are shown in Table 1. Based on the age group, most respondents were aged 20-35 years, namely 76.2% in groups 1 and 2, while in group 3 (80%). Most of the mothers had higher education, namely 76.2% in group 1, 81% in group 2, and 80% in group 3. Generally, the respondents did not work (Housewife), namely 90.5% in group 1, 85.7 in group 2, and 75 % in group 3. From the parity aspect, group 1 respondents have parity 1, namely 47.6%, and groups 2 and 3 generally have parity ≥3, namely 42.9% and 45%. 1, 95.2% in group 2, and 95% in group 3. The results of the chi-square test obtained a value of p> 0.05 which indicates the characteristic conditions of the three research groups are homogeneous (table 1).

Self-efficacy is the belief that a mother can breastfeed her baby. If the mother has confidence, the mother will provide exclusive breastfeeding until the baby is 6 months old, without additional formula milk or other foods. The median self-efficacy score was measured at the beginning of the study (t0) and at the end of the study (t1), then it was calculated to determine changes in self-efficacy scores after receiving lactation education with the modification module assuming the self-efficacy score was the *fhi isomorph*. There are changes in self-efficacy scores in the first and second measurements which can be seen in table 2.

Table 1. Characteristics of Respondents.

Characteristics	Group						*p-value*
	1		2		3		
	n(21)	%	n(21)	%	n(20)	%	
Age							
< 20	4	19,0	1	4,8	2	10,0	0,419
20 - 35	16	76,2	16	76,2	16	80,0	
> 35	1	4,8	4	19,0	2	10,0	
Education							
High	16	76,2	17	81,0	16	80,0	
Lower	5	23,8	4	19,0	4	20,0	0,554
Occupation							
Work	2	9,5	3	14,3	5	25,0	0,388
Not Work	19	90,5	18	85,7	15	75,0	
Parity							
1	10	47,6	6	28,6	4	20,0	0,426
2	5	23,8	6	28,6	7	35,0	
≥3	6	28,6	9	42,9	9	45,0	

Table 2. Changes in respondents' self-efficacy scores before and after the intervention based on intra-group

Self-efficacy	Median	
	t0	t1(*p*)
Group I (n=21)	79	88 (0,000)
Group 2 (n=21)	60	60 (0,005)
Group 3 (n=20)	64	68,5 (0,003)

Source: Primary Data, p: uji Wilcoxon

Table 2 shows that there was an increase in self-efficacy scores at the last measurement (t1) for all groups. The results of statistical tests with Wilcoxon showed that the median self-efficacy score of the respondents was significant in all groups. The distribution of changes in the respondents' self-efficacy before and after the intervention can be seen in Figure 1.

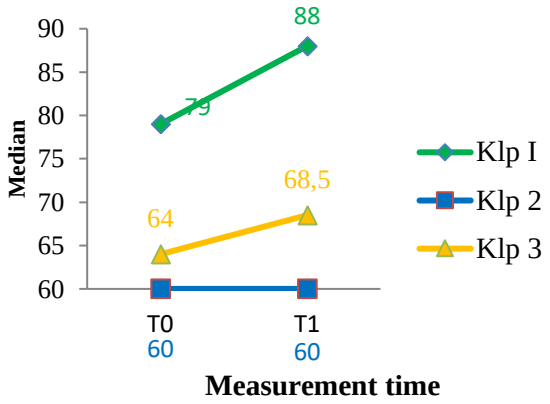

Figure 1. Graph of changes in the mother's self-efficacy score

Figure 1 shows that at the beginning of measurement (t0), the median self-efficacy score of the respondents was between 60–79. At the end of the measurement, the median score (t1) of mothers' self-efficacy was between 60-88. The highest self-efficacy score increase was in group 1. The median self-efficacy score in group 2 did not change after the end measurement (t2).

The difference in self-efficacy scores (Δ1) is obtained by self-efficacy scores at the end measurement (t1) minus the self-efficacy scores at the beginning measurement (t0). To compare the difference in self-efficacy scores between groups, the Median test was used. A comparison of different self-efficacy scores between research groups can be seen in table 3.

Table 3. Differences in respondents' self-efficacy scores before and after the intervention between groups.

Self-efficacy	Median	
	Δ1	*p-value*
Group I (n=21)	9	
Group 2 (n=21)	0	0,002
Group 3 (n=20)	4.5	

Source: Primary Data, p : Median Test

Median test results in table 3, it can be seen that there is a difference in self-efficacy between the three groups in terms of increasing scores, the highest increase is in group 1, then group 3. This shows that there is an effect of lactation education with modification modules on increasing self-efficacy scores of pregnant women and breastfeeding.

DISCUSSION

The results of this study found that the increase in maternal self-efficacy scores was significant at the end of measurement (t1) in all groups. The statistical test results showed that there was a difference between the self-efficacy of the three groups, in terms of increasing scores, the highest increase was in group 1, then group 3 (table 3). This shows that lactation education with modified modules increases the self-efficacy of breastfeeding mothers.

Breastfeeding self-efficacy is a mother's belief in her ability to breastfeed her baby and predict whether she will breastfeed or not, how much effort is made to breastfeed, the desire to improve mindsets or destroy mindsets and ways to overcome difficulties in breastfeeding [9]. There are 4 (four) main sources of information that affect breastfeeding, namely: work performance (previous breastfeeding experience), vicarious experience (seeing other people breastfeeding), verbal persuasion (husband and family support in breastfeeding), and physiological responses (fatigue, stress, and anxiety). Mothers' beliefs and intentions to breastfeed have also been cited as influencing factors in breastfeeding outcomes. The results showed that mothers with breastfeeding intentions and high self-efficacy (self-confidence) were more likely to exclusively breastfeed one week and four months after delivery than mothers with low self-efficacy [4].

The results of research that are in line with this research are found that mother's self-efficacy was related to the duration of exclusive breastfeeding [10]. Mothers with low self-efficacy have a risk of exclusive breastfeeding <60 days 1.9 times compared to mothers with high self-efficacy. Findings from research [11] showed that breastfeeding experience, other people's experiences, verbal persuasion, and emotional arousal influence breastfeeding.

The issue of lack of self-confidence, where the mother is not sure of the adequacy of her milk or the mother has problems believing that she can successfully breastfeed, is the main obstacle to breastfeeding [12] stated. So that self-efficacy is important to increase, especially after giving birth because the disclosure of difficulties in early breastfeeding is related to the ineffectiveness of exclusive breastfeeding.

During the implementation of the lactation education intervention, mothers did not only listen to material from midwives or tutors, but they interacted with each other and shared experiences between participants regarding how to breastfeed, myths about

breastfeeding, and problems they had experienced while breastfeeding, such as sore nipples, babies not wanting to breastfeed. breastfeeding and others. So that there is an exchange of information, especially for mothers who have not had a history of breastfeeding before (primipara) and multiparous mothers get even more information because sometimes their previous experience in terms of breastfeeding is still not quite right.

The exchange of information among mothers included the habit of breastfeeding only on one breast, or taking turns breastfeeding but the breasts did not empty. In addition, the practice of weaning is too early because the baby often cries, and the mother's perception is that her milk is lacking. A baby who often cries will cause tension for the family, so family members often diagnose that the baby is hungry so they feel sure the baby needs to be given additional formula milk or complementary foods.

Pregnant women who have good knowledge about pregnancy and breastfeeding make their quality of life better by accepting their pregnancy and the birth of their baby [13]. Providing information to classes of pregnant women will also increase the ability of pregnant women so they can reduce pain, anxiety, stress, fear, and depression during labor and postpartum[141516]. Mothers who experience increased symptoms of postpartum depression have a higher risk of stopping exclusive breastfeeding compared to mothers who do not experience symptoms of postpartum depression. There is a high prevalence of depressive symptoms (PDS) among new mothers, and most do not breastfeed for recommended time periods. Increased PDS screening during prenatal and postpartum visits and promotion of lactation support services may better address the high rates of PDS and suboptimal breastfeeding behavior [6]

Various studies have shown that breastfeeding self-efficacy is an important factor related to initiation, duration, and exclusive breastfeeding [17]. The results of research found that there was a close relationship between social support, knowledge, attitudes, and self-efficacy with breastfeeding behavior [18]. Other studies have found that mothers who have high breastfeeding self-efficacy tend to continue breastfeeding for 4 months [4]. Mothers with low breastfeeding self-efficacy are proven to tend to use alternative techniques to breastfeed their babies when facing problems during breastfeeding [19].

The results of these studies have opened up a new discourse that breastfeeding self-efficacy is hought to be closely related to successful breastfeeding practices [20]. Based on the research results obtained, researchers argue that self-efficacy is the key to the success of breastfeeding mothers. Mothers are actors in the practice of breastfeeding, so it is very important to develop self-efficacy from the beginning of pregnancy. Mothers who have high self-efficacy, of course, will prepare everything since pregnancy related to the breastfeeding process that will be experienced during the first 6 months until the baby is 2 years old. If a mother has the self-confidence to breastfeed, then she will go through breastfeeding more relaxed and not be a burden. However, if the mother's self-efficacy is low, the tendency to replace breast milk with formula is even greater. This is due to the assumption that breastfeeding will burden the mother and not be free to do activities. It is necessary to optimize the implementation of classes for pregnant women to increase knowledge and self-efficacy of mothers so that mothers can provide exclusive breastfeeding for 0-6 months and continue breastfeeding as an effort to prevent the risk of stunting in infants.

CONCLUSION

The Conclusion is the increase in self-efficacy scores was highest in the group that received lactation education and modification modules which indicated that mothers were more confident about exclusive breastfeeding. It is suggested to midwives or health workers provide lactation education to pregnant and lactating women by continuously using modules to increase the self-efficacy of pregnant and lactating women. Midwives also conduct breastfeeding counseling to help mothers who face problems with breastfeeding. Future research can measure the mother's self-efficacy for the duration of breastfeeding.

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CONFLICTS OF INTEREST
The authors declare no conflict of interest.

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Original Article

Food Security Status and Coping Strategies Among Adolescents During the Covid-19 Pandemic in Mamuju

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ABSTRACT

Adolescents are one of the vulnerable groups experiencing nutritional problems during the Covid-19 pandemic. Food insecurity in adolescents also impacts access to food, mental disorders, and eating disorders (eating disorders), which can cause nutritional problems in adolescents. This study aimed to measure the food security status of adolescents during the Covid-19 pandemic. Data was collected using a qualitative method through in-depth interviews and focus group discussions (FGD). The informants were state high school/vocational school students aged 15-17 amount 36 people who were selected by purposive sampling in the Mamuju District area, Mamuju Regency, in March-November 2021. Adolescents were vulnerable to experiencing food insecurity during the Covid-19 pandemic. This study found that adolescents experienced food insecurity during the Covid-19 pandemic, ranging from mild food insecurity (30.6%), moderate (58.6) to severe (1.8). Only 9% of youth experience good food security. As conclusion that adolescents experienced food insecurity status and doing several coping strategies to overcome this food insecurity problem by helping their parents to sell goods and find additional jobs outside the home during the Covid-19 pandemic. The problem of food insecurity will indirectly affect the nutritional status of adolescents.

Keywords: Food Security, Youth, Nutrition, Qualitative

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INTRODUCTION

Covid-19 not only has an impact on health but also has an impact on the educational process. Teaching and learning activities are mostly carried out online in various regions. This situation causes most of his time to be spent at home. Research shows changes in hygiene and sanitation behavior, eating patterns, and shopping behavior in the community[1,2]. Having to stay at home causes many people to cook for themselves. These are positive changes, but they do not necessarily improve the quality of individual and family diets [2].

Adolescents are one of the vulnerable groups experiencing increased nutritional problems during the Covid-19 pandemic. Food insecurity causes low nutritional intake in adolescents, which also impacts mental disorders, eating disorders, and changes in nutritional status in adolescents [3,4].

Before the pandemic, it was recorded that 14.5% of women of childbearing age, including adolescents, experienced chronic energy deficiency (CED). The central obesity rate in 2018 reached 31%, which continues to increase every year[5]. This figure can potentially increase during a pandemic due to economic changes and changes in shopping behavior and knowledge of food safety [6,7].

Another impact is decreased learning ability and low academic achievement[8]. But on

the other hand, based on reports from the Central Bureau of Statistics, the youth group is the group that has the least implementation of health protocols, such as rarely washing their hands, keeping their distance, and avoiding crowds[9]. This research is very important to measure and determine the status of food security in adolescents and their level of knowledge about nutrition during the Covid-19 pandemic. This study aimed to determine the food security status of adolescents and their coping strategies.

METHOD

This research was qualitative. Data was collected through in-depth interviews and focus group discussions (FGD). The informants in the study were 15-17-year-old state high school/vocational high school students in the Mamuju District, Mamuju Regency, West Sulawesi. The total number of informants were 36 and were selected by purposively based on variations in age, class, gender, and family economic status. Because the informants in this study were teenagers, all informants involved had to obtain informed consent approved by their parents.

All informants were interviewed in depth using an interview guide containing questions about adolescents' food security status and nutritional knowledge during the pandemic. Meanwhile, the FGDs were conducted by gathering 7-8 students for each FGD while still paying attention to health protocols.

Respondents' food security status was measured using the HFIAS questionnaire. The HFIAS is a questionnaire composed of nine sets of questions that have been used in various countries to measure the level of food security of individuals and households in different cultural contexts. The information generated by the HFIAS can be used to assess the prevalence of food insecurity to detect changes in the food insecurity situation of a population over time. The HFIAS questionnaire has been used to measure food insecurity in various contexts [11,12].

The HFIAS questionnaire was used to ask about the level of food insecurity experienced by respondents during the Covid-19 pandemic. The measurement results are then processed according to the status of food security based on the following score groups:

a. Food Secure : 0-1
b. mildly food insecure : 2 – 7
c. moderately food insecure: 8-14
d. severely food insecure :15-27

This research was conducted after obtaining permission from the Medical/Health Research Bioethics Committee, Faculty of Medicine, Unissula number 68/III/2022/Komisi Bioetik. All adolescent participants must have obtained their parents' written consent.

RESULTS

This research was conducted in March-November 2022 after obtaining permission from the Bioethics Committee. This research was conducted in two stages, namely the quantitative stage, by collecting data on the respondents' characteristics and the respondents' food security status. Quantitative data was collected at the start of the study in April 2022. A total of 111 adolescents were involved in this study. They filled out online and offline questionnaires, which were distributed directly. The characteristics of the respondents can be seen in Table 1.

Table 1. Characteristics of respondents.

Characteristics	Frequency (n)	%
Adolescent Age		
15	21	18,9
16	34	30,6
17	46	41,4
18	10	9,0
Sex		
Male	33	29,7
Female	78	70,3
Father's occupation		
Farmer/Fisher	34	30,6
Labour	5	4,5
Drive	9	8,1
Enterpreneur	31	27,9
Civil Servant	16	14,4
Private officer	7	6,3
Honorary staff	9	8,1
Mother's occupation		
Housewife	75	67,6
Farmer	5	4,5
Enterpreneur	5	4,5
Private officer	12	10,8
Honorary staff	4	3,6

Civil servant	10	9,0
Father's education		
Elementary	22	19,8
Junior High School	19	17,1
Senior High School	16	14,4
University	54	48,6
Mother's education		
Elementary	3	2,7
Junior High School	28	25,2
Senior High School	39	35,1
University	41	36,9

Table 1 shows that most of the respondents were female (70.3%), and the ages of the respondents were mostly 16 and 17 years old, namely 30.6% and 41.4%, respectively. Father's occupation as a farmer/fisherman (30.6%) and entrepreneur (27.9). The majority of mothers' work is housewives, 67.6%. As many as 48.6% of fathers and 36.9% of mothers have higher education.

Food security is generally defined as the physical, social, and economic ability to access sufficient, safe, and nutritious food[13]. Meanwhile, food insecurity is defined as a consistent lack of physical and economic access to sufficient, safe, and nutritious food for an active and healthy lifestyle. Before COVID-19, one in 7 children and adolescents did not have consistent access to an adequate and nutritious diet. But the pandemic has changed food systems significantly, and food insecurity is expected to increase sharply due to COVID-19 [13]. Adolescents are one of the vulnerable groups experiencing food insecurity during the pandemic.

After the data is processed, the respondents are classified based on their food security status. Table 2 shows adolescents' food security status (111 people). Most adolescents experienced food insecurity during the Covid-19 pandemic, ranging from mild (30.6%), moderate (58.6) to severe food insecurity (1.8). Only 9% of youth experience good food security.

Food insecurity is a public health problem that impacts the poor and inadequate quality of food intake. Food insecurity is associated with lower fruit and vegetable consumption and diet quality. In a cohort study, diet quality and food insecurity status improved compared to before the pandemic, and the frequency of eating out decreased [14].

Table 2. Adolescent food security status during the Covid-19 Pandemic.

Food Security Status	**n**	**%**
Food secure	10	9,0
Mildly food insecure	34	30,6
Moderately food insecure	65	58,6
Severely food insecure	2	1,8
Total	**111**	**100,0**

Experts believe that the problem of food insecurity is caused by the negative economic impacts that occurred during the pandemic, limited household food sources and households' ability to obtain food, and disruption to the supply chain due to social restrictions. The Covid-19 pandemic has impacted the four pillars of food security, namely availability, access, use, and stability. People experiencing poverty, women, children, and youth are particularly vulnerable to experiencing a greater impact from food insecurity due to the Covid-19 pandemic [15].

The Covid-19 pandemic has had an impact on adolescents' food security. Adolescents are experiencing more difficulties in accessing food than before the pandemic. This was corroborated by qualitative data collected through 20 in-depth interviews and 3 focus group discussions (FGD). The informants in the study were 15-17-year-old state high school/vocational high school students in the Mamuju District, Mamuju Regency, West Sulawesi.

Informants were selected by purposive sampling based on variations in age, class, gender, and family economic status. All informants were interviewed using an interview guide which contained questions about the status of food security and nutritional

knowledge of adolescents during the pandemic. Meanwhile, the FGD were conducted by gathering 7-8 students for each FGD while still paying attention to health protocols. A total of 20 people were interviewed in-depth, and 34 people were involved in 3 FGDs. The results of the interviews were transcribed verbatim, and data analysis was carried out using 3 stages, starting from coding, categorizing, and preparing themes.

From the in-depth interviews, several informants expressed their worries during the Covid-19 pandemic. Access to food is becoming more difficult due to social restrictions, and people, including adolescents, are prohibited from leaving the house. As conveyed by the following informants:

"I was worried during the pandemic. Afraid of getting Covid, but also afraid of lack of food at home." (Informant 2)

"I'm worried that if my parents don't work, I can't work, what will we eat?" (Informant 4)

Adolescents feel sad and depressed because of the food insecurity conditions in their households. They describe their worries as follows.

"I used to be very worried because Covid was severe, my family got Covid. We are worried that food was running out at home. We didn't dare to go out and it's not good to communicate with other people because we're definitely worried if we find out we had Covid" (informant 15)

Other informants also felt the lack of food due to the impact of their parents' lack of income. Adolescents experience changes in eating patterns.

"Rice was there but just enough. The side dish was dry fish. But the lockdown was long, so there was no income for the parents." (Informant 7)

"In the past, it was easy to buy, eat fried food, but during the pandemic, it was rare because going out was prohibited. Sometimes it was hard to get the ingredients at home if you want to make fried foods." (Informant 19)

Our research findings provide an overview of the experiences of food insecurity experienced by adolescents during the Covid-19 pandemic. Families affected by the economic impact of the Covid-19 pandemic are directly affected by adolescents. Adolescents worry about food shortages because their parents are not working, so there is less food at home. This worry is a natural thing to happen when a person or a household experiences food insecurity[16]. In addition, due to social restrictions, adolescents are prohibited from going out to buy food they usually bought before the pandemic.

This research is in line with research conducted in urban youth groups, which reported that the level of food insecurity among adolescents was very high. Nearly a third of students reported potential food insecurity in the previous two weeks during fall 2020 and spring 2021 [17]. Food insecurity in adolescents will result in inadequate nutritional intake, and food insecure adolescents are likely to have poor dietary intake [17,18].

Even though they are in a state of food insecurity during the pandemic, adolescents are trying to carry out coping strategies. Coping strategy is a mechanism used by a person in overcoming the problem of food insecurity that they experience, which can have a positive or even negative impact on their food security status [18].

During the Covid-19 pandemic, adolescents did several things to overcome their anxiety and the food insecurity situation they faced. Self-initiated coping strategies are youth initiatives themselves to overcome the food difficulties they face [17]. The following is a form of self-initiated coping strategies carried out by adolescents to overcome the problem of food insecurity they faced during the Covid-19 pandemic.

"I used to help my parents sell. If we didn't work, how will we eat? Parents are no longer able to sell at the market because it was closed. So I helped work selling in people's stalls. Paid 20,000 every day." (Informant 16)

"At the beginning of the pandemic, my mother's Café was closed. No more income. So, I help my mother sell things online so that there are buyers" (Informant 9)

Self-initiated coping strategies are positive coping strategies to overcome the food insecurity problems they face (16). Several informants helped their parents by helping their parents work and sell. However, a few adolescents also try to stay calm because they are not worried and confused about what they can help their parents with.

> *"Maybe my parents were worried because it was hard to work. I also want to help but I didn't know how to help. So, I just stay at home and help clean the house." (Informant 12)*

> *"I am worried. Parents must also be more worried, especially since we had Covid as a family. There is no food in the house. And no one is helping either. I could only pray at that time" (Informant 20)*

Coping strategies are conscious and subconscious responses to stress due to repeated experiences that occur so that the body will respond automatically. Coping strategies are a collection of adaptive tools adopted to avoid difficulties, such as thoughts, emotions, behaviors, and actions, and rely on everyone's character design. Personal characteristics play an important role in determining stress perception and coping abilities. Efforts to survive in this food insecure condition are very important [19].

Adolescents' efforts to overcome the food insecurity they face at the family level have enabled them to survive and overcome the anxiety they faced during the Covid-19 pandemic. Coping strategies adopted by children and adolescents play an important role in their mental health [20].

CONCLUSION

This study concludes that adolescents are vulnerable to experiencing food insecurity during the Covid-19 pandemic. Adolescents experienced food insecurity during the Covid-19 pandemic, ranging from mild food insecurity (30.6%) and moderate (58.6%) to severe (1.8%). Only 9% of youth experience good food security.

Adolescents experience several coping strategies to overcome this food insecurity problem by helping their parents to sell and find additional jobs outside the home. Adolescents who experience food insecurity can experience nutritional problems in adolescents, such as anemia and CED. Therefore, the problem of food insecurity in adolescents needs to get the attention of policymakers.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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Original Article

Social and Health Determinants of the Families of Children Under Two Years of Age with Stunting in Sigi District

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ABSTRACT

Social aspect is a determinant of stunting. Stunting in children is an indicator of well-being and an accurate reflection of social inequality. This study aims to analyze the social and health determinants of the families of children under two years of age with stunting in Sigi District. This was an analytical study with cross sectional design which involved a population of children aged 6-23 months. A sample size consisted of 380 people were selected through cluster simple random sampling technique. Respondents involved the mothers of children under two years of age. Data collection was conducted in February-June 2022. The dependent variables was stunting incidence. The independent variables were maternal age, parity, birth spacing, maternal education, child's gender, child's age in months, length of birth, early initiation of breastfeeding, exclusive breastfeeding, breastfeeding status, child condition at the time of study, history of ARI, diarrhea, pulmonary tuberculosis, measles, Helminth Infection, utilization of health facilities, growth and development stimulation, complementary food, water sources, ownership of family latrines, food insecurity, housing, and smoking family members. Stunting data was obtained by measuring body length using the Length Measuring Board (LMB) and measuring age by reading the birth certificate or MCH book of the child. Other data were obtained by filling out the kobocollect questionnaire. Data were analyzed using SPSS version 22.00. The WHO-Antro 2005 software was applied to determine the Z-Score. Height-for-Age data were analyzed using univariate, bivariate and multivariate analysis using Backward logistic regression method. Ethical clearance was obtained from the ethics committee of Palu Health Polytechnic number 0011/KEPK-KPK/IV/2022. The results showed that children aged 12-24 months had a 4.1 times higher risk of experiencing stunting compared to children aged 0-6 months (AOR=4.1; 95% CI: 2.0-8.4). Furthermore, children aged 7-11 months had a 2.2 times higher risk of experiencing stunting compared to children aged 0-6 months (AOR=2.2;95%CI: 1.2-3.9). Children who had a length of birth of <48 cm had a 2.1 times higher risk of experiencing stunting compared to children who had a length of birth of ≥48 cm (AOR=2.1; 95% CI: 1.2-3.6). Children of women with education of <9 years had a 2.7 times higher risk of experiencing stunting compared to children of women with education of ≥9 years (AOR=2.7; 95% CI: 1.4-5.0). Children from families with food insecurity had a 1.6 times higher risk of experiencing stunting compared to children from families with no food insecurity (AOR=1.6; 95% CI: 0.9-2.7). Social and health determinants of children under two years of age with stunting in Sigi District were child's age, length of birth of <48 cm, maternal education and food insecurity.

Keywords: Social and Health Determinants, Stunting, Children Under Two Years of Age

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INTRODUCTION

Social aspect is a determinant of the incidence of stunting among[1], Stunting is linear growth retardation of ≤2 SD height-for-age according to WHO standards[2]. Stunting is believed to be an indicator of well-being when assessing social inequality[3]. Stunting in childhood is an overall indicator of children's well-being and an accurate reflection of social inequality [4,5]. Prevention of stunting can utilize social behaviour changes communication intervention[6]. A recent study in relation to Covid-19 in Indonesia highlighted policy strategies to reduce the social impact of stunting during the COVID-19 pandemic [7].

Several previous studies revealed that the incidence of stunting was related to child's age[8-11] length of birth[12,13], maternal education [14,15,16] and food insecurity[17,18,19].

The high stunting rate with increasing age of children highlights the need for consideration towards social behavioural factors such as hand washing behaviour and access to clean water[20]. Combination of health and nutrition programs evaluated to identify priority interventions for program implementation to reduce stunting in low- and middle-income countries was associated with success when it included health and nutrition outcomes and social safeguards network [21].

Several studies showed an effect of social support on the incidence of stunting [22-25]. In addition, strengthening early initiation and exclusive breastfeeding, encouraging health service-seeking behavior and recommending social support programs for poor families were found to be beneficial for reducing stunting [22]. There was consistent evidence regarding the determinants of stunting in Indonesia which included non-exclusive breastfeeding for the first 6 months, low household socio-economic status, premature birth, short birth, low maternal height, parental education, poor condition of latrines, untreated drinking water, poor access to health care and living in rural areas [26].

The prevalence of stunting in Central Sulawesi in 2007, 2011 and 2016 were 32.3%, 31.5% and 26.0% respectively. There was a decline in the last 9 years by 6.2% with a mean of 0.6% per year[27]. The result of a survey on the nutritional status of under-five children conducted by the Ministry of Health of the Republic of Indonesia showed that there was a decrease in the trend of the prevalence of child stunting in Sigi District from 40.7% (Ministry of Health of the Republic of Indonesia, 2021) in 2021 to 36.8% (Ministry of Health of the Republic of Indonesia, 2022) in 2022 which indicated a decrease by 3.9% in a year[28,29].

The unknown social determinants among families of children under two years of age in Sigi District became the basis for the current study. This study aims to analyze the social and health determinants of the families of children under two years of age with stunting in Sigi District.

METHOD

This was an analytical study with a cross sectional design. The study site was Sigi District. The study population involved children aged 6-23 months in Sigi District. A sample size consisted of 380 people were selected through cluster simple random sampling technique. Respondents involved the mothers of children under two years of age. Data collection was conducted in February-June 2022. The completeness and correctness of the data was assessed by the Data Technical Person in Charge. The dependent variables was stunting incidence. The independent variables were maternal age, parity, birth spacing, maternal education, child's gender, child's age in months, length of birth, early initiation of breastfeeding, exclusive breastfeeding, breastfeeding status, child condition at the time of study, history of ARI, diarrhea, pulmonary tuberculosis, measles, Helminth Infection, utilization of health facilities, growth and development stimulation, complementary food, water sources, ownership of family latrines, food insecurity, housing, and smoking family members. Stunting data was obtained by measuring body length using the Length Measuring Board (LMB) and measuring age by reading the birth certificate or MCH book of the child. Other data were obtained by filling out the kobocollect questionnaire. Data were analyzed using SPSS version 22.00. The WHO-Antro 2005 software was applied to determine the Z-Score. Height-for-Age data were analyzed using univariate, bivariate and multivariate analysis using Backward logistic regression method. Ethical clearance was obtained from the ethics committee of Palu Health Polytechnic number 0011/KEPK-

KPK/IV/2022 dated April 5, 2022 and a research permit was obtained from the Central Sulawesi provincial government, national unitary body and regional politics number 070/0204/Bid.III-BKBPD /2022 dated March 14, 2022. The study questionnaire could be found in kobocollect: https://ee.kobotoolbox.org/x/GR86Vw0i.

The socialization of the implementation of the study has been presented by the researchers in the consolidation and reconciliation activities of the team of acceleration of the reduction of stunting at Sigi District level on August 2, 2022 with the participants of stakeholders in Sigi District.

RESULTS

Table 1 presented certain characteristics of the study samples. 54.5% of children under two years of age were male, 45.3% aged 12-24 months, 59.7% had Length of Birth of ≥48 cm, 53.4% of mothers performed Early Initiation of Breastfeeding, 51.6% did not provide exclusive breastfeeding, but 78.2% of mothers continued to breastfeed the children until the time of data collection. 87.4% of children were healthy, while 12.6% had mild disease at the time of data collection. Furthermore, 15.8% of children had a history of ARI, 12.4% had a history of diarrhea, 1.3% had a history of pneumonia, 0.3% had a history of pulmonary tuberculosis, 4.5% had a history of measles, and 1.8% had a history of Helminth Infection. 81.8% of families used health facilities, 61.6% conducted growth and development Stimulation, 37.1% of children received complementary food. 88.9% of families had improved water sources, 69.7% had family latrine, 21.3% had food insecurity, 74.2% of family members smoked. Meanwhile, the characteristics of the mother included maternal age of <20 years by 17.4%, Caesarean Section delivery by 16.8%, Parity of >3 by 14.5%, Birth spacing of <=3 years by 18.9%, maternal education of <9 years by 62.1%.

Table 1. Characteristics of children, mothers, breastfeeding behavior, access and health services of the respondents in Social and Health Determinants of the Families of Children Under Two Years of Age with Stunting in Sigi District.

Characteristic	Number	Percentage (%)
Child's Gender		
Male	207	54.5
Female	173	45.5
Child's Age (Months)		
0-6 months	109	28.7
7-11 months	99	26.1
12-24 months	172	45.3
Length of Birth		
<48 cm	153	40.3
≥48 cm	227	59.7
Maternal Age		
<20 years	66	17.4
≥20 years	314	82.6
Type of Delivery		
Normal	316	83.2
Caesarean Section	64	16.8
Parity		
>3	55	14.5
<=3	325	85.5
Birth Spacing		
<=3 Years	72	18.9
>3 Years	308	81.1
Maternal Education		
<9 years	64	16.8
≥9 years	316	83.2

Early Initiation of Breastfeeding		
No	177	46.6
Yes	203	53.4
Exclusive Breastfeeding		
No	196	51.6
Yes	184	48.4
Breastfeeding Status		
No	83	21.8
Yes	297	78.2
Utilization of Healthcare Facilities		
No	69	18.2
Yes	311	81.8
Growth and Development Stimulation		
No	146	38.4
Yes	234	61.6
Complementary Food		
No	239	62.9
Yes	141	37.1

Table 2. History of Infectious Diseases, Source of Drinking Water, Ownership of Family Latrine, Food Insecurity and Smoking Environment among respondents in Social and Health Determinants of the Families of Children Under Two Years of Age with Stunting in Sigi District.

Characteristic	Number	Percentage (%)
Child Condition at the Time of Study		
Mild Disease	48	12.6
Healthy	332	87.4
History of ARI		
No	320	84.2
Yes	60	15.8
History of Diarrhea		
No	333	87.6
Yes	47	12.4
History of Pneumonia		
No	375	98.7
Yes	5	1.3
History of Pulmonary Tuberculosis		
No	379	99.7
Yes	1	0.3
History of Measles		
No	363	95.5
Yes	17	4.5
History of Helminth Infection		
No	373	98.2
Yes	7	1.8
Source of Drinking Water		
Not Improved	42	11.1
Improved	338	88.9
Ownership of Family Latrine		
No	115	30.3
Ye	265	69.7

Food Insecurity		
Yes	81	21.3
No	299	78.7
Smoking Family Members		
No	98	25.8
Ye	282	74.2

Table 3. Stunting Prevalence among respondents in Social and Health Determinants of the Families of Children Under Two Years of Age with Stunting in Sigi District.

Nutritional Status	Number	Percentage (%)
Stunting	111	29.2
Normal	269	70.8

Cross-tabulation between the dependent variable and the independent variables (nutritional status) showed a significant correlation between the variables of Type of Delivery (p=0.020), Child's Age (p<0.001), Ownership of Family Latrine (p<0.001), Length of Birth (p<0.001), Matern education (p<0.001), Food Insecurity (p=0.010), Complementary Food (p=0.001), Growth and Development Stimulation (p=0.002), and History of Helminth Infection (p=0.001). Further finding showed that there were more children of women with education of<9 years who experienced stunting (34.7%) compared to children of women with education of ≥9 years (20.1%). There were more children of women with normal delivery who experienced stunting (31.6%) compared to children of women with Caesarean Section delivery (17.2%). There were 63 children who were born short and were currently stunted, while there were 90 children who were born short but were currently free from stunting. Likewise, there were 48 children who were not born short but were currently stunted, while 179 children were free from stunting since birth until the study was conducted.

Table 4. Cross Tabulation in Social and Health Determinants of the Families of Children Under Two Years of Age with Stunting in Sigi District

Variable	Nutritional Status				p-value
	Stunting		Normal		
	n (111)	%	n (269)	%	
Maternal Age					
<20 years	24	36.4	42	63.6	0.160
≥20 years	87	27.7	227	72.3	
Maternal Education					
<9 years	33	51.6	31	48.4	<0.001
≥9 years	78	24.7	238	75.3	
Child's Gender					
Male	67	32.4	140	67.6	0.139
Female	44	25.4	129	74.6	
Type of Delivery					
Normal	100	31.6	216	68.4	0.020
Caesarean Section	11	17.2	53	82.8	
Child's Age					
0-6 months	27	24.8	82	75.2	<0.001
7-11 months	13	13.1	86	86.9	
12-24 months	71	41.3	101	58.7	

Source of Drinking Water					
Not Improved	17	40.5	25	59.5	0.089
Improved	94	27.8	244	72.2	
Ownership of Family Latrine					
No	50	43.5	65	56.5	<0.001
Yes	61	23.0	204	77.0	
Early Initiation of Breastfeeding					
No	56	31.6	121	68.4	0.331
Yes	55	27.1	148	72.9	
Length of Birth					
<48 cm	63	41.2	90	58.8	<0.001
≥48 cm	48	21.1	179	78.9	
Exclusive Breastfeeding					
No	62	31.6	134	68.4	0.284
Yes	49	26.6	135	73.4	
Breastfeeding Status (at the time of the study)					
No	18	21.7	65	78.3	0.088
Yes	93	31.3	204	68.7	
Food Insecurity					
Yes	33	40.7	48	59.3	0.010
No	78	26.1	221	73.9	
Parity					
>3	19	34.5	36	65.5	0.347
<=3	92	28.3	233	71.7	
Birth Spacing					
<=3 years	19	26.4	53	73.6	0.559
>3 years	92	29.9	216	70.1	
Utilization of Healthcare Facilities					
No	25	36.2	44	63.8	0.156
Yes	86	27.7	225	72.3	
Complementary Food					
No	56	23.4	183	76.6	0.001
Yes	55	39.0	86	61.0	
Growth and Development Stimulation					
No	56	38.4	90	61.6	0.002
Yes	55	23.5	179	76.5	
Smoking Family Members					
No	24	24.5	74	75.5	0,233
Yes	87	30.9	195	69.1	
History of Disease					
No	21	30.0	49	70.0	0.872
Yes	90	29.0	220	71,0	

History of ARI					
No	93	29.1	227	70.9	0.883
Yes	18	30.0	42	70.0	
History of Diarrhea					
No	92	27.6	241	72.4	0.071
Yes	19	40.4	28	59.6	
History of Pneumonia					
No	110	29.3	265	70.7	0,648
Yes	1	20.0	4	80.0	
History of Pulmonary Tuberculosis					
No	111	29.3	268	70.7	0.520
Yes	0	0.0	1	100.0	
History of Measles					
No	105	28.9	258	71.1	0.572
Yes	6	35.3	11	64.7	
History of Helminth Infection					
No	105	28.2	268	71.8	0.001
Yes	6	85.7	1	14.3	
Child Condition at the Time of Study					
Mild Disease	13	27.1	35	72.9	0.729
Healthy	98	29.5	234	70.5	

Table 5. Multivariate Analysis in Social and Health Determinants of the Families of Children Under Two Years of Age with Stunting in Sigi District.

Variables	Nilai p	AOR	95%CI	
			Lower	Upper
Child's Age				
0-6 months				
7-11 months	0.010	2.2	1.2	3.9
12-24 months	<0.001	4.1	2.0	8.4
Length of Birth				
≥48 cm				
<48 cm	0.008	2.1	1.2	3.6
Maternal Education				
<9 years	0.003	2.7	1.4	5
≥9 years				
Food Insecurity				
Yes	0.083	1.6	0.9	2.7
No				

Social and health determinants of children under two years of age with stunting in Sigi District included age, length of birth of <48 cm, maternal education and food insecurity. Children aged 12-24 months had a 4.1 times higher risk of experiencing stunting compared to children aged 0-6 months (AOR=4.1; 95% CI: 2.0-8.4). Furthermore, children aged 7-11 months had a 2.2 times higher risk of experiencing stunting compared to children aged 0-6 months (AOR=2.2;95%CI: 1.2-3.9). Children who had a length of birth of <48 cm had a 2.1 times higher risk of experiencing stunting compared to children who had a length of birth of ≥48 cm (AOR=2.1; 95% CI: 1.2-3.6). Children of women with education of <9 years had a 2.7

times higher risk of experiencing stunting compared to children of women with education of ≥9 years (AOR=2.7; 95% CI: 1.4-5.0). Children from families with food insecurity had a 1.6 times higher risk of experiencing stunting compared to children from families with no food insecurity (AOR=1.6; 95% CI: 0.9-2.7).

As the age of the child increases, there is a tendency for the prevalence of stunting to increase. If a child is born with a body length of <48 cm, there is an increase in the risk of stunting. Children of women with the level of education of less than basic education or <9 years had a higher risk of experiencing stunting. A study conducted by Scheffler (2021) showed a correlation between maternal education and height among privileged and underprivileged children[30]. Scheffler further states that stunting is a complex phenomenon and can be considered a synonym for social retardation and low parental education[30].

A previous study conducted in Ethiopia showed that the prevalence of household food insecurity, poor diet and low wealth status were risk factors for stunting. Providing health and nutrition education through behaviour change communication is very important to address risk factors related to stunting. Nutrition and health information must be provided by health educators to mothers since poor child feeding practice was found as a major factor in stunting [19].

Social interventions to prevent stunting in Sigi District involved earlier prevention, even when the fetus is still in the preconception period, policy on 9-year compulsory education especially for women and an increase in family food security. In addition, encouraging households to do gardening and farming is very important for diversifying children's diets and helping the social and economic status of every household in Sigi District.

CONCLUSION

Social and health determinants of children under two years of age with stunting in Sigi District included the child's age, child's length of birth of <48 cm, maternal education of <9 years and food insecurity. Interventions toward stunting reduction should consider social and health determinants found in this study.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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Original Article

The Relationship between the Timing of Complementary Feeding and Maternal Knowledge of Responsive Feeding and the Incidence of Stunting in Children Aged 6-24 Months

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ABSTRACT

In 2021, the prevalence of stunting among toddlers in Wani Primary Health Care (Puskesmas) was still high at 18.2%. Delayed introduction of complementary feeding (MP-ASI) and inappropriate feeding practices, such as lack of responsive feeding, contribute to the occurrence of stunting. The objective of this study was to investigate the relationship between the timing of MP-ASI introduction and maternal knowledge of responsive feeding with the occurrence of stunting among children aged 6 to 24 months. This research employed a cross-sectional design using quantitative analytic observational methods. Simple random sampling was used to select the sample, and data were collected through questionnaire surveys from 126 mothers with children between the ages of 6 and 24 months. The study was conducted in the communities of Nupa Bomba, Bale, and Wani Lumbumpetigo, all located within the working area of Wani Primary Health Care. The results showed that 80.2% of the timing of MP-ASI introduction was inappropriate, and 62.7% of the mothers had insufficient knowledge of responsive feeding. The chi-square test revealed a significant association between the timing of MP-ASI introduction and the occurrence of stunting (p value = 0.047, OR = 0.290), as well as between the occurrence of stunting and maternal knowledge of responsive feeding (p value = 0.008, OR = 0.298). In conclusion, there is a relationship between the occurrence of stunting and the timing of MP-ASI introduction, as well as maternal knowledge of responsive feeding. It is recommended to enhance parental knowledge and attitudes and prevent stunting by providing nutrition education through counseling on proper complementary feeding and responsible childcare practices. This study highlights the importance of improving education and support for mothers to prevent stunting.

Keywords: Stunting, Complementary feeding, Knowledge, Responsive feeding.

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INTRODUCTION

A child who is *stunted* experiences slow body and brain growth due to long-term malnutrition. As a result, children face difficulties in thinking and are shorter than their average peers[1]. *Stunting* in children is a serious problem that remains challenging to address and is caused by various factors[2] including maternal and child health history[3–7], maternal height (≤150 cm)[8,] inadequate nutrition during pregnancy, poor sanitation[9–11], family economic status[12,13,] and Low Birth Weight (LBW)[14]. The prevalence of stunting in Indonesia has decreased from 24.4% in 2021 to 21.6%[15].

Data from the Indonesian Nutritional Status Survey (SSGI) in 2022 showed a decline in the prevalence of *stunting* over the past 3 years: 27.7% in 2019, 24.4% in 2021 and 21.6% in 2022. Central Sulawesi ranks seventh highest

among provinces in terms of stunting prevalence in *toddlers*, with a rate of 28.2%. Among the districts/cities in Central Sulawesi, Donggala district ranks fourth with a prevalence of 32.4%. The prevalence of stunting in children under five has decreased with a frequency of 16.2% over the past three years in Central Sulawesi: 25.2% in 2018, 21.4% in 2019, and 21.4% in 2020. The Ministry of Health Performance Report for 2020 stated that Central Sulawesi has been declining each year but still ranks eleventh highest in Indonesia[16]. In 2020, the highest frequency of stunting, 27.1%, was found in Donggala district. One of the community health centers in Donggala district, specifically Puskesmas Wani, had a number of stunted toddlers in 2021, with a prevalence of 18.2% and a total of 193 children. There were 154 toddlers classified as short and 39 toddlers classified as very short in the work area of Puskesmas Wani[17].

Stunting and child development are closely related, both indirectly through brain development and directly through physical growth, motor development, and increased physical activity. Anthropometry, which measures a child's height and weight to determine Body Mass Index (BMI), can be used to assess their nutritional health[18]. Inadequate nutritional intake is one of the causes of stunting. Insufficient nutrition can be influenced by a mother's caregiving practices, including providing inappropriate food to her child through responsive feeding. Mothers with insufficient knowledge of responsive feeding are 6.2 times more likely to have stunted children[19]. Mothers with good knowledge will provide appropriate complementary feeding according to the child's age and timing. Having good knowledge of responsive feeding principles can improve the quality of infant feeding. Most mothers believe that responsive feeding is the ability to feed infants in a responsive and active manner[20].

Starting from six months of age, Complementary Feeding, also known as Solid Food Introduction (SFI), should be provided properly. This is because Complementary Feeding, the food or drink given to infants alongside breastfeeding until the child reaches 24 months of age, contains significant energy and nutrients. Introducing complementary foods early can influence the growth and development of children, which can affect their nutritional status, resulting in stunting, severe stunting, and underweight[21]. Children who receive their first complementary food before six months of age are 6.83 times more likely to experience stunting compared to children who receive their first complementary food at the appropriate age[22]. Considering that the mismatch between the child's age and the introduction of complementary feeding can increase the likelihood of stunting by 2.8 times, the timing of complementary feeding significantly impacts the occurrence of stunting[23]. Therefore, mothers need to pay attention to the accuracy of providing complementary feeding to their infants.

This study differs from previous research, as it aims to examine the timing of complementary feeding in toddlers and the maternal knowledge of responsive feeding in relation to stunting. Providing complementary feeding to toddlers should be accompanied by the mother's knowledge of how to recognize signs of hunger and fullness. The literature review results from the same title and the same statistical test but different sample sizes, along with several other journals that only focus on one variable in relation to the incidence of stunting, mostly highlight determinants of behavior and practices related to complementary feeding. Based on the above description, the objective of this research is to determine the relationship between the incidence of stunting in children aged 6-24 months and the timing of complementary feeding and maternal knowledge of responsive feeding.

METHOD

This research was conducted from April 18, 2022 to June 20, 2022, using *a cross sectional* study design in 3 villages within the working area of Puskesmas Wani, namely Nupa Bomba, Bale, and Wani Lumbumpetigo villages due to the high stunting rate in these villages. The population of this study consisted of all mothers with toddlers living in the three villages in Puskesmas Wani, Donggala Regency, totaling 186 toddlers in 2021. The sample of this study consisted of 126 mother respondents, and the sampling method used was simple random sampling, with a breakdown of 79 individuals from Nupa Bomba Village, 29 individuals from Bale Village, and 26 individuals from Wani Lumbumpetigo Village.

The variables in this study were the timing of complementary feeding and knowledge of Responsive Feeding as

independent variables, and the incidence of stunting as the dependent variable. The appropriate timing of complementary feeding was considered when the introduction of complementary foods followed the schedule starting from 6 months of age. It was considered inappropriate if the introduction of complementary feeding occurred before 6 months or after 6 months of age. Responsive feeding knowledge referred to everything a mother knows about feeding her child in a responsive manner, including recognizing and responding to hunger and satiety cues in the child. A respondent's score in the questionnaire was considered adequate if it was ≥50%. Stunting data were collected by directly measuring length and weight using a length board and weighing scale. Stunting was categorized as a measurement result below -3 SD to ≤ 2 SD, as classified in the WHO Anthro application. This study utilized questionnaires and interviews to gather information on the timing of complementary feeding and maternal knowledge of responsive feeding. The Chi-square test was used as the statistical method.

RESULT

Table 1. Characteristics of Mother Respondents

Variable	N=126	Present (%)
Child's gender		
Male	57	45,4
Female	69	54,8
Mother's Highest Education		
Incomplete Primary School	1	8
Primary School	22	17,5
Junios High School	34	27,0
Senior High School	64	50,8
Bachelor's Degree	5	4,0
Mother's Ocuupation		
Employed	6	4,8
Unemployed	120	95,2
Monthly Family Income		
<1.000.000-3.270.000	126	100
Timing of Complementary Feeding		
Not Appropriate	101	80,2
Appropriate	25	19,8
Maternal Knowledge of responsive feeding		
Inadequate Knowledge	79	62,7
Sufficient Knowledge	47	37,3
Incidence of Stunting		
Stunted	44	34,9
Not Stunted	82	65,1

Table 1 shows that out of 126 respondents, the majority of the children were female (54.8%), the highest educational attainment of the mothers was high school completion (50.8%), the mothers were unemployed (95.2%), and the monthly family income ranged from <1,000,000-3,270,000 with a percentage value of 100%. The timing of complementary feeding for children aged 6-24 months was not appropriate for 101 children (80.2%), maternal knowledge of responsive feeding was insufficient for 79 individuals (62.7%), and there were 82 individuals (65.1%) who were not stunted.

Table 2. Bivariate Analysis with the Incidence of Stunting

Variable	Incidence of Stunting				Total		*p value*	OR
	Stunting		Not *Stunting*					
	n	%	n	%	N	%		
Timing of complementary feeding								
Appropriate	4	16.0	21	84.0	25	100	0.047	0.290
Not appropriate	40	39.6	61	60.4	101	100		

Maternal Knowledge of *responsive feeding*								
Sufficient	9	19.1	38	80.9	47	100	0.008	0.298
Inadequate	35	44.3	44	55.7	79	100		
N	44	34.9	82	65.1	126	100		

Table 2 shows that there were 40 individuals (39.6%) with inappropriate timing of complementary feeding among the stunted children, with a p-value of 0.047 and an odds ratio (OR) of 0.290, indicating a significant association between the timing of complementary feeding and the occurrence of stunting. Mothers who provided complementary feeding at the appropriate time had a risk of 0.290 for having stunted children. Additionally, there were 35 individuals (44.3%) with stunting among mothers with insufficient knowledge of responsive feeding, with a p-value of 0.008 and an OR of 0.298, suggesting a significant relationship between maternal knowledge of responsive feeding and the occurrence of stunting. Mothers with good knowledge of responsive feeding had a risk of 0.298 for having stunted children.

DISCUSSION

The Timing of Complementary Feeding in Children Aged 6-24 Months.

According to the research findings, many mothers introduce complementary foods such as honey, formula milk, or soft porridge to infants under the age of six months who are not ready for them. Due to the misconception that their babies are often fussy and crying due to hunger or insufficient breast milk, they frequently provide additional food besides breast milk at inappropriate times[24] On the other hand, some mothers believe that the ideal age for their child to start eating is when they are older than six months. When the baby reaches six months of age, complementary feeding should be initiated. Complementary Feeding (CF) is the food or drink given to infants or children aged between 6 and 24 months to complement breastfeeding and meet their nutritional needs[25–27].

The improper introduction of complementary feeding can have an impact on the child. Early introduction of CF can lead to gastrointestinal problems such as diarrhea, vomiting, and constipation. This is due to the limited digestive capacity of the child's system to handle solid foods. However, if the introduction of complementary feeding is delayed, the baby will have difficulty learning to chew, dislike solid foods, and experience nutritional deficiencies[22]. Based on additional information, the majority of children aged 6 to 24 months who start CF before 6 months use formula milk or plain water as a substitute for breast milk.

Mother's Knowledge *of Responsive Feeding.*

Based on the respondents' answers, it can be observed that the majority of mothers are aware of the correct way to feed their children, which is slowly and patiently. However, many respondents lack knowledge about how to feed their children when they refuse to eat and mothers stop feeding them until the child appears hungry again. The lack of knowledge among mothers about responsive feeding in Puskesmas Wani, Donggala Regency, indicates that there are more mothers with insufficient knowledge compared to those with good knowledge. The first step in changing someone's attitude and behavior is knowledge. The attitude and behavior of mothers in providing the appropriate types and amounts of food to their children will depend on their knowledge of nutrition[28].

The mother's knowledge of responsive feeding is crucial as it impacts the nutritional well-being of the child. Knowledge of feeding practices is important in influencing the attitudes and behaviors of mothers in terms of feeding their children, as it has been proven to enhance the quality of meals[20] the attitudes and behaviors of mothers in feeding infants and children are influenced by their knowledge of adequate complementary feeding, and anthropometric indicators such as length/height-for-age are used to assess nutritional status and indicate stunting[29] Having parents who feed their children with inappropriate food is one of the causes of nutritional problems. Knowledge and child-rearing practices are closely interconnected[30].

When providing complementary feeding to children, their nutritional needs should be adjusted according to their age. The amount of food consumed by the child increases as they grow older. Providing one plate of food every day, such as fruits, green bean porridge, or other alternative foods, helps infants aged 6-9 months to continue breastfeeding. For children aged 12 to 24 months, breastfeeding should still be continued but the amount of breast milk

decreases. Additionally, continue to serve family meals at least three times a day, with each portion being half of an adult's portion[25]

The Relationship between the Timing of Complementary Feeding and the Incidence of Stunting.

According to the research findings, a larger number of children were given complementary feeding before six months of age or after six months of age (not appropriate) compared to the number of children who were given complementary feeding at six months of age (appropriate). This is consistent with recent studies showing that the occurrence of stunting increases 2.8 times with the timing of the first introduction of complementary foods[23,31]

However, other studies state that there is no relationship between the timing of introducing complementary feeding and stunting because mothers introduce complementary feeding after the child reaches six months of age[32]. In this study, the timing of complementary feeding indicates that the majority of mothers provided complementary foods to their children for the first time when they were younger or older than six months (not appropriate), which resulted in stunting. According to the respondents' responses, mothers gave complementary feeding to their infants when they were less than six months old due to frequent fussiness, insufficient breast milk supply, and delayed milk production. On the other hand, mothers who introduced complementary feeding after six months believed it was the appropriate age because early introduction could lead to illness[33,34].

The Relationship between Maternal Knowledge of *Responsive Feeding and* the Incidence of *Stunting*.

According to research findings, mothers with inadequate knowledge of responsive feeding have a higher prevalence of stunted children. The analysis shows that mothers with limited knowledge of responsive feeding are more likely to have stunted children, consistent with previous studies indicating a higher frequency of stunting among mothers with insufficient knowledge of responsive feeding[20,35]

Based on the research findings from respondents with stunted children, the majority of mothers mistakenly believe that responsive feeding means forcefully feeding their children to ensure optimal growth. However, the true meaning of responsive feeding is the mother's ability to actively and responsively feed her child. In general, mothers are unaware of hunger and satiety cues in their children. Increased food acceptance and self-regulated eating are outcomes of responsive feeding[36].

Establishing good eating patterns will result in children experiencing feelings of hunger and satiety. When a mother recognizes signs of hunger in her child, she will promptly provide food. Conversely, if a mother observes signs of fullness in her child, she will stop providing food. This enables mothers to easily regulate their children's eating patterns and plan their meals correctly based on their needs and age. Eating behavior is one of the factors influencing nutritional status. The caregiver's ability to actively and responsively feed the child, including age-appropriate feeding, role modeling healthy eating habits, motivating children to eat, responding to a lack of appetite, providing meals in a safe environment, and using enjoyable interactions, defines responsive feeding[37]

Maternal knowledge of responsive feeding is crucial in recognizing hunger and satiety cues in children for nutritional fulfillment. Based on Latifah et al's (2020) study, increased knowledge has the potential to improve the quality of feeding practices, indicating the value of knowledge in influencing caregiver attitudes and feeding-related behaviors. The practice of responsive feeding in children aged six months and above is only implemented by 30% of caregivers in Indonesia, posing a barrier to reducing stunting issues[38].

CONCLUSION

There is a relationship between the timing of complementary feeding (MP-ASI) and the occurrence of stunting, as well as a connection between maternal knowledge of responsive feeding and stunting incidence in the Puskesmas Wani region of Donggala Regency. It is hoped that healthcare professionals can enhance education through counseling on appropriate complementary feeding practices and appropriate caregiving methods to improve parental knowledge and attitudes, thereby preventing the impact of stunting. This research is expected to educate individuals about stunting and serve as a reference for further studies, such as environmental sanitation, attitudes and behaviors

related to responsive feeding. Additionally, expanding the sample size of the research can yield more accurate results.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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Original Article

Determinants of Unmet Need of Married Women in Efforts to Reduce Unmet Need in West Sulawesi

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ABSTRACT

Reducing the number of unplanned pregnancies is one way to improve the standard of family planning programs. Unplanned pregnancies due to an unmet need for family planning are one of the factors contributing to the increase in IMR and MMR rates and an increase in the population. This study aimed to analyze what factors are related to the incidence of unmet need for family planning and strategies to accelerate the decline in unmet need for family planning in West Sulawesi Province using the 2021 Family Data Collection data set. The research method used is quantitative with a cross-sectional design on chi analysis-square and quadrant analysis using the 2021 Family Data Collection data set with a total sample of 185,132 couples of childbearing age in the province of West Sulawesi. The study found that education level, employment status, age, and the number of children born alive to couples of childbearing age were significantly related to the incidence of unmet need in West Sulawesi with a p-Value of 0.000 and two districts which were the top priority in accelerating the reduction of unmet need for family planning are Mamuju and Polewali Mandar Regency according to quadrant analysis. The results of this research can provide recommendations for mapping targets and areas to stakeholders to accelerate the reduction of unmet needs for family planning in West Sulawesi.

Keywords: Strategy, Decline, Unmet Need for Family Planning.
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INTRODUCTION

Population problems in Indonesia, especially concerning population quantity, are still very high. It is due, in part, to the still high incidence of unmet need by couples of childbearing age. Unmet need KB is one of the leading indicators that BKKBN must achieve in implementing the Family Development, Population, and Family Planning Program[1]. Family planning needs that are unmet threaten the quality and quantity of the population because this couple is of childbearing age. They don't want any more children or want to delay the birth of their child, but they don't use contraceptives, so one day, this couple can get pregnant without planning[2,3,4].

Reducing the number of unplanned pregnancies is one way to raise the standard of family planning programs. Unplanned pregnancies due to unmet needs for family planning contribute to population growth and increased infant and maternal mortality. Suppose a married woman becomes pregnant and has not previously used contraception but does not wish to become pregnant. In that case, it may be considered an "unmet need" situation and an unplanned pregnancy[5].

In Nigeria and other poorer countries, the majority of women do not use a contraceptive method, however, some of them are sexually active, fertile, and want to avoid

pregnancy,[7] Likewise, in Indonesia, many couples of childbearing age still want to delay pregnancy and terminate their pregnancies. Still, the need for contraceptive methods is not fulfilled for various reasons.

Data from the 2017 Indonesian Demographic and Health Survey shows the percentage of unmet needs among married women aged 15-49 years in West Sulawesi Province is 14.2%. 7.4% for delaying births, and 6.9% for limiting births[8]. Meanwhile, data from the 2019 Program Performance and Accountability Survey (SKAP) showed that the incidence of unmet need for family planning among married women continued to increase, which was recorded at 17.2% above the national figure of 12.1%[9].

West Sulawesi Province is still listed as a province with an Unmet Need for Family Planning rate above the national average of 22.10% of the target set at 12.96%[1]. This achievement is undoubtedly very far from the target, which is the benchmark for the success of the Family Development, Population, and Family Planning (Bangga Kencana) program. Therefore the analysis is urgently needed to accelerate the reduction in unmet need for family planning in West Sulawesi.

The impact on the family due to an unplanned pregnancy due to unmet need is many. First, in terms of an inappropriate pregnancy in terms of mental readiness or a mistimed pregnancy (mistimed pregnancy), which can be interpreted as a woman of childbearing age who is not ready in terms of time to get pregnant because she still wants to postpone her pregnancy[10]. High birth rates, unplanned pregnancies, and unsafe abortions are the main effects of unmet family planning needs[2]. Another lousy impact of the high incidence of unmet need for family planning is unwanted pregnancies (unwanted pregnancies). Unwanted pregnancies can increase the death of the mother and baby if not treated immediately[11].

Based on the above data, the high unmet need for family planning is still a benchmark for the success of the proud Kencana program. Therefore it is crucial to analyze what factors are related to the incidence of Unmet Need for Family Planning and strategies to accelerate the reduction of the incidence of Unmet Need for Family Planning in West Sulawesi.

METHODS

The research method was a cross-sectional design to study the correlation between independent and dependent factors with chi-square analysis and quadrant analysis using the 2021 Family Data Collection data with a sample of 185,132 couples of childbearing age in West Sulawesi which is Indonesian family census data collected by nationally and simultaneously through house-to-house visits by trained cadres of assessors from June to September 2021 targeting all Indonesian families.

The independent variables in this analysis were education level, working status, age, and the number of live births on the dependent variable of unmet need for family planning, which will then become the basis for formulating a strategy to accelerate the reduction of unmet need for family planning in West Sulawesi Province in the intervention of mapping priority targets in cultivation.

The education level category was divided into three categories with the details that low education with code 1 is a respondent who has never attended or graduated from elementary school. Secondary education with code 2 are respondents who have completed junior high school and high school education, and higher education with code 3 are respondents who have completed education at the tertiary level starting from diploma one. The working status category is divided into 2, namely respondents with working and non-working status.

The age categories are divided into 7, namely the age group 15-19 with code 1, the age group 20-24 with code 2, the age group 25-29 with code 3, the age group 30-34 with code 4, the age group 35-39 with code 5, age group 40-44 with code 6 and age group 45-49 with code 7.

The number of children born alive is divided into two categories: respondents with the number of children born less than or equal to 2 with code 1 and respondents with the number of children born alive above two children with code 2.

The analysis used is first; univariate to explain or describe the characteristics of each variable studied. Second, Bivariate analysis to see the relationship between one independent variable and the dependent variable. Third,

quadrant analysis is to know the mapping of priority target areas for cultivation to develop a strategy to accelerate the reduction of unmet need for family planning.

Analysis Units

The unit of analysis used in the 2021 Family Data Collection data set for West Sulawesi Province with unit of analysis as shown below:

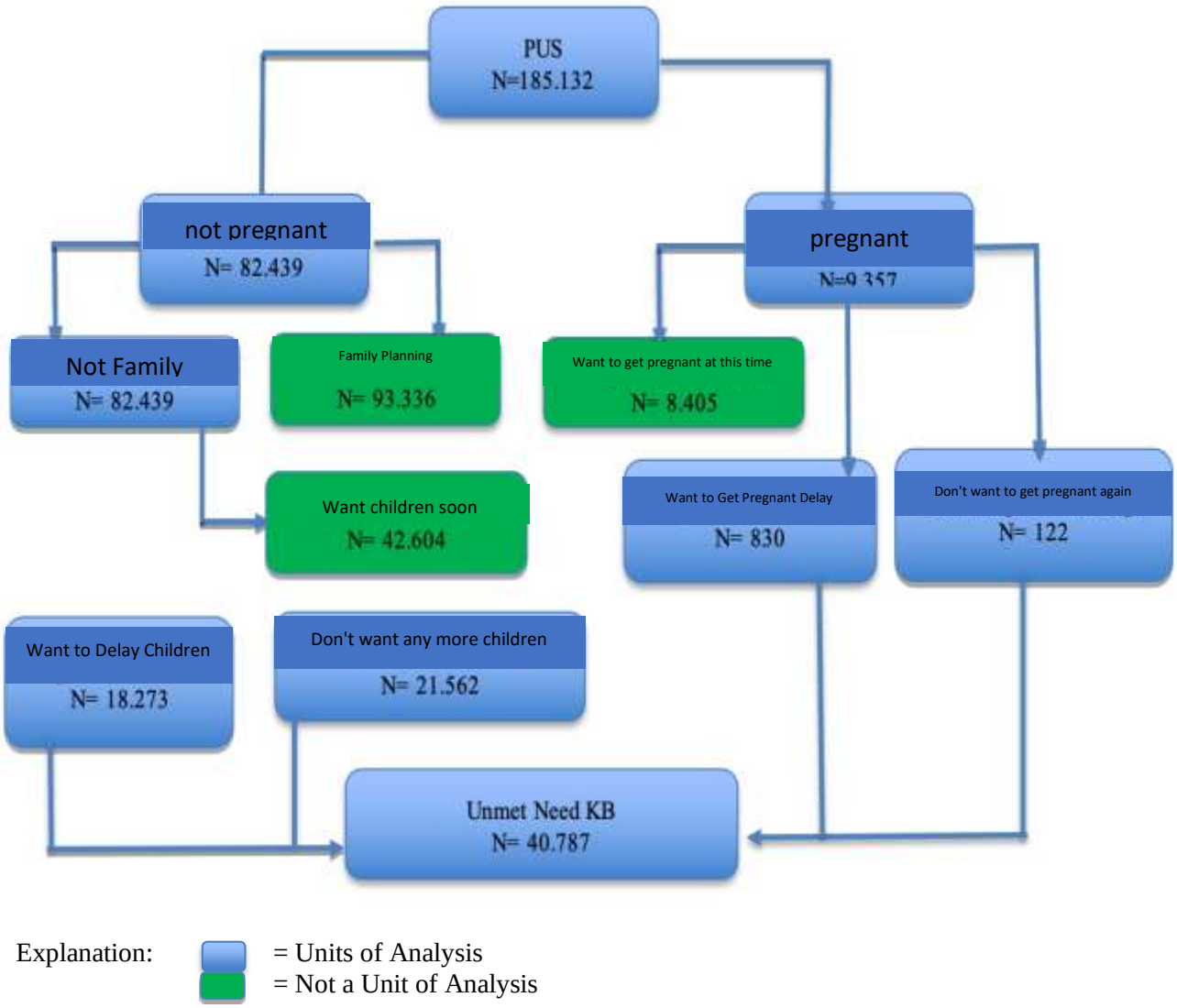


Figure 1. Determinant analysis unit of unmet need KB

RESULTS

Based on the results of the univariate analysis of the characteristics of couples of childbearing age based on their level of education, it shows that 47% of couples of childbearing age have low education, 42% have secondary education, and 11 percent have higher education, as shown in table 1 below:

Table 1. Characteristics of Respondents' Reproductive Age Couples.

Characteristics	n	%
Level of education		
Low	86362	46,6
Middle	77601	41,9
Higher	21169	11,4
Working Status		
Working	42389	22,9
Not working	142743	77,1
Age Group		
15-19	3151	1,7
20-24	18256	9,9
25-29	30154	16,3
30-34	34811	18,8
35-39	36313	19,6
40-44	39696	21,4
45-49	22751	12,3
Number of Children Born Alive		
≤ 2 children	142705	77,1
>2 children	42427	22,9
Unmet Need KB		
Unmet Need KB	40787	22,0
Met Need KB	144345	78,0
Total	185132	100,0

Based on the employment status, the characteristics of couples of reproductive age (PUS) are divided into two categories: working and not working. 23% of PUS working and 77% not working. The characteristics of couples of reproductive age based on age group shows that the largest PUS in the 40-44 year age group is 21%, and the lowest is in the 15-19 year age group with 2%.

PUS with less than or equal to 2 children is 57 percent, and more than 2 children is 43 percent. Couples of childbearing age with unmet need for family planning show that 22 percent of couples of childbearing age fall into the category of unmet need and 78 percent met need for family planning.

The relationship between the demographic characteristics of PUS and the incidence of Unmet Need for KB.

The bivariate analysis results show that the variable level of education has a p-value of 0.000, below the p-value of 0.025, which means a statistically significant relationship exists between education level and the incidence of unmet need for family planning in West Sulawesi Province. The lower the education level of PUS, the higher the incidence of unmet need for family planning as table 2 below:

Table 2. The relationship of the demographic characteristics of PUS to Unmet Need for Family Planning in West Sulawesi.

Variable		Unmet Need KB				p-value 0.025
		Yes	%	No	%	
Level of education	Low	20292	23	66070	77	0.000
	Middle	15745	20	61856	80	
	Higher	4750	22	16419	78	
Working Status	Working	10644	25	31745	75	0.000
	Not Working	30143	21	112600	79	
Age Group	15-19	355	11	2796	89	0.000
	20-24	2228	12	16028	88	
	25-29	4444	15	25710	85	
	30-34	6306	18	28505	82	
	35-39	7886	22	28427	78	
	40-44	11419	29	28277	71	
	45-49	8149	36	14602	64	
Number of Children	≤ 2 Anak	17488	17	88486	83	0.000
	≥ 3 anak	23299	29	55859	71	

Demographic characteristics of working status for unmet need for family planning have a p-value of 0.000, which means that there is a statistically significant relationship between the working status of PUS and the incidence of unmet need for family planning in West Sulawesi Province, meaning that PUS with unemployed characteristics will have more unmet need than with a working group.

The demographic characteristics of the age group with the unmet need for family planning in West Sulawesi have a statistically significant relationship with a p-value of 0.000 which is less than the p-value of 0.025. Older PUS will be more in the unmet need category for family planning than young PUS. From the table above, it can be seen that the 40-44 year-old group has the most unmet need for family planning compared to the 15-19 year age group, the 20-24 year age group, the 25-29 year age group, and the 30-34 year age group.

The characteristics of the number of children born alive to unmet need for family planning in West Sulawesi Province with a P-Value of 0.000 is less than the alpha value of 0.025, so it has a statistically significant relationship. The more children a couple of childbearing age has, the more likely they are to fall into the category of unmet need for family planning.

The level of education in this analysis is significantly related to the incidence of unmet need for family planning in West Sulawesi Province with a P value = 0.000. This result is in line with Hasnawatty's research showing that mother's education has a significant relationship with unmet need[12–14]. However, in contrast to the results of research on the determinants of education on the incidence of unmet need in urban areas conducted by Nanlohy in Panakkukang District, Makassar City, which is included in the urban classification according to the BPS, stated that there is no relationship between education and the incidence of unmet need for family planning[15].

Likewise, with research on the determinants of education on the incidence of unmet need conducted by Katulistiwa in Klabang District, Bondowoso Regency found that the education variable did not have a significant relationship in meeting contraceptive needs.[16]

The working status variable is significantly related to the incidence of unmet need for family planning with a p-value of 0.000. It is the same as research conducted by Lutfi Agus Salim in East Java. Based on the 2015 SUPAS data analysis, he found that unmet need for contraception in East Java Province was related to the mother's age, area of residence, mother's employment status, mother's educational level, number of sons born, number of daughters born[12]. The employment status of couples of childbearing age can affect participation in contraceptive use due to the influence of the work environment that encourages a person to participate in family planning so that it will indirectly affect the fulfillment of their family planning needs.[17]

Age indicates maturity in making decisions, including decisions regarding family planning participation. Decision-making for contraceptive methods usually requires weighing the advantages and disadvantages of various methods, which varies according to individual circumstances, perceptions, and interpretations, depending on the level of education and age[18]. The age group has a statistically significant relationship to the incidence of unmet need for family planning in West Sulawesi Province with a P-value of 0.000. This result is in line with the results of a study conducted by Begum, et. al. (2014) in Jidar in the urban area of Mumbai stated that maternal age is a factor that significantly influences the incidence of unmet need[19]. However, these results are different from the research conducted by Ulsafitri and Fastin in Magfirah Jidar with the title age determinants of the incidence of unmet need in urban areas stating that there is no relationship between the age of the respondent and the incidence of unmet need for family planning[20–22].

Based on the analysis results in this research, it was found that the variable number of live births had a significant relationship with the incidence of unmet need for family planning in West Sulawesi with a P-Value of 0.000. It is consistent with the results of research on the determinants of the number of living children on the incidence of unmet need in urban areas in line with Huda's study (2016) in Jidar in the working area of the Bandarharjo Health Center, North Semarang District, which is an urban area according to BPS classification which shows the result that there is a relationship between the number of children born alive with unmet need for family planning.

While research conducted by Sudha, et.

al. (2017) in Jidar in the urban area of Puducherry is not in line with the results of this study which found that the number of living children did not have a significant effect on the incidence of unmet need for family planning[20].

Strategy to Accelerate the Reduction of Unmet Need KB.

The strategy for reducing unmet need for family planning uses quadrant analysis to inventory target areas with low use of contraceptives and high unmet need for family planning. Districts in quadrant II will be the first priority area in working to accelerate the reduction of unmet need for family planning in West Sulawesi.

The results of the quadrant analysis between modern CPR and unmet need for family planning show that there are two districts that are in quadrant II, namely Polewali Mandar Regency and Mamuju Regency, which means that these two districts need first priority in handling the acceleration of the decline in unmet need for family planning.

While four districts are in quadrant 4, namely Mamasa, Mamuju Tengah, Majene, and Pasangkayu district, even though they are in quadrant 4, three districts namely Pasangkayu, Majene, and Mamuju Tengah can be made the second priority because the unmet need and modern CPR rates are only a few in below the provincial figure.

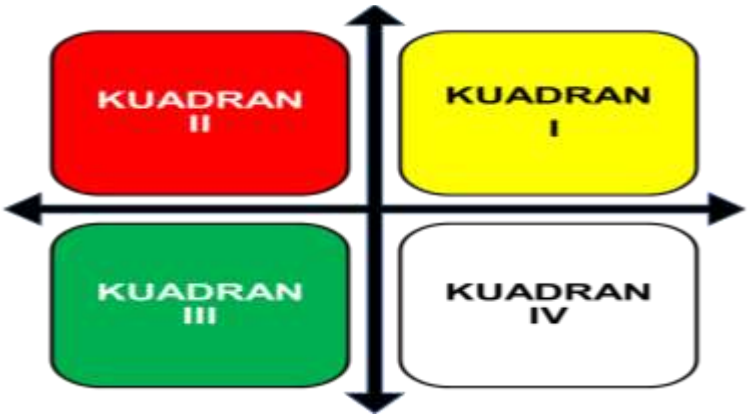
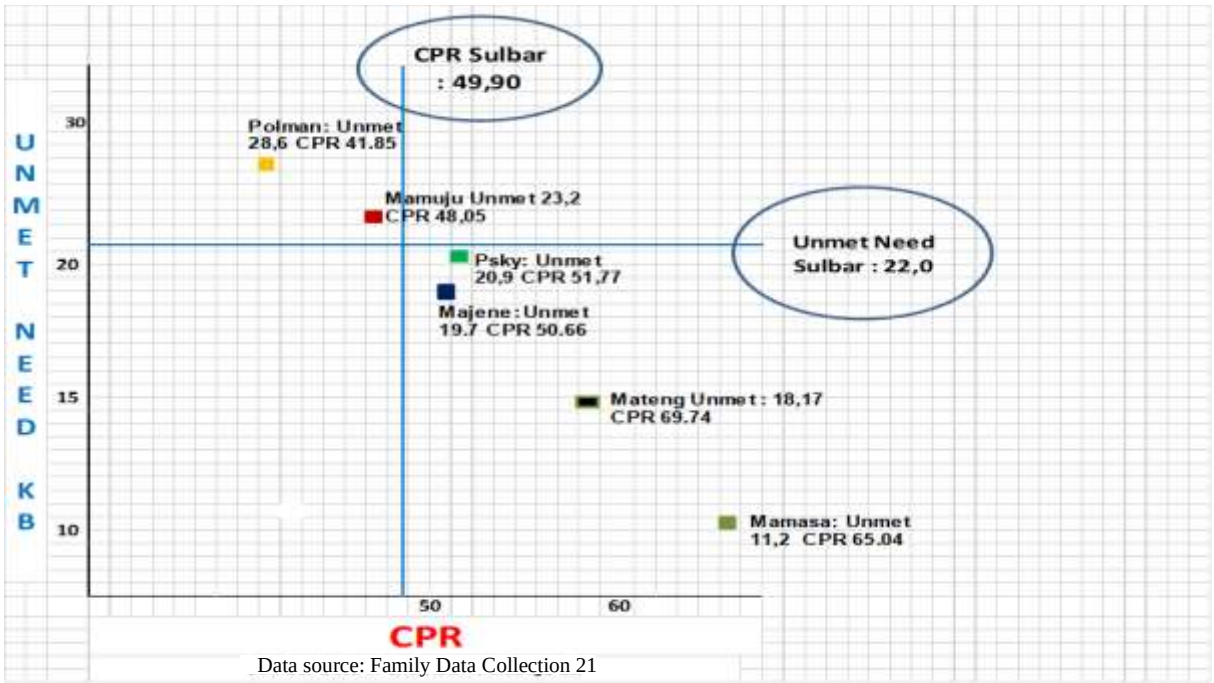


Figure 2. Quadrant mapping of cultivation priority areas.



Data source: *Process the 2021 Family Data Collection data set.*

Figure 3. Quadrant analysis of priority areas between Unmet and CPR Modern West Sulawesi.

Based on univariate, bivariate analysis, and quadrant analysis of unmet need for family planning events in West Sulawesi, an action plan intervention strategy can be formulated to accelerate the reduction of unmet need for family planning events in West Sulawesi Province as shown in the table below:

Table 3. Strategy for Reducing Unmet Need for Family Planning in West Sulawesi.

No.	Intervention	Action Plan
1	Target Area Inventory	a. Conduct quadrant analysis down to the village level to obtain priority areas for cultivation.
2	Inventory of PUS targets	a. Developing targets for PUS based on research results related to the incidence of unmet need for family planning in West Sulawesi Province, such as looking at the level of education, age group, employment status and the number of children born to couples of childbearing age.
		b. The focus of working on EFA is on the age group of 36-39 years, 40-44 years, and 45-49 years because, in this age group, there are pockets of unmet need for family planning in West Sulawesi.
		c. Focus on PUS with the number of live births above 2 children.
3	Strengthening Communication, Information and Education (KIE)	a. Make short Strengthening of Communication, Information, and Education materials following the reasons PUS does not have family planning and high risk of pregnancy for old PUS with high varieties to facilitate PKB/PLKB in providing counseling to PUS.
		b. Utilizing social media to reach out to PUS in providing information regarding reasons for not using family planning
4	Family planning services	a. Bringing access to family planning services closer, especially in areas with access to family planning service facilities that are difficult for PUS to reach.

CONCLUSIONS

The research shows that education level, occupation, age, and number of children born alive to couples of childbearing age are statistically related to the incidence of Unmet Need for Family Planning in West Sulawesi Province. In addition, the target areas for quadrant 2 with the main priority for accelerating the reduction of unmet need for family planning are Polewali Mandar and Mamuju districts. Policy makers can carry out an inventory of regional targets and targets for couples of childbearing age before conducting KIE so that they are more targeted.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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Original Article

The Effect of Seven Developmental Care Models on Mothers' Stress and Premature Infants' Length of Hospitalization

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ABSTRACT

The Neonatal Integrative Developmental Care Model (NIDCM) is a holistic model of premature infant care that refers to the seven neuroprotective developmental care cores involving the family. This study aimed to assess the effect of the application of NIDCM on mothers' stress response and length of stay in the neonatal care unit. This study used quasi-experimental with nonequivalent control group pre and posttest design. This study was carried out in the neonatal care unit at RSUP Dr. Wahidin Sudirohusodo Makassar from January 2020 to April 2021. The samples were 76 subjects consisting of 38 premature infants (19 controls, 19 interventions) and 38 mothers (19 controls, 19 interventions) ethical clearance by the Health Research Ethics Committee of the Faculty of Medicine, Universitas Hasanuddin No. 938/UN4.6.4.5.51/PP36/2009. The results show 1) NIDCM is proven to be able to reduce maternal stress more compared to routine Developmental Care (DC); 2) NIDCM is proven to shorten the length of stay compared to routine DC in infants with a gestational age of ≥33 weeks with BW ≥1800 grams (Median : 1900 grams), while in infants with a gestational age of <33 weeks and BW <1800 grams (Median : 1650 grams), NIDCM and routine DC are not proven to shorten the length of stay. It can be concluded that applying NIDCM reduces the stressors felt by mothers while their infants are in the neonatal room. In addition, the condition of infants with birth weights less than 1800 grams needs special attention with NIDCM intervention.

Keywords: NIDCM, Routine DC, Maternal Stress, Length of Stay.

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INTRODUCTION

A child begins to grow and develop from the beginning of conception and continues until birth to the next stage of life. Naturally, after an infant is born, adjustments to the environment outside the uterus take place within the first 24 hours of birth. However, these adjustments are more difficult to make if the infant is born with diseases, congenital abnormalities and infections—and there are complications during delivery, or if the infant is born prematurely and is a low birth weight. This condition occurs in all infants born at high risk, such as premature infants and low birth weight infants [1].

Statistical data show that Indonesia is ranked fifth as the country with the most cases of premature birth. Indonesia's population is around 225 million people, with premature birth rates reaching 675,700 cases per year from around 4.5 million live births per year [2].

In South Sulawesi, the percentage of infants with Low Birth Weight (LBW) in 2010

was 1.73% of live births, then in 2011, it increased to 2.35%. In 2012, it increased again to 3.12%, but in 2013 it decreased to 2.94%. In 2014, it increased to 3.02%, and in 2015 it increased again to 8.13% of live births. In the neonatal care unit at RSUP Dr. Wahidin Sudirohusodo Makassar in 2017, there were 229 premature infants with a mortality rate of 21.8%. Whereas in 2018, there were 195 infants with LBW with a mortality rate of 13.3% [3].

The infant care environment, especially in the NICU, not only causes stress for infants but also causes stress and anxiety for parents. Parent-infant bonding is difficult to occur when the infant is in the NICU. Mothers who have experienced premature births and their infants are treated in the NICU will experience stress. This will eventually affect the growth and development of their infants [4].

The involvement of family in caring for infants in the neonatal care unit is inseparable from the involvement of nurses. Nurses can provide education/guidance to families in any interventions performed on infants. A study by Arshadi, et al. (2017) states that the birth of premature infants treated in the NICU is a stressor phenomenon for parents and family support can help reduce the stress felt. Providing education to families, especially parents, can increase parents' confidence in caring for infants after being discharged from the hospital returning home [5].

RSUP Dr. Wahidin Sudirohusodo Makassar is one of the Referral Center Hospitals in Indonesia[3]. From the initial data collection through interviews with the head of the unit, it was revealed that nurses in the neonatal care unit had implemented developmental care since 2010. Education was carried out for parents while their infants were being cared for, such as kangaroo care and breastfeeding methods. However, the involvement of family (parents) while the infant was being cared for is still lacking as the majority of parents don't take care for their infants for 24 hours. There is no common perception between nurses in providing education to parents and no common understanding regarding family involvement in caring for infants, or regarding family centered care (FCC).

One strategy that can be developed is developmental care, namely care that can facilitate the development of infants through adequate environmental management which will increase physiological stability and reduce infant stress [6].

Developmental care includes adjusting the care and capabilities of the infant which involves the family. The aim is to improve the developmental potential of infants through the management of an intensive neonatal care environment. Developmental care is applied by looking at the infant's behavioral response, increasing physiological stability, improving sleep patterns, increasing the growth and development of the infant and reducing environmental and harmful stimuli in the infant [7].

Studies on developmental care have been carried out in Indonesia, but it is limited to each part of the seven developmental care cores so that it has not been integrated into one whole concept. Thus this is thought to be novelty from this study by looking at the application of premature infant developmental care integrated with the family in the concept of the Neonatal Integrative Developmental Care Model (NIDCM).

Based on the background explained, researchers wanted to know the effect of implementing the Neonatal Integrative Developmental Care Model (NIDCM) which is related to the seven neuroprotective developmental care cores by involving the family on mothers' stress response and (premature infants') length of stay in the neonatal care unit. This study aims to assess the effect of NIDCM implementation on maternal stress response and length of stay in the Neonatal Care Unit.

METHOD

This study used quasi-experimental with nonequivalent control group pre and post test design. The only difference was in the sample allocation for the Neonatal Integrative Developmental Care Model (NIDCM) and routine Developmental Care (DC) groups. This study was carried out in the neonatal care unit: level IIA, IIB and III RSUP at RSUP Dr. Wahidin Sudirohusodo Makassar

This study was carried out from January 2020 to April 2021. The sample selection in this study used a consecutive sampling technique with a total sample of 76 subjects consisting of 38 infants (19 controls, 19 interventions) and 38 mothers (19 controls, 19 interventions). The

instrument used in this study was a maternal stress questionnaire using the Parental Stressor Scale Neonatal Intensive Care Unit (PSS: NICU). Data analysis was carried out using the Independent t-test. This study has received ethical clearance by the Health Research Ethics Committee of the Faculty of Medicine, Universitas Hasanuddin No. 938/UN4.6.4.5.51/PP36/2009.

RESULTS

The neonatal integrative developmental care model refers to seven basic neuroprotective developmental care involving the family including: 1). environmental healing, 2). working with family, 3). set position and handling, 4). keep sleep, 5). minimize stress and pain, 6). protect the skin and 7). optimize nutrition. However, of the 7 (seven) basic developmental care, the interventions that can be carried out optimally are 5 (five). The 2 (two) basic care for neuroprotective development that have not been maximally implemented are: 1). environmental healing which includes noise and 2). working with family.

Table 1. Characteristics of Research Subjects.

Mother	Head of table column		
	Control (n=19)	**Intervention (n=19)**	***p-value***
Age, median (min-max)	32 (15-39)	27 (18-40)	0.518
Parity			
Primipara	10 (52.6%)	6 (31.6%)	0.333
Multipara	9 (47.4%)	13 (68.4%)	
Education			
Low	10 (52.6%)	1 (5.3%)	
Intermediate	2 (10.5%)	10 (52.6%)	0.148
High	7 (36.8%)	8 (42.1%)	
Experience of having			
a premature infant			
Yes	1 (5.3%)	2 (10.5%)	
No	18 (94.7%)	17 (89.5%)	0.560
Type of delivery			
SC/using	10 (52.6%)	13 (68.4%)	
tool	9 (47.4%)	6 (31.6%)	0.333
Normal vaginal	32 (15-39)	27 (18-40)	
Infant			
Gender			
Male	12 (63.2%)	9 (47.5%)	0.524
Female	7 (36.8%)	10 (52.6%)	
Gestational Age			
Median (min-max)	34 (27-36)	33 (38-36)	0.837
Birth Weight			
Median (Min-max)	1650 (1100-2450)	1900 (1190-2490)	0.936

Table 1. presents the characteristics of the research subjects including the characteristics of the mother and the characteristics of the infant. The characteristics of the mother consisted of mother's age, parity, education, experience of having a premature infant and type of delivery. Whereas the characteristics of the infant consist of gender, gestational age and birth weight. The results of the homogeneity test showed that the variance of the data was the same or homogeneous between the neonatal integrative developmental care model and routine developmental care groups.

Table 2. The Effect of Neonatal Integrative Developmental Care Model intervention (Mothers' Stress Response before and after the intervention)

Group	**Mothers' Stress Response (Mean ± SD)**		**Delta**	**p-value**
	Pre	Post		
NIDCM	2.97±0.37	2.61±0.23	0.36	<0.001
Routine	2.82±0.68	2.74±0.55	0.08	0.268[a]

DC			
p-value	0.296[b]	0.347[b]	0.005

Based on the data in Table 2, it can be seen that in the NIDCM group there is a decrease in the mothers' Stress Response by 0.36 (p <0.05) meaning that there is a significant difference before and after the NIDCM intervention. Whereas in the routine DC group, there is a decrease in the mothers' stress response by 0.08 (p>0.05) meaning that there is no significant difference before and after routine DC. The delta value shows that there is a significant difference in the mothers' stress response before and after the intervention.

Figure 1. Error Bar diagram of changes in maternal stress in the neonatal care unit between the NIDCM and routine DC Intervention and control group.

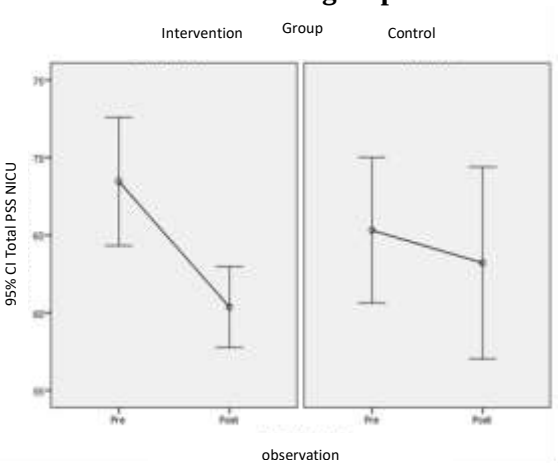


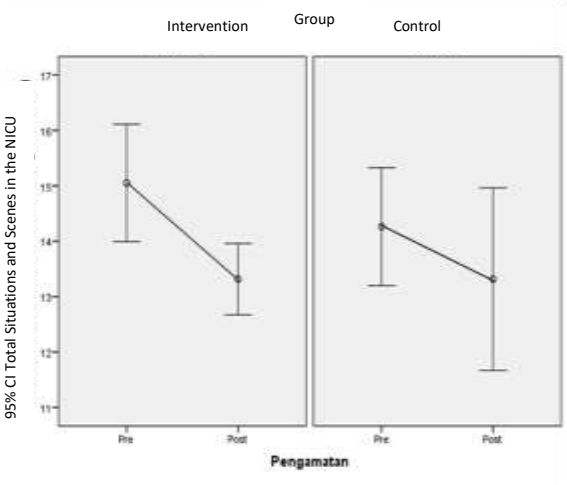
Figure 1 shows that there is a greater decrease in maternal stress in the NIDCM group compared to the routine DC group.

Table 3. Mothers' Stress Response for specific situations and scenes in the neonatal care unit before and after the intervention.

Group	Situation and view (Mean ± SD)		Delta	p-value
	Pre	Post		
NIDCM	3.01±0.43	2.66±0.26	0.35	0.006
Routine DC	2.85±0.44	2.66±0.68	0.19	0.193
p-value	0.277	0.931	0.163	

Based on the data in Table 3, it can be seen that in the NIDCM group there is a decrease in the mothers' stress response for specific situations and scenes by 0.35 (p <0.05), meaning that there is a significant difference before and after the NIDCM intervention. Whereas, in the routine DC group, there is a decrease by 0.19 (p>0.05), meaning that there is no significant difference in the mothers' stress response for specific situations and scenes before and after routine DC.

Figure 2. Error Bar diagram of changes in maternal stress for specific situations and scenes in the neonatal care unit between the NIDCM and routine DC groups.



The observation rs' stress response is the situations and scenes in the neonatal care unit. Figure 2 shows that there is a greater decrease in stress in the NIDCM group compared to the routine DC group. There are 5 (five) statement items from the mothers' stress response for specific situations and scenes, namely 1) presence of monitors and their equipment; 2) appearance of a sudden sound from the monitor alarm; 3) presence of other premature infants; 4) number of health workers; 5) presence of a breathing machine.

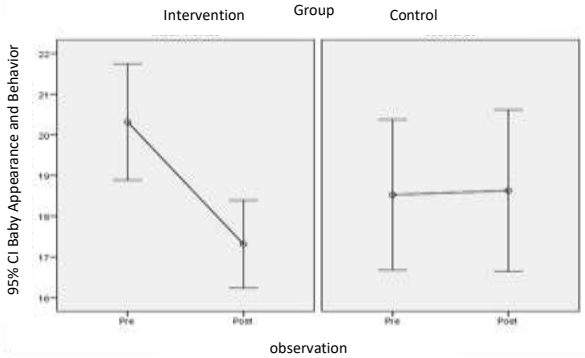
Table 4. Mothers' stress response specifically to the appearance and behavior of the infant in the neonatal care unit before and after the intervention.

Group	Appearance and behavior of the infant (Mean ± SD)		Delta	p-value
	Pre	Post		
NIDCM	3.38±0.49	2.87±0.36	0.51	0.001
Routine DC	3.09±0.64	3.10±0.68	0.01	0.752
p-value	0.138	0.223	<0.001	

Based on the data in Table 4, it can be seen that in the NIDCM group there is a decrease in the mothers' stress response by 0.51 (p <0.05) meaning that there are significant differences specifically to the appearance and behavior of the infant before and after the

NIDCM intervention. Whereas in the routine DC group there is a decrease in the mothers' stress response by 0.01 (p>0.05) meaning that there is no significant difference specifically to the appearance and behavior of the infant before and after routine DC. The delta value indicates that there is a significant difference in the mothers' stress response specifically for the appearance and behavior of the infant before and after the intervention.

Figure 3. Error Bar diagram of changes in maternal stress specifically to the appearance and behavior of the infant between the NIDCM and routine DC groups



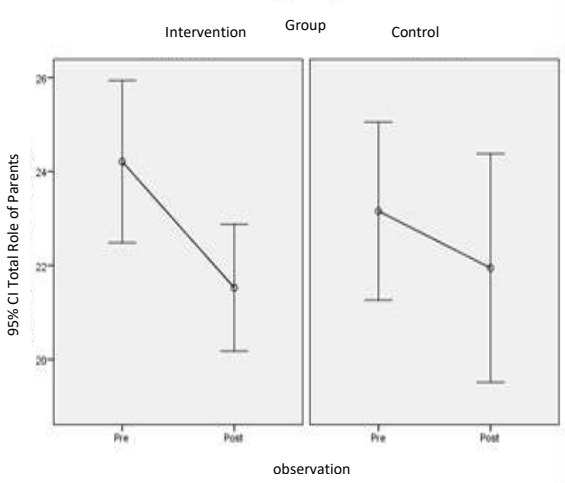
The second subscale of the mothers' stress response is the appearance and behavior of the infant in the neonatal care unit. Figure 3 Shows that there is a greater decrease in stress in the NIDCM group compared to the routine DC group. There are 6 (six) statement items from the mothers' stress response specifically to the appearance and behavior of the infant, namely 1) unusual skin color changes in the infant; 2) very small size of the infant; 3) wrinkled skin of the infant; 4) attached hose and needle; 5) helpless look of the infant; 6) suddenly pale and blue skin of the infant.

Table 5. Mothers' stress response specifically to the role of parents in the neonatal care unit before and after the intervention.

Group	The role of parents (Mean ± SD)		Delta	p-value
	Pre	Post		
NIDCM	3.03±0.43	2.71±0.35	0.51	0.002
Routine DC	2.91±0.48	2.74±0.62	0.01	0.103
p-value	0.405b	0.799b	0.181	

Based on the data in Table 5, it can be seen that in the NIDCM group there is a decrease in the mothers' stress response by 0.33 (p <0.05) meaning that there is a significant difference specifically to the role of parents before and after the NIDCM intervention. Whereas in the routine DC group, there is a decrease in the mothers' stress response by 0.16 (p>0.05) meaning that there is no significant difference specifically to the role of parents before and after routine DC.

Figure 4. Error bar diagram of changes in maternal stress specifically to the role of parents in the neonatal care unit between the NIDCM and routine DC groups.



The third subscale of mothers' stress response is the role of parents in the neonatal care unit. Figure 4 shows that there is a greater decrease in stress in the NIDCM group compared to the routine DC group. There are 8 (eight) statement items from the mothers' stress response specifically to the role of parents, namely: 1) sad to part with the infant; 2) unable to hug and hold the infant; 3) feeling unable to protect the infant; 4) do not have time with the infant; 5) sometimes forget to see the infant; 6) the infant cannot be with other family members; 7) afraid to touch the infant; 8) health workers are closer to their infants.

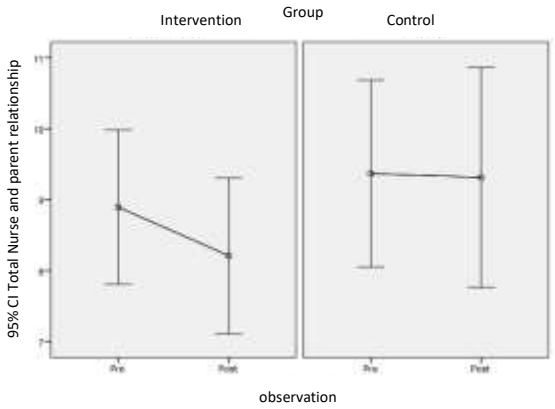
Table 6. Mothers' stress response, specifically the communication relationship between nurses and parents in the neonatal care unit before and after the intervention.

Group	Communication relationship between nurses and parents (Mean ± SD)		Delta	p-value
	Pre	Post		
NIDCM	2.25±0.55	2.07±0.55	0.51	0.121
Routine DC	2.35±0.69	2.34±0.81	0.01	0.939
p-value	0.506	0.242b	0.297	

Based on the data in Table 6, it can be seen that in the NIDCM group there is a

decrease in the mothers' stress response by 0.36 (p>0.05) and in the routine DC group, there is a decrease in the mothers' stress response by 0.07 (p>0.05) meaning that there is no significant difference before and after the intervention.

Figure 5. Error bar diagram of changes in maternal stress specifically to the communication relationship between nurses and parents in the neonatal care unit between the NIDCM and routine DC groups.



The fourth subscale on the mothers' stress response is the communication relationship between nurses and parents. Figure 5 Shows that the NIDCM and routine DC groups experience a greater decrease in maternal stress in the neonatal care unit. There are 4 (four) statement items from the mothers' stress response specifically to the communication relationship between nurses and parents, namely: 1) do not understand what the nurse conveys; 2) the nurse does not provide information when examining the infant; 3) (information) delivery of nurses varies; 4) not sure about the changes conveyed by the nurse.

Table 7. Differences in length of stay between the NIDCM and the routine DC groups.

Group	Mean (SD)	Median	95% CI	Min/ max	p-value
NIDCM	14,74 (4,74)	13.00	12.45-17.02	9/24	0.117
Routine DC	17.21 (8.24)	16.00	014.20-20.22	7/29	

Based on data in Table 7 the median length of stay in the NIDCM group is 13 days and the median length of stay in the routine DC group is 16 days. This means that the NIDCM group has a shorter length of stay compared to the routine DC group, but there is no significant difference (p>0.05).

Figure 6. Diagram Box plot length of stay of premature infants.

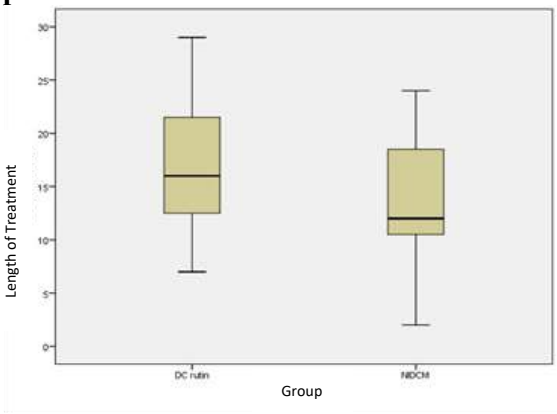


Figure 6 shows the representative length of stay of premature infants in the routine DC and NIDCM groups. In the routine DC group, the variance of the length of stay is longer compared to the NIDCM group.

Table 8. Differences in length of stay categories between the NIDCM and routine DC groups.

	2-13 days		14-29 days	
Group	n (%)	Median min-max	n (%)	Median Min-max
NIDCM	11(28.9)	11.0(2-13)	8(21.1)	20.0(14-24)
Routine DC	6 (15.8)	11.0 (7-13)	13(34.2)	20.0(14-29)
Total	17(44.7)	12.0(2-13)	21(55.3)	16.0(14-29)

Table 8 shows the results of a slightly longer length of stay in the routine DC group after the intervention and slightly shorter in the NIDCM group after the intervention.

Figure 7. Error bar diagram of length of stay in the neonatal care unit for premature infants.

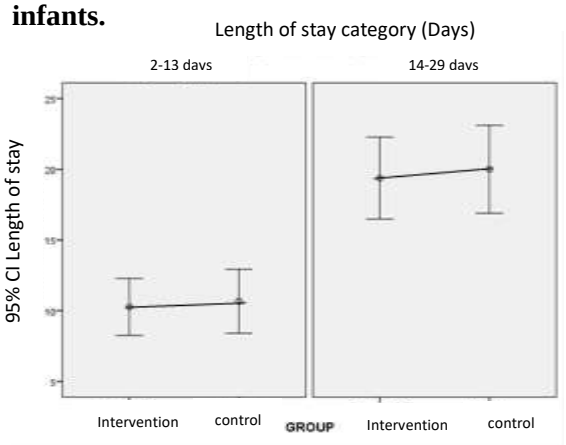


Figure 7 shows that in the NIDCM group, the length of stay (hospitalization days) is relatively short (7-<14 days) and in the routine DC group, the length of stay is long (14-

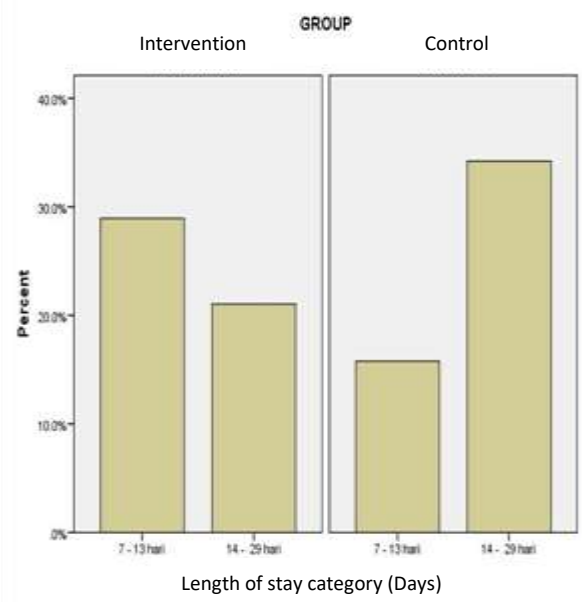
29 days). If categorical analysis is used with Chi-square and OR is calculated, the results can be seen in Table 8.

Table 9. Comparison of the incidence of length of stay in the NIDCM and routine DC groups.

Group	Short (7-13 days) n (%)	Long (14-29 days) n (%)	RR 95% CI	p-value
NIDCM	11 (57.9%)	8(42.1%)	1.83 (0.853-3.940)	0.192
Routine DC	6 (31.6%)	13(68.4%)		
Total	17(44.7%)	21(55.3%)		

Table 9 shows that the NIDCM group tends to have a shorter length of stay (hospitalization days), while the routine DC group tends to have a longer length of stay. The differences between groups are not significant, however, the NIDCM group has a 1.83 greater probability of experiencing a shorter length of stay compared to the routine DC group

Figure 8. Bar diagram of the difference in the percentage of length of stay of premature infants between the NIDCM and routine DC groups.



The bar diagram shows that there is a shorter length of stay in the NIDCM group, while the longer length of stay is more in the routine DC group.

Table 10. Comparison of NIDCM with the category of length of stay in the neonatal room after stratification based on the combined category of gestational age and birth weight of premature babies

UG + BBI	Category	Short	Slow	RR (95% IK)	p-value
(<33 weeks <1800) Routine DC	NIDCM	(20%)	4 (80%)	1,00 (0,084-11,931)	0.060
	DC routine	(20%)	4 (80%)		
(≥33 week BB ≥ 1800)	NIDCM	10 71,4%)	4 (28,6%)	2,00 (0,920-4350)	0.041
	DC routine	5 35,7%)	9 (64,3%)		

Table 10 it can be seen that the ratio of the incidence of short hospital stay between the NIDCM group and the routine DC group is 1:1 with RR = 1.0 if NIDCM is given to babies who have BBL <1800 and gestational age <33 weeks. If the babies were born with low birth weight and gestational age as above (gestational age ≥33 weeks and/or birth weight ≥1800 grams), then NIDCM gave twice the possibility of short length of stay (7-13 days) when compared with the routine DC group.

DISCUSSION

Effect of neonatal integrative developmental care model intervention on maternal stress response in the neonatal ward.

This study involved the mothers' stress response variable which is defined as the physical and emotional conditions experienced by the mothers due to the physical and psychological environment of the neonatal care unit and the condition of premature infants. In this case, the Parental Stressor Scale: Neonatal Intensive Care Unit (PSS: NICU) instrument was used to measure the mothers' stress levels. This instrument consists of 23 statements with 4 answer choices, namely 1. Not Felt Very Much; 2. Not Felt; 3. Felt and 4. Strongly Felt.

The results of this study are supported by a previous study by Agrawal and Gaur (2016) that the most dominant aspect of causing stress to parents is their changing roles and their relationship with infants treated in the NICU. Therefore, to reduce the level of stress on parents, aspects of the role of parents, especially mothers, as well as regular family visits (must be increased). With this, the relationship

between parents and infants becomes more optimal, so that it can support the infant's further development.

Another aspect that can cause stress for parents is the appearance and behavior of the infant. These findings are in line with the results of a study by Dudek-Shriber (2004), that the appearance and behavior of the infant are one of the biggest factors causing stress to parents. This is because infants born prematurely show unstable physiology, so these infants have a different appearance and have less response when interacting than normal infants. Apart from these aspects of appearance and response, premature infants also need medical equipment and a long treatment period compared to infants born normally, to support their growth and development [8].

Besides, there is also the aspect of the situations and scenes in the neonatal care unit which can increase stress on parents, although not as big as the previous two aspects. The findings of this aspect are in line with the findings of a previous study by Franck et al., (2005) that the NICU room environment helps keep infants alive even though they have to be assisted by various sophisticated equipment, so parents must also adapt to the environment in the NICU room [9].

Furthermore, routine DC in the neonatal care unit cannot significantly reduce the mothers' stress levels due to the lack of family involvement during infant care. Therefore, this is believed to be a major cause of stress for parents because parents cannot carry out their roles as fathers and mothers during infant care in the neonatal care unit. This lack of involvement in their role causes parents to feel inadequate because they cannot protect and care for their infants [10]. This mainly occurs in mothers who cannot breastfeed, change diapers, bathe, hug, kiss, hold and caress their infants [11].

Significantly, the NIDCM intervention involving family roles can reduce the mothers' stress levels, although this takes time because parents are still under pressure [4]. Parental involvement in infant care has indeed been proven to reduce the mothers' stress levels, especially with support from other aspects, such as staff providing clear and precise information, forming parent groups, providing educational materials about norms and daily infant care and parental participation in performing infant care procedures [12].

Santos et al., (2017) in a previous study show similar results, that the involvement of mothers assisted by health workers in caring for infants in the neonatal care unit can reduce their stress because in this case, they can finally achieve their desire to play an active role as a mother who is judged to be more competent in caring for their infant. However, in this case, health workers also have a role, namely by guiding and supervising mothers in carrying out their role to care for their infants with confidence [13].

Of the several factors causing stress in parents, the role of parents is the biggest stressor because when parents are separated from their infants, they feel helpless and unable to protect their infants from pain and painful treatment procedures. This is in line with a study by Wormald et al., (2015) that the most significant aspect of causing stress to mothers is the moment when they are separated from their premature infants and their inability to love and protect their infant from pain and painful treatment procedures[14].

The Effect of Neonatal Integrative Developmental Care Model on the length of stay of premature infants in the neonatal care unit.

In this study, the length of stay of premature infants refers to the number of days premature infants are hospitalized during a treatment period. The length of stay for the infant is calculated by looking at the difference between the date of discharge (discharge from the hospital) and the date of admission to the hospital. This measurement method has been carried out by Maier et al., (2018) to measure the duration of care for premature infants who stay in the hospital, where the measurement is carried out by calculating the date of birth until the final date of discharge [15].

Based on this study, it is found that the control group who received routine DC intervention was treated for a longer period than the group who received NIDCM intervention, namely 16 days while the NIDCM group was treated for 13 days. In addition, there were more infants who had short periods of stay in the group who received NIDCM intervention compared to the routine DC group. This means that the NIDCM group has a shorter length of stay (hospitalization days) compared to the routine DC group so it can be concluded that the NIDCM intervention can reduce the need to

care for infants in the neonatal care unit. If it is related to conservation theory, the NIDCM intervention is meant as part of social integrity conservation because of family involvement in the care of premature infants which results in reduced days spent in hospital for infants [16].

However, the differences that occurred are considered not significant. This is because the involvement of the family, especially the mothers, has not been maximized during the implementation of developmental care interventions due to restrictions on contact between infants and families due to the COVID-19 pandemic. As a result of this pandemic, family involvement in the intervention has decreased because interactions between mothers and infants cannot be carried out on an ongoing basis so the application of family-centered care has not been maximized. In addition, routine DC care in the neonatal care unit has been implemented and includes a subset of NIDCM intervention.

Furthermore, Numerato et al., (2017) show that the length of stay for premature and low birth weight infants in Europe differed from one area to another, where the shortest average length of stay for infants in the NICU occurred in the Netherlands for 11.5 days, in Hungary for 13.1 days and in Italy for 13.4 days. However, very premature infants born at 23-24 weeks of gestation have a long day of stay in the NICU ranging from 105.2 to 106 days [15]. This is in line with AlJohani, Qaraqei and Al-Matary (2020) who show that infants born at 23 and 24 weeks of gestation have an average hospitalization day of 122 and 119 days, respectively, slightly longer than infants born after 34-36 weeks of gestation [17].

Some literature has suggested that the mother's gestational age and infant medical conditions such as bronchopulmonary dysplasia and persistent apnoea are factors affecting the length of stay of premature infants in the NICU[18]. In this regard, it is stated that the younger the mother's gestational age, the longer the care for premature infants born, where premature infants born at less than 32 weeks of gestation have a length of hospitalization days of around 46.2 [19]. while premature infants born at 23-24 weeks of gestation receive longer care in the NICU, which is more than 100 days [20].

The results show that infants who were born with a gestational age of less than 33 weeks and a BW of less than 1800 grams receive longer care compared to infants with a gestational age of more than 33 weeks and a BW of more than 1800 grams. Therefore, premature infants in the NIDCM intervention group received shorter care than infants in the routine DC group.

The researchers argue that there is a close relationship between the length of care Kramer, M. S. (1987) Determinants of low birth weight: methodological assessment and meta-analysis. For the infant and the care they underwent while in the neonatal care unit, gestational age, and the infant's birth weight. Therefore, family involvement, especially parents, needs to be maximized in the care of premature infants because parents really understand the needs of infants and are more intense in providing individual care to infants, so that this can indirectly affect reducing the length of infant care in hospitals, especially in the neonatal care unit [2].

CONCLUSIONS

The neonatal integrative developmental care model (NIDCM) intervention has been shown to be able to reduce maternal stress more compared to the routine developmental care (DC) intervention. The neonatal integrative developmental care model (NIDCM) intervention has also been shown to shorten the length of stay compared to the routine DC intervention in infants with a gestational age of ≥33 weeks with BW ≥1800 grams, while in infants with a gestational age of <33 weeks and BW <1800 grams, the NIDCM and routine DC interventions are not proven to shorten length of stay. It is recommended to carry out further research by observing the neonatal care unit nurses in carrying out the seven neuroprotective developmental care cores by involving the family.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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Original Article

Inhibiting Back Pain and Enhancing Comfort During Pregnancy with The Power of Endorphin Massage

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ABSTRACT

Back pain and anxiety during pregnancy can cause discomfort and interfere with activities in meeting daily needs. Endorphin massage is known to reduce back pain and make a person calmer so that it can reduce anxiety, but research on the effect of endorphin massage in dealing with back pain and anxiety is still minimally reviewed. The study aims to should be to find out the effect of endorphin massage for back pain and anxiety in third trimester pregnant women. The one-group pretest-posttest research method used a quasi-experimental design involving 42 respondents from 2 selected villages using a purposive sampling technique. The endorphin massage intervention was carried out 18 times with 2 observations, during the pretest and after the end of the intervention 18 times. After the analysis using the t-test, it is known that endorphin massage affects reducing back pain and anxiety in pregnant women. The analysis's findings demonstrated that there was an intervention effect on anxiety and back pain, with a p-value of 0.000, compared to a p-value of 0,042 for the control group. It was concluded that there is influence of endorphins to inhibiting back pain, enhancing comfort during pregnancy and it is very important to educate pregnant women about physical and psychological discomfort so that they can be anticipated in carrying out their daily activities. It is also recommended to consider the presence of the husband when implementing this activity.

Keywords: Anxiety, Endorphin massage, Low back pain, Pregnancy.

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INTRODUCTION

A woman's pregnancy is a complicated time in her life. It is linked to major physical and psychological changes that help a woman's body's many systems balance their operations in relation to the needs of the fetus. Pregnant women are more susceptible to physical and emotional issues because of these changes, even though they are important for the fetus' life and the mother's body to adjust to new situations. Pregnancy discomfort is brought on by these changes at various times, including morning sickness, difficulties moving, poor sleep, lower back pain, and changes in moods including impatience, sorrow, and anxiety [1–4]. The prevalence of physical discomfort that pregnant women complain about the most is back pain and anxiety, this occurs in the third trimester [5],

Weight gain during pregnancy of 10-15 kg causes disturbances in the bones that function to support the body, causing low back pain [6]. This is also exacerbated by the increasing weight of the baby which also contributes to putting pressure on the blood vessels, pelvic nerves and the pregnant woman's back, causing

back pain. Hormonal changes in pregnancy cause the process of releasing beta-endorphins in the body, causing various physical discomforts that are felt during pregnancy [7].

Not only physical problems experienced by pregnant women but also psychological problems arise in the form of increased anxiety[8]. The pituitary gland was found to release peptide hormones called endorphins into the circulatory system in addition to acting as neurotransmitters in the central nervous system. Clinical research has shown that endorphins can contribute to mental health issues during pregnancy, such as autism, depression, and mood disorders [9,10]. Endorphins are produced by the trophoblastic tissue of the placenta and then enter the mother's blood circulation system, starting in the third month of pregnancy. At 25-28 weeks of gestation, the levels of endorphins and anxiety hormones increase and will continue to increase as the gestation period increases [11].

The impact of back pain complaints and increased anxiety in pregnant women will affect fetal development. Endorphin massage is frequently utilized as an additional non-pharmacological treatment to improve pregnancy-related anxiety and back pain [12,13]. Endorphin massage is a light touching and massaging technique that can cause beta-endorphin release and stop pain impulses, this will have the effect of normalizing heart rate and blood pressure, as well as increasing relaxed conditions in the body [14] [1513]. Endorphins are believed to boost the immune system, reduce pain, and reduce stress, and anxiety [16], [17].

Many studies of Endorphin Massage have not been explored, so further studies are needed to support the existing findings. According to the findings of a preliminary study at a Puskesmas, 75% of pregnant women in their third trimester reported back pain and an increase in tension, so management is needed so that the condition does not become a critical pathology, one of which is by giving endorphins massage to third-trimester pregnant women. Study aims to explore the benefits of endorphin massage for back pain and maternal anxiety during the third trimester of pregnancy.

METHOD

One-Group Pretest-Posttest Design is the sort of quasi-experimental design used in this investigation. The researcher described the proposed intervention to the responders, namely endorphins massage to reduce discomfort in pregnant women, especially back pain and increased anxiety. Respondents were asked to do a pretest to assess the worsening of lower back pain and increased anxiety. After the intervention, which took place over the course of 18 meetings, a post-test was conducted. Before and after the intervention, research participants were observed twice. After that, the test results from the treatment group were compared to the test results obtained before and after the therapy.

Samples were collected based on selected criteria according to research needs, 42 responses, all of them were pregnant women in the third trimester were located in two villages under the working area of the public health centre.

Obtained data that has a normal distribution after the Shapiro-Wilk test The effectiveness of endorphin massage is evaluated by contrasting the mean test results obtained prior to treatment (pre-test) and following therapy (post-test). A significance test employing the t-test is used to determine how much the rise in significance has increased. The One Group Pre-test and Post-test Design is the t-test formula utilized with the study design. This research has passed an ethical review from the Poltekkes Palembang research ethics committee number 0538A/KEPK/Adm2/III/2022.

RESULTS

This research was conducted by waiting for patients in the third stage of pregnancy who will give birth at the village midwife. The instrument used to assess complaints of pregnancy discomfort focusing on complaints of back pain and a variation that measures pregnancy anxiety has been assessed for validity and reliability with 20 participants. Then the respondents were divided into two groups, the intervention and control groups. Both groups were given questionnaires before and after the procedure to measure complaints of back pain and anxiety in pregnancy. The analysis's findings demonstrated that there was an intervention effect on anxiety and back pain, with a p-value of 0.000, compared to a p-value of 0,042 for the control group.

Table 1. Characteristics of Respondents

Characteristics	Frequency	Percentage
Age		
Not at risk (20-35 years)	24	57.1
At risk (< 20 & >35 years)	18	42.9
Parity		
Primigaravids	18	42.9
Multigravida	24	57.1
Education		
SD-SMP-SMA	36	85.7
Academic/PT	6	14.3
Family Support		
Support	39	92.9
No support	3	7.1
Residence		
Urban	41	97.6
Rural	1	2.4

Table 2. Distribution of Back Pain Complaints Before and After Endorphin Massage (n = 42).

Respondent	Before		After	
	f	%	f	%
Heavy	6	28.6	1	4.8
Currently	10	47.6	7	28.6
Light	4	19.0	11	52.4
No complaints	1	4.8	3	14.3
Total	21	100	21	100

Table 3. Distribution of Pregnancy Anxiety Before and After Endorphin Massage (n = 42).

Respondent	Before		After	
	f	%	f	%
Heavy	6	28.6	1	4.8
Currently	10	47.6	7	28.6
Light	4	19.0	11	52.4
No anxiety	1	4.8	3	14.3
Total	21	100	21	100

Table 4. Analysis of the Effect of Endorphin Massage on Back Pain and Pregnancy Anxiety in the Intervention and Control Groups (n = 42)

Variables	Group	Mean	z	*p-value*
Endorphin massage for back pain	group Intervention			
	Pre-test	2.00	2.29288	0.000
	Post-Test	1.24		
	Difference	-0.76		
	group Control			
	Pre-test	1.95	0.58531	0.042
	Post-Test	2.33		
	Difference	0.38		

DISCUSSION

Weight gain during pregnancy causes the bones that function to support the body to be disrupted. The mother's posture will also change to compensate for the increase in gestational age. This condition if given immediate action can cause chronic back pain and problems in resting and sleeping[18,19]. Thus causing discomfort during pregnancy.

Back pain is the most frequent complaint of discomfort during pregnancy. If it is not treated right away, it can result in long-term back pain and increase the likelihood of postpartum back pain and chronic back pain, both of which will be more challenging to treat or cure. From the beginning of pregnancy until 24 weeks of gestation, pregnancy discomfort is present. It becomes more frequent and severe during the third trimester.

Adaptation to the conditions that must be experienced is important for pregnant women. In addition to adaptation, actions are needed that can relieve discomfort during pregnancy. Many other factors in a pregnant woman's body can respond to brain chemicals known as neurotransmitters that cause pain. Endorphin somatic cell receptors can bind to neurotransmitters thereby eliminating pain problems [20].

For pregnant women, endorphin massage is a gentle touch (massage therapy) that is necessary near the end of pregnancy or after childbirth. This is due to the fact that a little touch or massage will induce the body to release endorphins, which are substances that can reduce pain and increase comfort. The majority of pregnant women who received endorphine massage therapy saw a reduction in pain. Mothers who receive endorphin massage therapy report feeling at ease and relaxed.

Administering drugs to pregnant women is not recommended, because certain drugs can have a negative impact, including affecting the growth and development of the fetus and increasing the risk of birth defects. One alternative to avoid the problem of drug effects in pregnant women is complementary

therapy.

Currently, complementary therapy is widely used in various fields of health as an alternative therapy [21]. Complementary therapy has been proven to be able to support the process of pregnancy and childbirth so that it is comfortable and enjoyable [22]. One of the most widely used complementary therapies to treat discomfort during pregnancy is endomorphin massage. A study found that massage given to pregnant women can increase feelings of relaxation and comfort [14,23]. The body can be stimulated to release endorphins, which are natural painkillers, by the use of endorphin massage [8,24].

Anxiety is the most common mental health problem experienced, and most studies have been conducted in the third trimester of pregnancy [25]. Understanding comorbid anxiety in pregnancy is a growing area of research [26]. A meta-analysis of anxiety during pregnancy reveals a moderate prevalence; 3.9% of women reported feeling depression during pregnancy, and 15.8% of women self-reported having symptoms of anxiety throughout pregnancy and 17.1% in the postpartum period (1–24 weeks after delivery) [27]. The prevalence of clinical diagnoses for anxiety is 9.3% antenatally and 4.2% postpartum. The problem that arises is when this anxiety occurs continuously and there is no effort to reduce it, causing increasingly severe symptoms, namely depression and trauma [28] and this requires greater treatment [29]. In addition, The detrimental impacts of sadness and anxiety will impact partner intimacy, maternal health, and mother-infant bonding [27].

The negative impact of anxiety during pregnancy is enormous and numerous, not only on the health of the mother, but also on the unborn child, family relationships and the baby's growth and development process when it is born. It is important to provide therapy, one of the many chosen therapies is Endorphin Massage. Endorphins are hormones that cause anxiety in pregnant women [11]. With this therapy, it is thought that the immune system will be strengthened, pain will be lessened, anxiety will decrease, and most importantly, the aging process will be slowed [17]. Based on the results of the study, it was known the aims of that endorphins massage which has the power to reduce lower back pain and increase comfort during pregnancy.

CONCLUSION

This shows that the intervention given in the form of regnant women who receive an endorphin massage report less anxiety and back pain, and there are differences between the intervention and control groups' pain and anxiety scores before and after the action is administered. Thus, it can be concluded that Endorphine Massage is very effective and efficient. However, it is no less important to achieve the success of all therapies influenced by many factors, one of the most important factors is family support, especially the closest person, namely the husband. The husband can consistently provide therapy and arrange a therapy schedule. There is no conflict of interest in this study.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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Original Article

The Potential Antibacterial Effect of Papaya Leaf Extract (Carica papaya L) and Miana Leaf Extract (Coleus scutellarioides L) as Adjuvant Therapy for Rifampicin-Resistant Tuberculosis

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ABSTRACT

The adhesion of Rifampicin-resistant TB to neutrophils plays an essential role in colonization. Several active compounds in papaya leaf and Miana leaf (Coleus scutellarioides L) are believed to regulate or prevent the formation of bacterial colonies. The purpose of this study was to determine the anti-bacterial effectiveness of extracts of papaya leaf (Carica Papaya L.) and Miana leaf (Coleus scutellarioides L) against bacterial isolates of Rifampicin-Resistant TB strain (RR). This research method is a in vitro laboratory experiment, and extracts of papaya leaf and Miana leaf (50, 25, 12,5%) were tested as anti-bacterial using the M-TB susceptibility test using the Proportion Method. The results showed the anti-bacterial ability of papaya leaf extract against bacterial isolates of the MTBC-Resistant Rifampicin strain at a concentration of 50% with a resistance percentage value of 0% so that it was included in the Sensitive category, but at a concentration of 25% the resistance percentage value was 42.86% % and a concentration of 12.5%, the percentage value of resistance is 42.86% so that it is included in the category of resistance (Resistant > 1% and Sensitive < 1%). The anti-bacterial ability of miana leaf extract against bacterial isolates of the MTBC-Resistant Rifampicin strain at a concentration of 50% with a resistance percentage value of 5.33%, at a concentration of 25%, with a resistance percentage value of 17.14%, and at a concentration of 12.5%, with a resistance percentage value of 100%, so all are included in the resistant category. The Conclusion 50% papaya leaf extract inhibits the formation of Rifampicin-resistant MTBC-resistant bacterial colonies, allowing its usage as a substitute ingredient in Rifampicin-resistant MTBC-resistant medications.

Keywords: Extract, Papaya Leaf, Miana Leaf, Antibacterial, Rifampicin-Resistant TB Strains.

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INTRODUCTION

The introduction should briefly place the Tuberculosis is a disease that can be passed from one person to another. This disease often occurs in tropical areas such as Indonesia because the air is a lot of dust and the temperature is warm and humid so microbes can thrive caused by the bacterium Mycobacterium tuberculosis [1,2]. These bacteria are spread in the air through the sprinkling of the patient's saliva, for example, when talking, coughing, or

sneezing; however, the transmission of TB requires close and long contact with the patient, not as easy as the spread of the flu [3].

According to WHO, one person is infected with tuberculosis every second. After India, Indonesia is the second largest country with the most pulmonary TB cases globally. The total number of TB cases in 2016 was 351,893 people, most of whom were people of productive age (25-34 years) [4]. Tuberculosis is curable, and patients must routinely take antibiotics, typically recommended for six months. Antibiotics are compounds generated by microorganisms that prevent or destroy the growth of other microbes. In developing nations, however, the rise of antibiotic- and drug-resistant bacterial species is a significant concern [5].

Drug-resistant tuberculosis is TB caused by Mycobacterium tuberculosis which has developed immunity to anti-tuberculosis drugs (OAT). MDR-TB is drug-resistant tuberculosis (RO-TB) to at least two of the most potent anti-TB medications, isoniazid (INH) and rifampicin, or accompanied with immunity to other first-line anti-TB drugs like ethambutol, streptomycin, and pyrazinamide [6]. Indonesia ranks eighth among the 27 nations with the highest prevalence of MDR-TB globally [5]. The grouping of TB-resistant TB is as follows, bacterial strains of TB-Monoresistant, TB-Polyresistant, TB-Multi Drug Resistant (MDR), TB-Extensively Drug Resistant (XDR), and TB-Rifampicin Resistant (RR) [7, 8].

One of the factors causing resistance to OAT is that patients do not comply with doctor or health worker recommendations, do not regularly take OAT alloys, have impaired drug absorption, and stop treatment unilaterally prematurely. Patients stop treatment unilaterally because they cannot stand the side effects of each OAT drug [5,6]. The side effects of OAT drugs require us as health workers to look for alternatives to natural ingredients that are commonly consumed by people who do not have side effects.

Papaya and miana leaf extract can be used as a substitute for medicinal herbs to reduce adverse effects [9,10]. Papaya and miana leaf extracts include antimicrobial components, including flavonoids, alkaloids, and tannins [11–16]. The membrane will be damaged by lipophilic flavonoids, increasing permeability and interfering with bacterial metabolism [17,18]. Alkaloids can impede the formation of peptidoglycan in bacteria, resulting in the incomplete formation of the cell wall layer and bacterial mortality [9,10,19]. The antimicrobial effect of tannins can inactivate microbial adhesives, inactivate hydrolytic enzymes such as proteases and carbohydrates, and inhibit enzymes in envelope transport proteins [10,20,21]so that the compounds in papaya leaf extract and miana leaf extract can influence or inhibit the growth of bacterial colonies [10,22,23]. Therefore, researchers want to know the role of Papaya Leaf Extract (Carica papaya L), Miana (Coleus scutellarioides L) as Antibacterial in Rifampicin-resistant TB.

METHOD

This research is a laboratory experimental. It was started by preparing samples of papaya leaf extract and miana leaf extract with concentrations of 50, 25, and 12.5% , respectively, from 100% thick extract. Then make, preparation of 75% extract from 100% extract of papaya leaf and miana leaf, 7.5 mL of extract plus 1 mL of DMSO, homogenized using a vortex plus 1.5 mL of aqua dest, homogenized again using a vortex so that 75% extract is available. Preparation of 50% extract with 8 mL of 75% extract + 4 mL of sterile distilled water, homogenized with the help of a vortex, obtained 12 mL of 50% extract. Preparation of extract 25 with 3 mL of 50% extract + 3 mL of sterile distilled water, homogenized with the help of a vortex, obtained 6 mL of 25% extract. Preparation of 12.5% extract with 1.5 mL of 50% extract + 4.5 mL of sterile distilled water, homogenized with the help of a vortex, obtained 6 mL of 12.5% extract. Furthermore, the provision of MTBC-RV bacteria as a bacterial control strain from pure M-TBC strains that are sensitive to 4 types of M-TB drugs and the provision of M-TBC-RR bacteria that are resistant to rifampin was successfully isolated from patients examined at the Provincial Health Laboratory. West Java.

Then, the sensitivity test of Mycobacterium tuberculosis (M.tb) was carried out to determine the sensitivity status of M-TBC bacteria to anti-TB drugs. This sensitivity test is needed to determine the most appropriate anti-M-TB drug choice for the patient. The M-TB susceptibility test was carried out using the conventional method, which requires a

relatively long time (2 - 3 months). The data obtained are primary data by examining according to the procedures carried out at the Microbiology Laboratory Health Laboratory of West Java Province, Sederhana Bandung Street, namely M-TBC Sensitivity Test Proportion Method The standard procedure according to the Ministry of Health, two types of extracts were simultaneously tested for sensitivity to control MTBC bacteria (sensitive to various OATs) RV and to Rifampicin-resistant M-TB bacteria M-TB RR with bacterial strengths of 10-3 and 10-5 dilutions were simultaneously tested for sensitivity to 4 anti-MTBC drugs namely Isoniazid, Rifampicin, Ethambutol, Streptomycin.

The new MTBC colony growth readings can be observed after incubation on day 28 and wait for it to be re-read on day 42 to observe whether or not there is the certainty of colony growth from the test bacteria MTBC-RV (control) and MTBC-RR in contact with Isoniazid, Rifampicin, Ethambutol, Streptomycin and extracts of papaya and miana leaf with concentrations of 50%, 25%, and 12.5%, respectively.

The data obtained were from the sensitivity values of MTBC bacteria to the leaf extracts tested. To determine the difference in sensitivity of each concentration using the T-test and Bonferroni post hoc test with a significance level of 95%.

Ethical approval the research proposal was approved by the Health Ethics Commission of the Poltekkes Kemenkes Banten. Aspects of

research use the general principles of research ethics in humans, namely: Respect for human dignity, beneficence, and justice. Number of the ethical protocol: 05/KEPK/POLKESTEN/IV/2021.

RESULTS

Table 1. Antibacterial test results of papaya leaf extract and Miana leaf against MTBC-RR.

No	Code	Reading Results 10-3	Scale	Reading Results 10^{-5}	Scale	Resistance
1	Rifampicin 50% (Control)	2+	3	0	0	
		2+	3	2 colony	1	
2	papaya leaf -50%	0	0	0	0	sensitive *
		0	0	0	0	
3	Rifampicin 25% (Kontrol)	3+	4	1+	2	
		3+	4	1+	2	
4	Papaya Leaf -25%	2+	3	1+	2	Resistance
		2+	3	1+	2	
5	Rifampicin 12,5% (Kontrol)	3+	4	1+	2	
		3+	4	1+	2	
6	Papaya Leaf -12,5%	2+	3	14 colonies	1	Resistance
		2+	3	16 colonies	1	
7	Rifampicin 50% (Kontrol)	1+	2	0	0	
		2+	3	4 colonies	1	
8	Miana Leaf 50%	2 colonies	1	0	0	Resistance
		8 colonies	1	0	0	
9	Rifampicin 25% (Control)	3+	4	1+	2	
		3+	4	1+	2	
10	Miana Leaf 25%	12 colonies	1	0	0	Resistance
		1+	2	2 colonies	1	
11	Rifampicin 12,5% (Control)	2+	3	1+	2	
		2+	3	1+	2	
12	Miana Leaf 12,5%	2+	3	13 colonies	1	Resistance
		2+	3	17 colonies	1	

Explanation	Number of Colonies	Reporting	Scale
	Tidak ada pertumbuhan	Negative	0
	1-19 Colony	Write down the amount (write the number of colonies)	1
	20-100 Colony	1+ (Count the number of colonies)	2
	100-200 Colony	2+	3
	200-500 Colony	3+ (almost confluent)	4
	>500 Colony	4+ (confluent)	5

Interpretation:

Resistance

$$\frac{Number\ of\ colonies\ in\ media\ containing\ drug,extract}{(Number\ of\ colonies\ in\ control)}\ X\ 100\% = \%\ Resistance$$ [1]

Resistance ≥ 1%

Sensitive < 1%

The antibacterial test results between papaya leaf extract and Miana leaf against the rifampicin-resistant TB test bacteria showed antibacterial ability, marked by reduced growth of the test bacterial colonies. The test results at several concentrations of papaya leaf and miana leaf showed sensitivity to Rifampicin-Resistant TB bacteria in papaya leaf samples with a concentration of 50%.

Table 2. Colony Count Reading Results in MTBC-RR Control.

Control	Reading Results			
	I	R	E	S
(10^{-3})	0	2+	0	0
(10^{-3})	0	2+	0	0
(10^{-5})	0	10 colonies	0	0
(10^{-5})	0	1+	0	0

The number of colonies in the MTBC-RR control at 10-3 dilution was 2+, meaning 100-200 colonies, an average of 150 colonies.

Table 3. Antibacterial effectiveness of papaya leaf extract against MTBC-RR.

Papaya Leaf Extract

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
$RV10^{-3}$	K	50%	-3.00000*	0.00354	0.000	-3.0172	-2.9828
		25%	-4.00500*	0.00354	0.000	-4.0222	-3.9878
		12,5%	-4.00000*	0.00354	0.000	-4.0172	-3.9828
$RV10^{-5}$	K	50%	-0.50000	0.35355	1.000	-2.2151	1.2151
		25%	-2.00000*	0.35355	0.029	-3.7151	-0.2849
		12,5%	-2.00000*	0.35355	0.029	-3.7151	-0.2849
$RR10^{-3}$	K	50%	0.00000	0.00354	1.000	-0.0172	0.0172
		25%	-3.00000*	0.00354	0.000	-3.0172	-2.9828
		12,5%	-3.00500*	0.00354	0.000	-3.0222	-2.9878
$RR10^{-5}$	K	50%	0.00000	0.00354	1.000	-0.0172	0.0172
		25%	-2.00500*	0.00354	0.000	-2.0222	-1.9878
		12,5%	-1.00000*	0.00354	0.000	-1.0172	-0.9828

The mean difference is significant at the 0.05 level.

Statistical test results using the Bonferroni test showed that a concentration of 50% papaya extract inhibited growth at dilutions of MTBC-RR bacteria 10-5 and 10-3, marked with a significance of 1,000. Thus there is no difference between the sensitivity of the MTBC-RR bacteria to papaya leaf extract with anti-MTBC drugs as a comparison. MTBC-RR bacteria have the same sensitivity to 50% papaya leaf extract and anti-MTBC drugs.

Table 4. Antibacterial effectiveness of Miana Leaf extract against MTBC-RR.

Miana Leaf Extract							
Dependent Variable			**Mean Difference (I-J)**	**Std. Error**	**Sig.**	**95% Confidence Interval**	
						Lower Bound	**Upper Bound**
$RV10^{-3}$	K	50%	-2.50000*	0.35355	0.013	-4.2151	-0.7849
		25%	-4.00000*	0.35355	0.002	-5.7151	-2.2849
		12,5%	-3.00000*	0.35355	0.006	-4.7151	-1.2849
$RV10^{-5}$	K	50%	-0.50000	0.35355	1.000	-2.2151	1.2151
		25%	-2.00000*	0.35355	0.029	-3.7151	-0.2849
		12,5%	-2.00000*	0.35355	0.029	-3.7151	-0.2849
$RR10^{-3}$	K	50%	-1.00000	0.35355	0.285	-2.7151	0.7151
		25%	-1.50000	0.35355	0.079	-3.2151	0.2151
		12,5%	-3.00000*	0.35355	0.006	-4.7151	-1.2849
$RR10^{-5}$	K	50%	0.00000	0.35355	1.000	-1.7151	1.7151
		25%	-0.50000	0.35355	1.000	-2.2151	1.2151
		12,5%	-1.00000	0.35355	0.285	-2.7151	0.7151

*The mean difference is significant at the 0.05 level.

Statistical test results showed that 50% miana extract concentration inhibited growth in MTBC-RV 10-5 dilution (p = 1,000), meaning there was no statistical difference. Statistical test results showed that 50% and 25% miana extract concentrations inhibited growth in the dilution of MTBC-RR bacteria 10-3 (p = 0.285; 0.079), meaning there is no difference with statistics. Statistical test results showed that at concentrations of miana extract, 50% and 25% inhibited growth in dilution of MTBC RR bacteria 10-5 (p = 1.000) means that there is no difference in statistics

DISCUSSION

Drug-resistant tuberculosis (RO-TB) is still a danger to tuberculosis (TB) control and a serious global public health concern in many nations [24,25]. In 2019, it was anticipated that 3.3% of newly diagnosed TB patients and 17.7% of previously treated TB patients would be drug-resistant. In Indonesia, an estimated 2.4% of all new TB patients and 13% of cured TB patients have resistant tuberculosis, with a total incidence of 24,000 cases, or 8.8/100,000 population [5].

The management of TB RO patients has been carried out in Indonesia since 2009. The treatment results of TB RO patients from 2009–2017 still show a trend of decreasing treatment success rates, increasing dropout rates, and increasing patient mortality rates [5]. To prevent patients from dropping out of treatment due to the side effects of TB drugs, researchers are trying to find alternative drugs derived from natural ingredients commonly consumed by the public that do not have side effects. The plants used were papaya and miana leaf extract [9–12,17,21,23,26].

The results demonstrated that 50% papaya leaf extract inhibited the growth of MTBC-Rifampicin-resistant bacterial colonies with a resistance value of 0%; therefore, the content of papaya leaf extract can be used as an alternative material for anti-Rifampicin-resistant MTBC drugs because it falls under the category of Sensitive. As papaya leaf extracts with concentrations of 25% and 12.5% and miana leaf extracts with concentrations of 50, 25%, and 12.5% demonstrated resistance to

Rifampicin-resistant MTBC bacterium.

One of the plants that can be used to inhibit bacterial growth is papaya leaf extract. The content in papaya leaf extract in the form of flavonoids, carpain alkaloids, papain enzymes, and tannins can inhibit bacterial activity [10,14–22].

This study demonstrates the potential of papaya leaf extract as an alternative medicine to lessen the adverse effects of anti-tuberculosis drugs based on its capacity to prevent the growth of resistant MTBC bacteria during an in vitro trial. Flavonoids, saponins, tannins, carpain alkaloids, and papain enzymes could suppress bacterial colonization of MTBC-RR [10,14–22].

Previous research revealed that papaya leaf flavonoids inhibit Gram-positive bacteria. Gram-positive bacteria's inhibitory action inhibits the function of the bacterial cell wall as a shape-determinant and protects cells against osmotic lysis. By interfering with the permeability of the bacterial cell wall and causing cell lysis, flavonoids can suppress the growth of Staphylococcus aureus [10,15,18].

Because these compounds' presence can diminish the cell wall's surface tension, saponins can inhibit the growth of bacteria. The wall will lyse or break down when interacting with the bacterial cell wall. Saponins interfere with the surface of the cell wall; when the surface is disrupted, antibacterial substances can easily enter the cell and disrupt the metabolism of bacteria, resulting in their eventual demise [10,27].

By causing bacterial protoplasm to coagulate, tannin compounds can restrict bacterial growth. Tannins serve as antibacterial agents by binding to proteins to prevent the production of cell walls. Tannins are inhibited because saponin and flavonoid chemicals lyse bacterial cell walls, allowing tannin compounds to easily enter bacterial cells and coagulate bacterial cell protoplasm; as a result, the cells are unable to carry out living activities, and their growth is inhibited or even stopped [10,18,14,20,27]. Papain, a proteolytic enzyme, also inhibits the growth of Gram-positive and Gram-negative bacteria through its bactericidal and bacteriostatic properties [9,10,11].

This study has limitations because the active substance in papaya leaf extract and the mechanism involved in suppressing the MTBC RR bacterial colony are unknown. However, the findings of this investigation reveal that papaya leaf extract can effectively inhibit the formation of Rifampicin-resistant MTBC bacterial colonies.

CONCLUSION

The study results indicate that 50% of papaya leaf extract can inhibit the formation of Rifampicin-resistant MTBC bacterial colonies, allowing its content to be utilized as an alternative ingredient for Rifampicin-resistant MTBC-resistant medications. Additional study is required for antibacterial papaya leaf extract concentrations of TB drug-resistant MTBC other than Rifampicin > 50%, examining the immunomodulator of papaya leaf extract in experimental animals, and producing papaya leaf extract capsules as anti-MTBC-Rifampicin resistance.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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Original Article

Relationship Between Food Acceptability and The Amount of Leftover Food Among Patients in The Rehabilitation Room of Drug Dependence Hospital of Jakarta

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ABSTRACT

Acceptability of food is influenced by many related factors such as individual factor, food factor and environmental factor. The success of a food administration is often associated with the presence of leftover food consumed by the patient. Leftover food is also an indicator of the success of nutrition services in hospitals. This study aims to determine the relationship between food acceptability and the amount of leftover food among patients in the rehabilitation room of Drug Dependence Hospital of Jakarta. This was a descriptive study with a cross sectional approach. The study samples were selected using purposive sampling technique as many as 33 respondents. The results of bivariate analysis showed that there was a relationship between the leftover food and food temperature (p 0.017), the food serving time (p 0.006), and the suitability of cutlery used (p 0.009) with food acceptability. It can be concluded that there was a relationship between food acceptability and leftover food among patients in the rehabilitation room of Drug Dependence Hospital of Jakarta. It is recommended to conduct further study with a larger number of samples and involve other variables to find out which variables are related to food acceptability and food lefovers.

Keywords: Cutlery, Acceptability, Leftover Food, Food Temperature, Serving Time.

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INTRODUCTION

Hospital management generally requires effective and efficient food management. Effective refers to the high success rate of treatment of patients and efficient means saving in the use of existing resources. Patient satisfaction is an important indicator that must be considered in health services. According to the Regulation of the Ministry of Health of the Republic of Indonesia in 2016, the Minimum Service Standard for patient satisfaction is above 95%[1]. The success of a food administration is often associated with the presence of leftover food of food consumed by the patients. Leftover food is one indicator of the success of nutrition services in hospitals.

Factors that affect leftover food in the hospital include appetite and perception of eating (food presentation and taste). Appetite is influenced by the state or condition of the patients. Feelings of displeasure and fear because of illness can lead to feeling of hopelessness make the patients to not consume the food served. Weak body condition, digestive tract disorders, different eating

patterns at home and socio-cultural factors that determine attitudes and preferences for food can influence the appetite of patients to finish the food served [2].

Drug Dependence Hospital of Jakarta (RSKO) is a hospital that provides special services to patients with narcotics, psychotropic and addictive substances dependence. One of the services of the Drug Dependence Hospital of Jakarta is a rehabilitation unit. Rehabilitation is part of the process of healing mental and behavioural disorders due to psychoactive substance abuse. The rehabilitation program is divided into three, namely the regular program, special program and after care program. The regular program consists of an induction phase, primary phase, pre-entry phase and re-entry phase. Each of these phases has a different treatment time depending on the addiction condition or the psychological condition of the patients. Before entering the treatment room or enrolling rehabilitation program, patients must first enter the Medical Psychiatric Evaluation (MPE) room for 7 to 14 days. The long duration of treatment causes the patient to feel bored and memorize the food served. So, it is necessary to evaluate the acceptability of food after the patient receives food from the Nutrition Department.

Based on a study among patients with mental disorders (schizophrenia) at Prof Dr.Soerojo Mental Hospital of Magelang, there was a relationship between food acceptability and the meal cost among schizophrenic patients ($p = 0.000$) [3]. A study on acceptability and its relationship with food lefotoverd has never been conducted at the rehabilitation room of RSKO of Jakarta. The results of a patient satisfaction survey conducted by the Nutrition Department showed that there were still sub-optimal services, which was evidenced by data on leftovers reported in January 2020 at Drug Dependence Hospital of Jakarta by 20.59%. Such data exceeds the standard set by the Indonesian Ministry of Health of 20%. This study aims to determine the relationship between food acceptability and leftover food among patients in the rehabilitation room of Drug Dependence Hospital of Jakarta.

METHOD

This was a quantitative study using descriptive analytical method with an observational approach. The design of this study was cross sectional. Statistical analysis was performed in the form of the Chi Square test at the rehabilitation room for 7 days which involved 33 samples. Data on the characteristics of respondents consisted of age, gender, period of hospitalization, and medical diagnose derived from the patient's medical records and interviews in the rehabilitation room of Drug Dependence Hospital of Jakarta. Data on food service quality data were obtained through questionnaires given to patients regarding food taste, food appearance, food serving time, food temperature, suitability of cutlery, staff reliability. Data were further scored. Data on leftover food were obtained using the food weighing method for each breakfast, mid-morning snack, lunch, afternoon snack and dinner. The data were then calculated. Analysis of research data was performed using SPSS and the chi square test to determine the correlation between independent and dependent variables. Secondary data in this study consisted of menu cycles, food ingredients used during food distribution hours which were obtained from the nutrition department report book of RSKO of Jakarta. This study has also obtained acceptance for ethical review from the Research Ethics Commission of Prof. Dr. HAMKA Muhammadiyah University number 03/21.06/01077.

RESULTS

Table 1. Frequency Distribution of Leftover Food.

Charakteristic	Category	n	%
The amount of	Large (>20%)	11	33.3
Leftover food	Small (≤20%)	22	66.7
Total		33	100

Table 1 showed that 11 respondents (33%) had a large amount of leftover food (≥ 20%).

Table 2. Frequency Distribution of Relationship between Food Acceptability and the Amount Leftover Food.

Chracteristic	Category	The Amount of Leftover Food				p-value	OR (95% CI)
		Large >20%		Small ≤20%			
		n	%	n	%		
Food Color	Unattractive	2	28.6	5	71.4	1.000	0.756
	Attractive	9	34.6	17	65.4		(0.121-4.701)
Form of Food	Inappropriate	2	16.7	10	83.3	0.249	0.267
	Appropriate	9	42.9	12	57.1		(0.46-1.53)
Meal Portion	Inappropriate	4	40.0	6	60.0	0.690	1.52
	Appropriate	7	30.4	16	69.6		(0.32-1.74)
Food Temperature	Inappropriate	7	36.4	4	63.6	0.017	7.875
	Appropriate	4	18.2	18	81.8		(1.531-40.514)
Food Seasonings	Not Good	3	27.3	8	72.7	0.709	0.656
	Good	8	36.4	14	63.6		(0.134-3.205)
Food Smell	Inappropriate	5	45.5	6	54.5	0.437	2.22
	Appropriate	6	27.3	16	72.7		(0.48-10.08)
Food Texture	Hard	6	46.1	7	53.9	0.270	2.75
	Soft	5	25.0	15	75.0		(0.258-11.38)
Food Taste	Bad Taste	3	30.0	7	70.0	1.000	0,804
	Good Taste	8	34.7	15	65.3		(0.162-3.987)
Serving Time	Not On Time	7	70.0	3	30.0	0.006	11.08
	On Time	4	17.4	19	82.6		(1.92-62.4)
Reliability of Food Serving Staff	Unreliable	2	25.0	6	75.0	0.687	0.593
	Reliable	9	36.0	16	64.0		(0.98-3.57)
Suitability of cutlery	Inappropriate	10	52.6	9	47.4	0.009	14.44
	Appropriate	1	7.1	13	92.9		(1.56-133.5)
Completeness of cutlery	Incomplete	4	28.6	10	71.4	0.719	0.686
	Complete	7	36.8	12	63.2		(0.15-3.03)

**Information: Chi Square test, significant if p value was ≤ 0.005*

Based on table 2, relationship between food colour and the amount of leftover food obtained a p value of 1.000> 0.005. Relationship between the form of food and the amount of leftover food obtained a p value of 0.249 >0.005. Relationship between meal portion and the amount of leftover food obtained a p value of 0.69> 0.005. Relationship between food temperature and the amount of leftover food obtained a p value of 0.017<0.005. Relationship between food seasonings and the amount of leftover food obtained a p value of 0.70> 0.005. Relationship between food aroma and the amount of leftover food obtained a p value of 0.437>0.005. Relationship between food texture and the amount of leftover food obtained a p value of 0.270> 0.005. Relationship between food taste and the amount of leftover food obtained a p value of 1.000> 0.005. Relationship between serving time and the amount of leftover food obtained a p value of 0.006 <0.005. Relationship between the reliability of food serving staff and the amount of leftover food obtained a p value of 0.143> 0.005. Relationship between the suitability of cutlery and the amount of leftover food obtained a p value of 0.009<0.005. Relationship between completeness of cutlery and the amount of leftover food obtained a p value of 0.719> 0.005.

DISCUSSION

There was no significant relationship between food color and the amount of leftover food in this study. Respondents stated that the color of the food served was appropriate (not overcooked), such as white staple food, colorful vegetables (lodeh), green melon and red Balado egg dish. The study finding is in line with a study conducted at the Jemur Sari Islamic Hospital in Surabaya (Habiba & Adriani, 2017) which found that there was no relationship between food color and the amount of leftover

food with a p value of 0.64 [4]. Unattractive food colors can lead to leftover food [5]. Based on the results of study conducted in the rehabilitation room of the RSKO of Jakarta, the occurrence of leftover food was due to boredom when the respondents felt that they often got repeated menus. The relationship between the form of food and the amount of leftover food also did not show a significant value. This is due to the form of the food was suitable and attractive, so that respondents could chew their food easily. Such finding is different from a study conducted at the Ramelan Naval Hospital which found a significant relationship between the form of food and the amount of leftover food with a p value of 0.04 [6]. Based on statistical test conducted, there was no relationship between meal portion and the amount of leftover food. Such finding is in line with a study conducted by Nurjanah, (2019), which found that there was no significant relationship between the amount of leftover food and meal portion[7]. Furthermore, respondents in this study stated that the meal portion was sufficient for their needs. Such finding is in contrast with a study conducted by Damayanti, (2016), which revealed that the large amount of leftover food was due to the respondents consumed food from outside the hospital[8]. The results of interviews with respondents regarding the food temperature served revealed that some respondents were accustomed to consuming food in a warm condition so that cold food would reduce their appetite and it caused leftovers. Such finding is in accordance with the study conducted by Kusuma, (2020)[9].

In this study, there was no significant relationship between food seasonings and the amount of leftover food because the respondents stated that food seasonings were appropriate. Such finding is not in line with a study conducted by Tanuwijaya et al., (2018) and Tanuwijaya et al., (2019) which found that there was a significant relationship between food seasonings and the amount of leftover food. The results of interviews with respondents revealed that the seasonings used were appropriate. The curry vegetable seasoning was different from the seasonings in vegetable soup, and the amount of seasonings used was also considered appropriate by the respondents[10, 11]. The results of observations made during study on the menu revealed that animal and vegetable side dishes served were left less because they smelled delicious and could stimulate appetite, in contrast to vegetables which lacked a pleasant aroma so they tended not to be eaten. Such finding is in line with a study conducted by Kusuma, (2020)[9].

Appropriate food texture will affect the taste and sensitivity of food so that it will result in less leftover food. This study revealed that there was no relationship between food texture and the amount of leftover food (p value = 0.27). Such finding is in contrast with a study conducted by Velita, (2016) which found that there was a relationship between food texture and the amount of leftover food (p value = 0.019)[12]. The study finding regarding food taste is in line with a study conducted by Sundara, (2019) which showed that there was no relationship between food taste and the amount of leftover food (p value=1.000)[13]. Respondents in this study stated that the food taste was as expected. The large amount of leftover food was due to the respondents consumed food from outside the hospital.

The study finding regarding serving time is in accordance with a study conducted by Rina, (2017) which states that there is a relationship between food serving time and the amount of leftover food with a p value of 0.006[14]. Respondents stated that the time for serving food greatly affected food intake because too fast serving time would cause the respondents to feel full and too long serving time would make the food served cold, thereby reducing respondents' appetite. Based on the statistical test, relationship between the reliability of food serving staffs and the amount of leftover food did not have significant result because respondents felt that food serving staffs were reliable in providing information and carrying out their duties as food servers. The reliability of food serving staffs in serving food and in providing information to patients significantly affected patient satisfaction.

Statistical test using Chi Square (p 0.009) resulted in a significant relationship between the suitability of cutlery and the amount of leftover food. Such finding is in accordance with a study conducted by Nabella, (2018), Ronitawati et al., (2018), Ronitawati et al., (2021) and also Nurqisthy, et al., (2016) which found that there was a relationship between cutlery and the amount of leftover food[15,16,17,18]. The difference between the cutlery used at home and the cutlery in the hospital would affect patients' appetite. Patients could not use cutlery that they usually use at

home such as glass plates or stainless steel spoons because of patient safety concerns. Cutlery made of plastic tends to be easily damaged and broken, and this was complained by the patients during the interview. Therefore, patients did not finish the food served.

In addition to the suitability of the cutlery, this study also observed the completeness of the cutlery used by the respondents. Most of the respondents (4.5%) stated that the cutlery used was complete. Complete cutlery consisted of serving utensils, namely closed plastic bents, plastic tablespoons and melamine cups. According to the respondents, all tools used were disposable or not reused. This was good because they were kept clean and more hygienic. Cutlery used could be immediately thrown away and not shared with other patients. Statistical test results showed that there was no significant relationship between the completeness of cutlery and the amount of leftover food in the rehabilitation room of Drug Addiction Hospital of Jakarta (p value=0.71). Such finding is in contrast with a study conducted by Mutmainah, et al., (2020) and Wirasamadi et al., (2015) which found that there was a relationship between the completeness of cutlery and the amount of leftover food[19,20]. Complete cutlery at RSKO of Jakarta led to little amount of leftover food.

CONCLUSION

This study resulted in factors that affected food acceptability based on the amount of leftover food, namely the appropriate food temperature, the food serving time and the suitability of the cutlery used. It is recommended to conduct education and evaluation regarding the suitability of the cutlery used so as to be in accordance with food safety and patients can finish their food. In turn, it can have an impact on efficiency on the meal cost incurred. Future researchers can conduct a study with a larger number of respondents and observe other variables to determine their correlation with leftover food.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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Original Article

History of Chronic Energy Deficiency (CED) during Pregnancy and the Incidence of Stunting among Children Aged 0-59 Months in East Jakarta

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ABSTRACT

Based on SSGI data (2021), the prevalence of stunting among under-five children in DKI Jakarta Province was 16.8%. Meanwhile, based on the Ministry of Health Republic of Indonesia Performance Report for 2021, there were 3.1% of pregnant women with Chronic Energy Deficiency (CED) in DKI Jakarta Province. This study aims to determine the correlation between a history of Chronic Energy Deficiency (CED) during pregnancy and the incidence of stunting among children aged 0-59 months in East Jakarta. This study involved secondary data derived from the e-PPGBM application for the City of East Jakarta in 2021 with a sample size of 2,688 people and data were analyzed using Cox-regression. Based on the results of data analysis, it was found that the proportion of pregnant women with a history of CED was 3.7% and the proportion of under-five children with stunting was 21.1%. The multivariate analysis on the correlation between a history of CED during pregnancy and the incidence of stunting after being controlled by the potential confounder variable obtained a PR of 1.354 (95% CI: 0.922-1.988). It can be concluded that there was no significant correlation between a history of CED during pregnancy and the incidence of stunting in the East Jakarta area in 2021 after being controlled by the potential confounder variable. However, there are still possible confounder factors that should be analyzed further.

Keywords: Chronic Energy Deficiency, Pregnancy, Stunting.

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INTRODUCTION

The problem of stunting is still a priority in the global situation. One of the main points discussed in the Sustainable Development Goals (SDGs) is achieving food security including stunting, which is the second form of sustainable development through elimination of hunger and all forms of malnutrition by 2030. In 2025, the target set is to decrease the stunting rate to 40% [1].

The proportion of stunting globally was 22% or 149.2 million under-five children in 2020. The prevalence of stunting by sub-region (distribution made by WHO) in 2020 in Oceania was 41.4%, in Africa it was 30.7%, in Asia it was 21.8%, in Latin America-Caribbean it was 11.3%, in Europe it was 4.5 % and in Australia-New Zealand it was 2.3%. Meanwhile, South

Asia region showed the highest prevalence of stunting in the Asian continent by 30.7%, followed by Southeast Asia by 27.4%[2]. Based on the 2018 Basic Health Research, the prevalence of stunting among under-five children in Indonesia was 30.8%[3]. Furthermore, data derived from the 2019 Indonesian Child Nutritional Status Study (SSGBI) revealed that the proportion of stunting among under-five children in Indonesia was 27.7% and data derived from the 2021 Indonesian Nutritional Status Study (SSGI) revealed that the proportion of stunting among under-five children in Indonesia decreased to 24.4% and in the Province DKI Jakarta it decreased to 16.8%[4]. According to the 2018 Basic Health Research the proportion of stunting among under-five children in DKI Jakarta Province and East Jakarta was 17.7% and 18.4%, respectively.

Stunting has a major impact on the development of children in the future. In general, stunting will hinder the development of child motor and cognitive abilities which can further affect productivity and child may experience health problems in adulthood such as the emergence of non-communicable diseases which can also result in low economic productivity [5].

According to the WHO Conceptual Framework (2017), the causal factors of stunting involve family and household factors (maternal factors and home environment)[2]. To prevent stunting in umdsr-five children, it is necessary to determine a history of maternal nutritional problem during pregnancy. Problems during pregnancy may have an impact on the baby, one of the problems is pregnant women with chronic energy deficiency (CED)[6]. Based on the 2021 Ministry of Health Performance Report, the percentage of pregnant women with CED in Indonesia was 8.7% and in DKI Jakarta Province it was 3.1%[7]. In addition, there are many other factors that can cause stunting that must also be considered.

This study aims to determine the correlation between a history of Chronic Energy Deficiency (CED) in pregnancy and the incidence of stunting among children aged 0-59 months in East Jakarta area after controlling for covariate variables.

METHOD

This was a cross-sectional study. Secondary data were collected from the electronic Community-Based Nutrition Recording and Reporting (e-PPGBM) application for the City of East Jakarta in 2021. The target population in this study was all children aged 0-59 months in the East Jakarta area by 140,513 people. The source population of the study was children aged 0-59 months in the East Jakarta area whose measurement data and determinant measures were recorded in the e-PPGBM application by 3,204 people. However, as many as 516 data were incomplete so that the eligible population that met the inclusion criteria was 2,688 people. The inclusion criteria were children aged 0-59 months in the East Jakarta area with complete measurement and determinant data on all variables. The eligible population was then assigned into 2 groups, namely the exposed group (under-five children who had a history of CED during pregnancy) and the unexposed group (under-five children who had no history of CED during pregnancy). The researchers involved all eligible respondents in the analysis process by 2,688 people. The collection of e-PPGBM data waa conducted in 2021. Interviews with respondents were conducted using a guide for filling out the e-PPGBM application in Integrated Sigizi and a field review was also conducted. Study using e-PPGBM secondary data was conducted from October to November 2022.

Chronic energy deficiency (CED) is a state of malnutrition experienced for a long time (several months/years). Such condition can be determined by measuring the upper arm circumference/UAC of <23.5 cm. This condition can occur in pregnant women8. Furthermore, stunting is a condition of growth and development disorder experienced by children resulting from chronic nutritional problem with undernourishment that lasts for a long time. Such condition can be identified based on measurement of height for age or the z-score of <-2 SD3.

Data analysis was performed using STATA software version 14.2 (Stata Corp). The variable of a history of CED during pregnancy and the covariate variable were described by frequency and percentage. Bivariate analysis applied bivariate Cox-regression to produce PR crude. In addition, multivariate analysis applied Cox-regression to produce PR adjusted. The significance level applied in this study was a 95% level of confidence.

RESULTS

Variable	n	%
Stunting		
Yes	567	21.1
No	2121	78.9
History of CED during Pregnancy		
Yes	98	3.7
No	2590	96.3
Health Insurance		
Didn't have	35	1.3
Had	2653	98.7
Access to Clean Water		
No	54	2
Yes	2634	98
Healthy Latrine		
No	31	1.2
Yes	2657	98.8
Worm Infection		
Yes	207	7.7
No	2481	92.3
Immunization		
No	112	4.2
Yes	2576	95.8
Smoking Family Member		
Yes	822	30.6
No	1866	69.4

Based on the results of univariate analysis among 2,688 respondents (Table 1), the proportion of stunting was 21.1%, the most common risk factor was the presence of smoking family member by 30.6% followed by worm infection by 7.7%, no immunization by 4.2%, history of CED during pregnancy by 3.7%, no access to clean water by 2%, no health insurance by 1.3% and no healthy latrine by 1.2%.

The results of bivariate analysis (Table 2) showed that 32.6% of respondents who had a history of CED during pregnancy had stunted children, while 20.7% of respondents did not have a history of CED during pregnancy. The statistical test results obtained a PR value of 1.581 (95% CI: 1.107-2.258) with a p-value of 0.012. Such findings indicated that there was a significant correlation between a history of CED during pregnancy and the incidence of stunting. Women who had a history of CED during pregnancy were 1.581 times more at risk of having stunted children compared to respondents who did not have a history of CED during pregnancy.

Statistical test results regarding other risk factors showed that no healthy latrine had a significant correlation with the incidence of stunting. Family who did not have healthy latrine were 2.489 times more at risk of having stunted children compared to those who had healthy latrine (PR of 2.489; 95% CI: 1.514-4.091; p-value of <0.001).

The multivariate analysis carried out was regarding selection of multivariate candidates and modeling. Before making multivariate modeling, the independent and covariate variables were tested with the dependent variable in a bivariate manner. Variables with p-value of <0.25 became candidates to be included in multivariate modeling. Table 3 shows a confounder variable, namely healthy latrine. The final model (Table 4) revealed hi no significant correlation between a history of CED during pregnancy and the incidence of stunting in the East Jakarta area in 2021 after being controlled by the healthy latrine variable.

Table 2. Bivariate Analysis on the History of CED in Pregnancy and Risk Factors for Stunting among Children Aged 0-59 Months in the East Jakarta Region in 2021.

Variable	Stunting Status				PR	95%CI	p-value
	Stunting		No Stunting				
	n	%	n	%			
History of CED during Pregnancy							
Yes	32	32.6	66	67.4	1.581	1.107 – 2.258	0.012*
No	535	20.7	2055	79.3			
Health Insurance							
Didn't have	10	28.6	25	71.4	1,361	0.728 – 2.543	0 .334
Had	557	21	2096	79			

Variable	Stunting Status				PR	95%CI	p value
	Stunting		No Stunting				
	n	%	n	%			
Access to Clean Water							
Didn't have	14	25.9	40	74.1	1.235	0.726 – 2.099	0.436
Had	553	21	2081	79			
Healthy Latrine							
Yes	16	51.6	15	48.4	2.489	1.514 – 4.091	0.000*
No	551	20.7	2106	79.3			
Worm Infection							
Yes	31	15	176	85	0.693	0.483 – 0.996	0.047*
No	536	21.6	1945	78.4			
Immunization							
Yes	31	27.7	81	72.3	1.330	0.926 – 1.911	0.122*
No	536	20.8	2040	79.2			
Smoking Family Member							
Yes	184	22.4	638	77.6	1.091	0.915 – 1.300	0.334
No	383	20.5	1483	79.5			

Table 3. Multivariate Analysis Model.

Variable	PR adjusted	95%CI	p value
History of CED during Pregnancy			
Yes	1.342	0.913 – 1.974	0.135
No			
Healthy Latrine			
Yes	2.123	1.243 – 3.626	0.006
No			
Worm Infection			
Yes	0.693	0.482 – 0.995	0.047
No			
Immunization			
Yes	1.262	0.877 – 1.816	0.211
No			

Table 4. Multivariate Analysis Final Model.

Variable	PR adjusted	95%CI	p value
History of CED during Pregnancy			
Yes	1.354	0.922 – 1.988	0.122
No			
Healthy Latrine			
Yes	2.148	1.258 – 3.669	0.005
No			

DISCUSSION

The prevalence of stunting obtained in this study was 21.1%. Such finding was higher when compared to the 2018 Basic Health Research result regarding the prevalence of stunting in DKI Jakarta Province of 17.7%. Meanwhile, according to SSGI data for 2021, the prevalence of stunting among under-five children in Indonesia and East Jakarta were 16.8% and 13.4%, respectively[9]. Such rates were still classified as high based on the WHO standard threshold of 20%. Furthermore, by referring to the 2020-2024

RPJMN strategy, the targeted prevalence in 2024 is 14%[3]. This target can be achieved through the right preventive efforts.

Based on the results of multivariate analysis, it was shown that there was no significant relationship between a history of CED during pregnancy and the incidence of stunting in the East Jakarta area in 2021 after being controlled by potential confounder variable, namely healthy latrine. The absence of a significant relationship between a history of CED during pregnancy and the incidence of stunting might be due to the fact that a history of CED during pregnancy is not a direct risk factor for stunting among under-five children in the East Jakarta area in 2021 based on the e-PPGBM application data. Another possibility related to the study finding of no relationship between a history of CED during pregnancy and the incidence of stunting after being controlled by a potential confounder variable of healthy latrine was due to the awareness of pregnant women who routinely visited heatlh facilities for pregnancy check up (ANC/Antenatal Care). In addition, the women also received health education so that CED could be immediately followed up and managed by healthcare workers.

The study finding is in line with the results of a cohort study conducted by Nurfatimah, et al (2021) and a cross-sectional study conducted by Sartika et al, (2021) which showed no correlation between chronic energy deficiency and stunting[10-11]. Furthermore, a correlative descriptive study with a retrospective design conducted by Qoyyimah, et al (2021) also showed that there was no relationship between a history of chronic energy deficiency among pregnant women and the incidence of stunting among children 3-5 years old in the work area of Jatinom Community Health Center[12]. The study finding is also in line with the result of a correlational analytic study with a retrospective approach conducted by Faradisy and Nurhasanah (2022) which showed that there was no relationship between a history of chronic energy deficiency among pregnant women and stunting risk in Four Locus Stunting Villages, the Work Area of Tambelangan CHC, Tambelangan Sub-District, Sampang District[13]. However, the analysis of the study was only conducted in the bivariate analysis stage. A case-control study conducted by Warsini, et al (2016) further showed the result of multivariate analysis that there was no relationship between maternal history of CED during pregnancy and the incidence of stunting in Sedayu District, Bantul, Yogyakarta[14].

In contrast to a cross-sectional study conducted by Muliadi, et al (2023), the result of the analysis showed that among the 20 indicators that had a significant correlation with stunting, they included complementary food for pregnant women with CED, zinc supplementation for children and participation in parenting[15]. The results of a cross-sectional study conducted by Dewi, et al (2020) similarly showed that there was a relationship between a history of maternal CED during pregnancy and the incidence of stunting among children aged 1-3 years in the Work Area of Kalirejo CHC, Pesawaran[16]. Furthermore, in a case-control study conducted by Agustina and Fathurrahman (2022) also showed that there was a significant relationship between maternal history of CED and the incidence of stunting in the work area of Tatah Makmur CHC, Banjar District[17]. However, the analysis of this study was only conducted in the bivariate analysis stage. The results of a case-control study conducted by Karjono and Erna (2021) showed the result of a multivariate analysis that there was a significant relationship between CED and the incidence of stunting in the work area of Senaru CHC unit, North Lombok District[18]. Also in the case-control study conducted by Sari et al (2022) showed the results of the multivariate analysis that there was a significant relationship between the incidence of CED during pregnancy and the incidence of stunting among under-five

children in the work area of Bontobahari CHC[19].

According to the Indonesian Ministry of Health (2015), Chronic Energy Deficiency (CED) can occur as a result of a lack of balanced intake of macro and micro nutrients from adolescence to pregnancy. As is known, to support the growth and development of the fetus, pregnant women should concern about nutritional needs during pregnancy. If a pregnant woman is malnourished, the fetus will get inappropriate nutrition since the nutritional intake consumed by the mother is used to supplement the maternal nutritional deficiencies, so that the baby will be at risk of being born with low birth weight which further fave the risk of stunting[12, 20].

CONCLUSION

The results of this study indicated the prevalence of stunting and history of CED during pregnancy by 21.1% and 3.7%, respectively. There was no significant relationship between a history of CED during pregnancy and the incidence of stunting among under-five children after being controlled by a potential confounder variable, namely healthy latrine in the East Jakarta area in 2021. Based on the results of the study, the researchers recommend that the causal factors of stunting, both regarding nutritional and non-nutritional factors, still need to be considered so as to prevent stunting in the future. On the other hand, researchers further recommend the DKI Jakarta Provincial Health Office to improve data quality to prevent incompleteness so that the quality of future research can also be improved. In addition, it is necessary to increase the filling of determinants in the e-PPGBM application routinely as an effort to prevent stunting. Future researchers are expected to conduct further research related to stunting using the same or different data sources and to pay attention to other factors related to stunting such as a history of LBW, EIB, exclusive breastfeeding, balanced nutritional intake and active visits to Integrated Healthcare Post.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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Original Article

Analysis of Relationship between the Level of Knowledge on Stunting and Socio-demographic Characteristics among Students

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ABSTRACT

Stunting is a developmental disorder in children caused by malnutrition, repeated infections, and inadequate psychosocial simulation. The incidence of stunting will have a negative impact on the development of children during adolescence in the form of suboptimal growth. Stunting is the result of long-term nutritional deficiencies and often results in retarded mental development, poor performance and reduced intellectual capacity due to the level of knowledge and awareness of parents about the importance of meeting nutritional needs of children as the main causal factor for high stunting rate in Indonesia. Such knowledge and awareness doesnot develop automatically, and must be continuously nurtured and instilled from an early age, namely during adolescence. This study aims to determine relationship between the level of knowledge on stunting and the characteristics among the students of MA Madania of Bantul. This was a Cross Sectional Study with observational approach. Among 72 study population, the study samples were selected using Random Sampling to obtain 50 respondents. The results of the study showed that most of students had a poor level of knowledge on stunting by 80.6%, while only 19.4% of respondents who had a good level of knowledge. Furthermore, the cross-tabulation result showed that there was a relationship between the independents variable and the dependent variable with p values for gender, age and Grade of 0.04, 0.03 and 0.047, respectively, which were lower than the significant value of 0.05. There is a need for health education on nutrition for adolescents in schools in order to increase their knowledge on the incidence of stunting and nutritional problems among adolescents.

Keywords: The Prevalence of Stunting, Nutritional Problem, Knowledge, Adolescents.

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INTRODUCTION

Stunting is a form of failure to thrive in under-five children characterized by short stature as the result of chronic nutritional insufficiency[1]. The prevalence of stunting among under-five children in Indonesia showed the second highest rate in the Southeast Asian region after Laos by 43.8%. However, based on the 2017 Nutritional Status Monitoring (PSG), it was recorded that there were 26.6% of under-five children who experienced stunting, consisted of 9.8% in the very short category and 19.8% in the short category[2].

Furthermore in 2018, the Indonesian Ministry of Health through the Health Research

and Development Agency (Litbangkes) conducted Basic Health Research (Riskesdas) on the Prevalence of Stunting[3]. Based on this research, it was revealed that the rate of stunting or short for age among children decreased from 37.2%[3]. However, the prevalence of underweight increased considerably from 16.3% to 17%[4]. The national prevalence of stunting among under-five children in 2019 reached 27.7% and in 2021 it decreased to 24.4%[5]. Meanwhile, based on the results of the data derived from SSGI in 2022, the prevalence of stunting decreased from 24.4% in 2021 to 21.6% in 2022. However, hard work is still needed to achieve the target of 14%[6].

Despite there was a decrease in the prevalence rate, stunting is still a problem in Indonesia because the prevalence rate was still above 20%. Therefore, stunting is still a serious problem and must be managed immediately so that stunting rates can decrease and in line with WHO recommendation[7]. In addition, stunting may lead to suboptimal children's cognitive, motoric and verbal development. In the future, children who experience stunting have a higher risk of obesity and various other diseases. In addition, children's learning capacity and performance as well as productivity and work capacity will not be optimal. Stunting also has an adverse effect on reproductive health[4].

Stunting is a chronic nutritional problem caused by various factors such as socio-economic conditions, maternal nutrition during pregnancy, illness during infancy, and lack of balanced nutritional intake during adolescence[8]. In the future, stunted children may experience difficulties in achieving optimal physical and cognitive development when they are teenagers[9].

Stunting is a state of malnutrition associated with insufficient nutrients. One of the causal factors of stunting is high-risk pregnancies such as too young maternal age, lack of maternal knowledge about health and nutrition before and during pregnancy, and after childbirth[10]. In addition, teenage pregnancy, short birth spacing, hypertension, and the maternal mental health condition also the risk factors of stunting in children[11].

Based on the regulation of the Minister of Health number 97 of 2014 concerning health services during pre-conception, pregnancy, childbirth, and postpartum periods, contraception service delivery, and sexual health services, there are several risk factors for pregnancy, namely too young, too old, too young, frequent births, and too close birth spacing. Too young maternal age (under 20 years) will place the women at risk of giving birth to babies with low birth weight (BBRL), which will further lead to around 20% of the incidence of stunting[10.]

Education has an important role for the development of knowledge since education is fundamental in developing knowledge and experience of adolescents. The older they get, the better their mental processes, and they can learn something well. An educational institution has an important role to form quality adolescents[12]. his study aims to determine relationship between the level of knowledge on stunting and the characteristics among the students of MA Madania of Bantul.

METHOD

This was a quantitative study with the type of data analysis of SPSS 25 using a cross sectional analysis study. The current study was conducted on December 10-15, 2022 at Madrasah Aliyah Madania of Bantul. The study population involved all students who were selected using a non-probability sampling technique, which is a technique that does not provide equal opportunities for each element of the population to be selected as a sample, namely purposive sampling. The study samples involved 50 respondents. Data collection process was carried out through distributing questionnaires to the students of MA Madania of Bantul.

RESULTS

Table 1. Characteristic of Respondents by Gender.

No	Gender	N	%
1	Female	31	60.0%
2	Male	20	39.2%
Total		51	100%

Based on the results of analysis regarding characteristic of respondents by gender, it was found that 31 respondens (60.8%) were female and 20 respondents (39.2%) were male.

Table 2. Characteristic of Respondents by Age.

No	Age	N	%
1	13-15 Years	24	47.1%

2	16-19 Years	27	52.9%
Total		51	100%

Based on the results of analysis regarding characteristic of respondents by age, it was found that 24 respondens (47.1%) aged 13-15 years, and 27 respondens (52.9%) aged 16-19 years.

Table 3. Characteristic of Respondents by Grade.

No	Grade	N	%
1	X Religion	10	20.5%
2	X Natural Science	9	17.6%
3	XI Religion	14	27.5%
4	XI Natural Science	9	17.6%
5	XII Religion	5	9.8%
6	XII Natural Science	4	8.0%
Total		51	100%

Based on the results of analysis regarding characteristic of respondents by grade, it was found that 10 respondens (20.5%) were in the Grade X Religion, 9 respondens (17.6%) were in the Grade X Natural Science, 14 respondens (27.5%) were in the Grade XI Religion, 9 respondens (17.6%) were in the Grade XI Natural Science, 5 respondens (9.8.0%) were in the Grade XII Religion, and 4 respondens (8.0%) were in the Grade XII Natural Science.

Table 4. Respondents' Level of Knowledge

No	Category	N	%
1	Poor	41	80.4%
2	Good	10	19.6%
Total		51	100%

Based on the results of analysis regarding respondents knowledge on stunting, it was found that 10 respondents (19.6%) had a good level of knowledge and 41 respondents (80.4) had a poor level of knowledge.

Table 5. Results of Cross-Tabulation Regarding Relationship between Level of Knowledge and Gender.

No	Gender	Level of Knowledge		Total
		Poor	Good	
1	Female	80.6%	19.4%	100%
2	Male	80.0%	20.0%	100%
Total		80.4%	19.6%	100%

The results of cross tabulation for the level of knowledge by gender, 6 female respondents (19.4%) had a good level of knowledge, and 25 female respondents (80.6%) had a poor level of knowledge. On the other hand, 4 male respondents (20.0%) had a good level of knowledge, and 16 male respondents (80.0%) had a poor level of knowledge. It can be concluded that by gender, more respondents had a poor level of knowledge (80.4%) compared to those with a good level of knowledge (19.6%).

Table 6. Results of the Chi Square Test on the Relationship between Level of Knowledge and Gender.

	Value	Df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	.003[a]	1	.004	
Continuity Correction[b]	.000	1	.003	
Likelihood Ratio	.003	1	.005	
Fisher's Exact Test				.000
Linear-by-Linear Association	.003	1	.005	
N of Valid Cases	51			

Based on the results of the Chi-Square Tests analysis, it was obtained an Asymptotic Significance value of 0.04, which was lower than the significant value (p-value) of 0.05. It can be concluded that there was a relationship between gender and the level of knowledge of the respondents.

Table 7. Results of Cross-Tabulation Regarding Relationship between Level of Knowledge and Age.

No	Age	Level of Knowledge		Total
		Poor	Good	
1	13-15 Years	71.4%	28.6%	100%
2	16-19 Years	88.2%	11.8%	100%

Based on the results of analysis regarding relationship between level of knowledge and age, it was found that more respondents had a poor level of knowledge (80.6%) compared to those with a good level of knowledge (19.4%).

Table 8. Results of the Chi Square Test on the Relationship between Level of Knowledge and Age.

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.040[a]	5	.003
Likelihood Ratio	1.000	5	.050
Linear-by-Linear Association	1.002	1	.023
N of Valid Cases	51		

Based on the results of the Chi-Square Tests analysis, it was obtained an Asymptotic Significance value of 0.03, which was lower than the significant value (p-value) of 0.05. It can be concluded that there was a relationship between age and the level of knowledge of the respondents.

Table 9. Results of Cross-Tabulation Regarding Relationship between Level of Knowledge and Grade.

No	Grade	Level of Knowledge		Total
		Poor	Good	
1	X Religion	76.9%	23.1%	100%
2	X Natural Science	77.8%	22.2%	100%
3	XI Religion	85.7%	14.3%	100%
4	XI Natural Science	88.9%	11.1%	100%
5	XII Religion	60.0%	40.0%	100%
6	XII Natural Science	90.0%	10.0%	100%
Total		80.4%	19.6%	100%

Based on the results of analysis regarding relationship between level of knowledge and grade, it was found that more respondents had a poor level of knowledge (80.4%) compared to those with good level of knowledge (19.6%).

Table 10. Results of the Chi Square Test on the Relationship between Level of Knowledge and Grade.

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.065[a]	5	.047
Likelihood Ratio	2.009	5	.040
Linear-by-Linear Association	.013	1	.023
N of Valid Cases	51		

Based on the results of the Chi-Square Tests analysis, it was obtained an Asymptotic Significance value of 0.047, which was lower than the significant value (p-value) of 0.05. It can be concluded that there was a relationship between Grade and the level of knowledge of the respondents.

Based on the conclusion derived from the data analysis above, it is necessary to take action to increase knowledge on stunting among adolescents, which can be performed through optimization of the role of adolescents in preventive efforts through communication, information and education about stunting.

DISCUSSION

Based on the results of study, it was found that most of respondents aged >16-19 years by 50%. Furthermore, it was shown that there was a relationship between the independent variables, namely the socio-demographic characteristics of respondents and the dependent variable, namely the level of knowledge of respondents on stunting. The cross-tabulation result showed that there was a relationship between the independents variable and the dependent variable with p values for gender, age and Grade of 0.04, 0.03 and 0.047, respectively, which were lower than the significant value of 0.05. Furthermore, it was revealed that most of respondents had a poor level of knowledge, so that it is necessary to increase the respondent's knowledge.

A previous study conducted by Ayu Namirah Filayeti (2019) showed that there was a relationship between the characteristics of respondents and the respondent's level of knowledge[12]. Moreover, another study conducted by

Sisilia Natanael, et al (2022) showed a lack of knowledge on the incidence of stunting among students, the majority (86.6%) of respondents did not know about stunting and the cause of nutritional problems among adolescents, and 50.4% of respondents had a negative perception of stunting, especially in terms of stunting prevention[13].

A study conducted by Fauziatin, et al (2019) concerning the effect of educational flipcharts on knowledge about stunting prevention among prospective brides revealed that prospective brides had low level of knowledge on the causes of stunting and the impact of stunting[14].

Furthermore, Basitha, (2020) states that currently adolescents do not understand the importance of proper nutrition and stimulation to prevent early stunting. Their knowledge is very limited but they have to get married, get pregnant and become mothers. So, it is important to educate them about the issue of stunting. Stunting is a cycle, if a prospective mother had insufficient nutritional intake since she was a teenager, she will be at risk of having a malnourished child. The cycle starts with the health condition of young women. Therefore, the problem of stunting must be a concern since a young age.

Another study showed that most of respondents (73.3%) had received information about stunting, but there were still 27 people (26.7%) who had never received information about stunting or had never been exposed to it. The result of the current study also found that many people thought the issue of stunting was only for parents and married couples so that many adolescents were not exposed to information about stunting[7].

A study conducted by Yuni Alfi, Z. C., et al. (2021) regarding the evaluation on the implementation of specific nutrition interventions to reduce stunting targeted for adolescents found that adolescents' knowledge on the definition of anemia and stunting was good with a percentage of 85%, but 77.5% of female adolescents did not know that anemia had a risk of causing stunting[15].

A study conducted by Yunda, et al further revealed that knowledge of adolescents was influenced by age and grade, because a person will be more mature in thinking, mental development, as well as good emotions. At the age of 15-17 years, adolescents have a level of maturity in thinking well so that they can easily understand and know about nutrition, especially nutrition for female adolescents. Therefore, it is necessary to increase the knowledge of adolescents through the mass media or healthcare workers. Adolescents are also expected to be able to apply knowledge in choosing daily proper nutritional intake needed so as to support good nutritional status of adolescents[15].

Based on the results of several previous studies, it was indicated the importance of providing education for early prevention of stunting among adolescents, especially by emphasizing the aspects of perceived seriousness and perceived benefits to develop awareness regarding preventive efforts toward stunting since an early age[13].

Adolescent knowledge serves as an indicator to shape one's attitude and behavior in preventing stunting. Incorrect perceptions about stunting prevention can potentially lead to negative behaviors such as ignoring the impact of the problem of Chronic Energy Deficiency (CED) and anemia or ignoring the negative impacts of young marriage and teenage pregnancy[16]. Based on the WHO conceptual framework on childhood stunting, teenage pregnancy is a cause of stunting in children, besides that it is also caused by nutritional problems during adolescence (anemia and CED), as well as adolescents with short stature[13].

The World Health Organization (WHO) states that one of the contributing factors of stunting is malnutrition during pre-conception (adolescence), CED, and anemia. In addition, maternal height also contributes to the occurrence of stunting. Several studies have shown a relationship

between CED, anemia, and maternal height (short stature or height of ≤145 cm) during pregnancy and the incidence of stunting[13]. Such condition needs to be explored to what extent perceptions are related to stunting, especially among adolescents.

Stunting cases are still a global health problem because they are associated with the risk of illness and even death. The problem of stunting in Indonesia is ranked fifth in the world. Stunting is failure to thrive in children characterized by short stature due to chronic malnutrition caused by anemia in young women[16]. Stunting is a chronic nutritional problem caused by many factors such as socio-economic conditions, maternal nutrition during pregnancy, illness during infancy, and lack of balanced nutritional intake during adolescence[8]. In the future, stunted children may experience difficulties in achieving optimal physical and cognitive development when they are teenagers[17].

Efforts to prevent stunting should be initiated earlier, namely by preparing female adolescents to become healthy adult women, so that they are able and ready to get pregnant and have healthy children by maintaining a good, balanced and regular diet[18]. Thus, it is very important to hold health education on stunting preventive efforts with the aim of increasing the knowledge and insights of adolescents in preparing for future pregnancies[18].

In addition, increasing knowledge of nutrition will provide provision for adolescents on how to choose healthy foods and understand that food is closely related to nutrition and health. Providing an overview of nutritional problems, stunting education and prevention for adolescents is one way to reduce stunting rates in the future[19]. Some nutritional and health problems during adulthood can actually be corrected during adolescence through the provision of knowledge and awareness about healthy eating habits and lifestyle[15].

Implementation of health efforts for school-age children and adolescents aims to maintain healthy living habits so that they have the knowledge, understanding and skills to implement the principles of healthy living and actively participate in health improvement programs, namely at school, at home and in the community. Adolescents have an opportunity to improve stunting preventive efforts. One of the preventive efforts that can be carried out is optimizing the role of adolescents in stunting prevention through effective communication, providing accurate information and health education[20].

CONCLUSION

It can be concluded that there was a relationship between the independent variables of gender, age and grade with the dependent variable of the level of students' knowledge on stunting. There is a need for health education on nutrition for adolescents in schools in order to increase their knowledge on the incidence of stunting and nutritional problems among adolescents. It is expected that the information obtained by adolescents may increase their knowledge and awareness or positive perceptions regarding the problem of stunting.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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Original Article

Implementation of Aseptic Dispensing for Non-Cytostatic Injectable Drugs in the Internal Medicine Inpatient Ward of 'X' hospital, West Java

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ABSTRACT

Aseptic Dispensing activity is a procedure to minimize pharmaceutical preparations from the threats of pyrogens and contaminants. This study aims to determine the implementation of aseptic dispensing for non-cytostatic injectable drugs and the sterility of intravenous mixed preparations in the Internal Medicine Inpatient Ward of 'X' hospital, West Java for the period January - February 2022. This was a descriptive observational prospective study with a cross sectional approach. Researchers made direct observations of dispensing personnel, room and equipment as well as the process of aseptic dispensing activities including the stages of preparation, mixing, storage and disposal as well as sterility test of aseptic dispensing products. Based on the study results, it was obtained that of the 150 intravenous mixed preparations collected, there were 40 activities of diluting intravenous preparations, 100 activities of packaging into ready-to-use preparations and 10 activities of mixing intravenous preparations into infusion fluids, room suitability by 74%, preparations arrangement procedure by 68%, mixing procedure by 44%, storage procedure by 100% and disposal procedure by 63%. It can be concluded that the aseptic dispensing of non-cytostatic injection drugs in the internal medicine inpatient ward of 'X' hospital, West Java was not in accordance with the guidelines, especially at the mixing procedure stage (≤50). Compliance of dispensing personnel and room cleanliness during the process of mixing intravenous preparations need to be considered. The result of the identification of contamination during the aseptic dispensing activity of non-cytostatic injectable drugs showed that 1 in 150 samples (0.66%) was contaminated.

Keywords: Aseptic Dispensing, Non Cytostatic Injectable Drugs, Sterility Test, Contamination.

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INTRODUCTION

Dispensing of sterile preparations is a form of pharmaceutical service carried out in health service facilities which can be defined as procedures that change the form of a drug from its original condition into a new product by dissolving or adding other ingredients aseptically by pharmacists[1].

Dispensing of sterile preparations must be performed centrally in the Hospital Pharmacy Department. To ensure the safety, quality, benefits and efficacy of the drugs prepared and delivered to patients, hospitals are required to prepare and dispense drugs in a safe environment for patients, staff and the environment or so called aseptic dispensing[2,3].

Aseptic Dispensing is a procedure to minimize pharmaceutical preparations from the threats of pyrogens and contaminants. Such

method includes the stages of preparation, mixing, storage and disposal. Each stage is closely related to the availability of human resources (HR), equipment and room, so that the correct technique in mixing parenteral preparations is required. Aseptic means free of microorganisms and bacteria which can reduce the risk of exposure to officers. Contaminants may be carried into the aseptic area from medical devices, pharmaceutical preparations, or personnel. Sterile preparations mixing must consider product protection from contamination by microorganisms. Sterile preparations mixing requires trained human resources, appropriate facilities and equipment as well as specific management procedures. Non-Cytostatic Injectable Drug refers to a parentral preparation or sterile solution intended for parenteral use (administered intravenously) made by mixing one or more parenteral products into one container. The scope of sterile preparation dispensing includes non-cytostatic injectable drugs (iv-admixture), preparation of parenteral nutrition, cytotoxic mixing and dispensing of eye drop preparations[4].

Many inpatient patients are prescribed parenteral preparations because they are more appropriate for emergencies, have a quick onset and considered the appropriate treatment for uncooperative patients with oral drug preparations. One of constraints in sterile preparations mixing is the risk of contaminants which may lead to further risks of embolism and phlebitis. To avoid the presence of hazardous substances in intravenous preparations, an aseptic dispensing technique is needed so as not to cause adverse effects for patients and healthcare workers on duty.

Several previous studies showd that there was 1 contamination out of 43 intravenous preparation mixing (2.3%) carried out in the treatment ward[5]. Another study showed that the preparation to dispensing in the ICU and NICU wards had not been carried out according to the guidelines for injectable drugs mixing and cytostatics management. Among 110 Aseptic Dispensing, the levels of suitability of the preparation stage, mixing stage, storage stage and disposal stage were 87.77%, 49.09%, 80% and 98.18%, respectively[6]. A study on bacterial contamination in single dose vials and repeated dose vials showed that only 1 of the 92 preparations made in treatment room was contaminated[7].

Unsterile mixing has health impacts such as nosocomial infections. Dispensing of sterile preparations for patients with internal disease requires special care since they have a lot of drug use. Therefore, the level of aseptic dispensing activity is higher than other treatment wards. The impelemtation of aseptic dispensing for non-cytostatic injectable drugs at 'X' hospital, West Java had never been evaluated. Such fact has prompted researchers to make observations on dispensing of sterile preparations as an evaluation and basis for further development to optimize and improve pharmaceutical services, especially in terms of dispensing personnel, dispensing infrastructure, and quality sterile preparations products in the hospital. This study was conducted to determine the implementation of aseptic dispensing of non-cytostatic injectable drugs and the sterility of intravenous preparation products. Therapeutic suitability and the quality of the formulation are two important things to achieve optimal therapy for internal medicine patients. Until now, researchers have not obtained and found research data published in Indonesia that directly observed all aseptic dispensing activities of non-cytostatic injectable drugs, which include dilution of sterile preparations, packaging into ready-to-use preparations and mixing into infusion fluids and all aseptic dispensing products were tested for sterility.

METHOD

This study was conducted in a descriptive observational manner with prospective data collection. The current study was conducted at 'X' hospital, West Java, and has obtained ethical approval from the Research Ethics Committee of the Yarsi University Research Institute through a letter number 035/KEP-UY/BIA/II/2022. Inclusion samples were aseptic dispensing activities: dilution of sterile preparations, packaging into ready-to-use preparations and mixing into infusion fluids which were carried out in the Internal Medicine Room in January - February 2022 from Monday to Sunday at 08.00 - 22.00 WIB. All activities were directly observed by researchers. On the other hand, the exclusion criteria were sterile preparations containing cytostatics, sterile preparations in original packaging (Insulin, Fondafarinux inj) and mixing of antibiotics. The specified sample size involved 150 samples.

The incidental sampling technique was applied. The study instrument involved the 2009 Indonesian Ministry of Health Republic of Indonesia's Basic Manual for Sterile Preparations, an observation sheet (checklist) intended for dispensing personnel, room, equipment as well as process of aseptic dispensing activities consisting of 4 stages (preparation, mixing, storage and disposal). A Sterility Test was applied for the results of the aseptic dispensing activities at the Bogor Biopharmaca Study Center. Data were analyzed descriptively and qualitatively regarding the dispensing personnel, room and equipment, as well as regarding the process of aseptic dispensing activities by using the Guttman Scale. Certain variable was considered suitable if the percentage was ≥50% and not suitable if ≤50%. Secondary data derived from the process of aseptic dispensing activities were interpreted using categories by Arikunto, 2006, namely very good (80%-100%), good (66%-79%), moderate (56%-65%), poor (40%) -55%) and failed (≤40%).

RESULTS

Table 1 showed that there were 5 dispensing personnel who carried out aseptic dispensing activities. Furthermore, most of personnel were in the age category of <35 years by 3 people and were female by 3 people. 1 person had Bachelor of Nursing education. Based on years of service, most of personnel had been working <10 years by 3 people. Such findings indicated that the aseptic dispensing activities in the internal medicine inpatient ward at 'X' hospital, West Java was carried out entirely by nurses. There was no role for pharmacists or pharmaceutical technical staffs in dispensing injectable drugs either in the form of dilution of intravenous preparations (A), packaging into ready-to-use preparations (B), mixing intravenous preparations into infusion fluids (C). In addition, nurses performed injectable drugs dispensing based on previous experience and did it every day, although they rarely took part in training regarding injectable drugs dispensing.

Table 1. Data on dispensing personnel.

Dispensing Personnel	Gender	Age (Years)	Education	Years of Service	Profession
1	Male	34	Bachelor of Nursing	5	Nurse
2	Female	28	Diploma III of Nursing	6	Nurse
3	Female	40	Diploma III of Nursing	17	Nurse
4	Male	35	Diploma III of Nursing	11	Nurse
5	Female	33	Diploma III of Nursing	8	Nurse

Table 2. Number of Sampling Activities.

Dispensing Personnel	Number of Aseptic Dispensing Activities		
	January	February	Total
1	9	21	30
2	11	19	30
3	7	23	30
4	14	16	30
5	1	29	30
Total Activities			150

Table 2 showed that the number of sterile preparation activities for each dispensing personnel was 30. The activities were assessed according to the work schedule of dispensing personnel in the field. From 5 dispensing personnel, a total sample of 150 aseptic dispensing activities was obtained. The number of samples in January was less than in February since the study started in mid-January.

Table 3. Suitability of the Room for Aseptic Dispensing Activities.

No	Room	Number of Activities (N = 150)				Category
		Suitable		Not Suitable		
		n	%	n	%	
1	Clean room, specifically for processing sterile preparations	150	100	0	0	Very Good
2	All doors and windows were always closed	25	17	125	83	Failed
3	No sink	150	100	0	0	Very Good
4	No permanent shelves or blackboards	150	100	0	0	Very Good
5	Floor was disinfected daily using hypochlorite	150	100	0	0	Very Good
6	Easy-to-clean wall	0	0	150	100	Failed
7	Work table was far away from the door	150	100	0	0	Very Good

Table 3 revealed 2 procedures that were not in accordance with the guidelines, namely all doors and windows were always closed with a suitability percentage of 17% and easy-to-clean wall with a suitability percentage of 0%. Implementation of aseptic technique in a space with criteria of clean room, the floor was disinfected daily using hypochlorite and the work table was far qway from the door showed a suitability percentage of 100%. In contrast, the unavailability of sink for washing, permanent shelves or blackboards showed a suitability percentage of 100% Such findings indicated that the process of sterile preparation dispensing was still not able to apply the provisions of aseptic dispensing to protect against possible contamination.

Table 4. Suitability of Procedures for Sterile Preparations Arrangement.

No	Procedure	Number of Activities (N = 150)				Category
		Suitable		Not Suitable		
		n	%	n	%	
1	Hand disinfectant	136	91	14	9	Very Good
2	Wore mask, gloves, goggles and cap	68	45	82	55	Poor

Table 4 showed that the procedures for sterile preparations arrangement regarding hand disinfectants had a suitability percentage of 91%. On the other hand, wearing masks, gloves and protective eyewear and cap showed a suitability percentage of 45% which was not in accordance with the guidelines. Such finding indicated poor aseptic practice in the arrangement of sterile drug preparations.

Table 5. Suitability of Procedures for Sterile Preparations Mixing.

No	Mixing Procedure	Number of Activities (N = 150)				Category
		Suitable		Not Suitable		
		n	%	n	%	
1	Clean room, specifically for processing sterile preparations	150	100	0	0	Very Good
2	All doors and windows were always closed	25	17	125	83	Failed
3	No sink	150	100	0	0	Failed
4	No permanent shelves or blackboards	150	100	0	0	Failed
5	Floors were disinfected daily using hypochlorite	150	100	0	0	Failed
6	Easy-to-clean wall	0	0	150	100	Failed
7	Work table was far away from the door	150	100	0	0	Very Good
8	Gauze was disposed into the sealed bag	150	100	0	0	Very Good
9	Took off personal protective equipment	103	69	47	31	Very Good

Table 5 revealed a minimum suitability of the 9-stage mixing. The dominant mixing suitability was only found at the point of disposing of all contaminated material amd all gauze into a closed bag by 100%. Meanwhile, at the other stages, the minimum category by 30% was found for cleaning the work area by washing with detergent and rinsing with distilled water, repeated 3 times, and finally by rinsing with distilled water and cleaning the workbench with distilled water followed by 70% alcohol.

Table 6. Suitability of Procedures for Sterile Preparations Storage.

No	Storage procedure	Number of Activities (N = 150)				Category
		Suitable		Not Suitable		
		n	%	n	%	
1	Protected from direct light, using carbon paper/black plastic bags or aluminum foil	150	100	0	0	Very Good
2	Storage temperature was 2 - 8 º C in the refrigerator (not Freezer)	150	100	0	0	Very Good

Table 6 showed that the 2 procedures at the storage stage met the standards with a percentage of 100%. The storage temperature was in accordance with the requirement for preparation made in the inpatient room, namely 2-8°C, with a percentage of 100%. Preparations were stored in a place that was protected from direct light and used carbon paper/ black plastic bags or aluminum foil for lipid preparations. Temperature checking and recording were performed by nurses on duty effectively with a percentage of 100%. Storage stage of injection preparations in the internal medicine inpatient room of "X" hospital, West Java was in accordance with the SOPs with a percentage of 100%.

Table 7. Suitability of Waste Disposal Procedures.

No	Waste Disposal Procedure	Number of Activities (N = 150)				Category
		Suitable		Not Suitable		
		n	%	n	%	
1	Wore PPE	120	80	30	20	Very Good
2	Placed waste in closed disposal container (sharp waste such as syringes, vials, ampoules were placed in unpenetrable container)	150	100	0	0	Very Good
3	Put a warning label on the outside of the bag	35	23	115	77	Failed
4	Took waste to disposal	30	20	120	80	Failed
5	Washed hands	140	93	10	7	Very Good

Table 7 showed that in the disposal stage procedure consisted of 5 points, only placed waste in a closed disposal container (sharp waste such as syringes, vials, ampoules were placed in unpenetrable container) had a percentage of 100%. Such finding indicated that the procedures for the waste managemenet had not been optimally carried out and were not in accordance with the applicable SOPs.

Table 8. Results of Sterility Test.

Dispensing Personnel	Product Activities	Results of Sterility Test*	
		Steril	Unsteril
1	30	30	0
2	30	30	0
3	30	29	1
4	30	30	0
5	30	30	0

Table 8 showed that there was 1 contaminant out of 30 aseptic dispensing activities from Personnel 3, while the other sterility test results did not find any contaminant. Such finding indicated that there was 1 contaminated sample out of all the samples of aseptic dispensing activities.

DISCUSSION

1. Dispensing Personnel and Aseptic Dispensing Activities.

The study findings showed that there were 22 dispensing personnel was 22 people, and 5 personnel were responsible for dispensing sterile preparations. Pharmacists are preferred to be responsible for drug dispensing to ensure the quality of the preparations produced. Based on previous study, dispensing of sterile preparations carried out by pharmacists better quality of products quality compared to those produced by non-pharmaceutical workers.

According to the Indonesian Pharmacist Competency Standards, the pharmacist is responsible for ensuring that the mixing of sterile preparations in hospitals is in accordance with Good Preparation Practices (GPP) so that sterility, solubility and stability of products are guaranteed. Inaccuracy in intravenous mixing in terms of aseptic procedures, mixing techniques, dissolution, and storage can cause precipitation of the drug which may further cause blockage in the injection device and endanger the patient. Dispensing personnel must be trained regarding the implementation of aseptic techniques. Despite adequate facilities and infrastructure, without sufficient capabilities in aseptic dispensing, the product will not be protected from contamination[6].

Other research further revealed that dispensing personnel in the children's ward of a hospital in Istanbul, Turkey, did not have specific education and training regarding the preparation and administration of injectable drugs, which resulted in preparations with inappropriate doses and concentrations as prescribed[8]. Another opinion also explains that dispensing personnel must be trained in the implementation of aseptic techniques as the key factor to guarantee a product that is free of contamination.

2. Suitability of Aseptic Dispensing Procedures based on the Basic Guidelines for Sterile Preparation Dispensing

The internal medicine inpatient ward at 'X' hospital, West Java did not have LAF. Aseptic mixing procedures are performed according to the standards of the Indonesian Ministry of Health, regarding matters to be considered in dispensing sterile preparations. The inpatient ward was always closed and git sufficient natural lighting from sunlight or light. The floor was disinfected every day using wipol liquid which contains cresol as a disinfectant.

The preparation room used was a special room that was the cleanest and specifically intended for sterile preparations only. Another thing that must be considered during the dispensing of sterile preparations is that the work table must be far from the door. In addition, the distribution of drugs and equipment for dispensing sterile preparations should not go through passboxes since dispensing in such hospital was not carried out in a special room that can guarantee drug sterility.

The study showed that the facilities and infrastructure available at "X" Hospital were inadequate for dispensing ceftriaxone injection. During the observation, the dispensing of ceftriaxone injection was only carried out in the nurse's room which was not equipped with a special air conditioning system or particle and microbial control. Laminar Air Flow (LAF) was also not available at “X” Hospital[7]. Another study showed that the infrastructure and procedures for mixing sterile injection preparations at hospitals in the Cilacap area

were not in accordance with the Guidelines for Injectable Drugs Mixing[9].

It is recommended that dispensing of sterile preparations is carried out in the LAF in a special room consisting of a preparation room, dressing room, intermediate room, and a sterile room, with a special air conditioning system that can limit the number of particles and microbes[10,11].

Other study also explained regarding the risk of bacterial contamination of mixed intravenous preparations prepared in the nursing ward and pharmacy showed that the frequency of contamination for drugs prepared in the nursing ward was higher than those prepared in the pharmaceutical environment namely 3.7% vs 0.5%[12,13]. Furthermore, some critical aspects of sterile preparations do not meet the requirements according to guidelines such as dispensing personnel and infrastructure[14].

3. Procedures for Sterile Preparations Arrangement.

Procedures for sterile preparations arrangement includes washing hands and using Personal Protective Equipment (PPE). Personal Protective Equipment (PPE) are equipment that must be used while working to maintain the safety of the workers as well ass people around them. Table 4 showed that the procedures for sterile preparations arrangement regarding hand disinfectants had a suitability percentage of 91%. On the other hand, wearing masks, gloves and protective eyewear and cap showed a suitability percentage of 45% which was not in accordance with the guidelines. Such finding indicated poor aseptic practice in the arrangement of sterile drug preparations. One of the things that triggers non-compliance with the use of PPE is the inadequacy of the facilities available in the internal medicine inpatient ward at "X" hospital, West Java.

4. Procedures for Sterile Preparations Mixing.

At the mixing stage, personal protective equipment (PPE) must be used. Several things to be considered while mixing sterile preparations include the controlled stages of mixing which functions to minimize microbial contamination. While mixing sterile preparations, it is necessary to pay attention to certain conditions, such as protection of the product from contamination by microorganisms, protection of personnel and the environment against exposure, stability of the preparation, and non-mixing of the preparation. Therefore, to avoid unwanted things, the preparation must be performed in a special (sterile) room, in a disciplined and careful manner along with adequate knowledge and skills to prevent unwanted risks[1].

The high incidence of nosocomial infections in hospitals is one of the reasons for the importance of implementing aseptic techniques by healthcare workers, especially nursing staff as a preventive measure to prevent the entry of microorganisms into the patient's body[15]. Based on observation, the practice of sterile preparations mixing was not in accordance with the SOPs and this condition may increase the risk of microorganisms contamination and the spread of infection. Such infection rate can often arise due to the high number of patients and limited time in mixing drugs, lack of knowledge of human resources about aseptic dispensing, and incomplete facilities for carrying out aseptic dispensing. Another factors regarding aseptic dispensing were the availability of equipment and room[16]. The procedures for sterile preparations mixing in the internal medicine ward of “X” hospital, West Java, was in accordance with the SOPs with a percentage of 43.55%.

5. Procedures for Sterile Preparations Storage.

Storage is an activity of securing medicines received so that they are safe and protected from physical or chemical damage. Storage functions to maintain the stability of the drug and its quality is guaranteed. The storage conditions that should be considered to maintain stability and quality of the drug include humidity, sunlight, and temperature or heat[17].

6. Procedures for Waste Disposal/Management.

According to Minister of Health Decree Number 1204 of 2004 concerning Hospital Environmental Health, good management of waste disposal may kill or inhibit cell growth[18]. Waste needs to be collected in a strong, leak-proof and labeled container. Health waste is paotentially hazardous and microorganisms can infect hospital patients, personnel and the public[19].

According to the theory of the Health belief model, human resources may feel to be threatened if they do not comply with using PPE (masks, handscoons, gowns) during dispensing practices[20]. Suitability of hand washing procedure which only obtained a value of 93.33% indicated a risk of contamination after managing waste. Obviously, the management of injection preparations waste in the internal medicine ward of "X" hospital, West Java, was not in accordance with the SOPs.

CONCLUSION

Implementation of aseptic dispensing for non-cytostatic injectable drugs based on the work procedures for sterile preparations in internal medicine inpatient ward of 'X' hospital, West Java revealed that dispensing personnel, rooms and equipment as well as procedures for mixing sterile preparations were not in accordance with the Basic Guidelines for Sterile Preparation Dispensing and Guidelines for Injectable Drugs Mixing and Cytostatics Management so as to affect the quality of the sterile preparations produced. Compliance of dispensing personnel and room cleanliness during the process of mixing intravenous preparations need to be considered. In addition, the compliance of dispensing personnel with aseptic activity procedures also affects the products of intravenous preparations. The result of the identification of contamination during the aseptic dispensing activity of non-cytostatic injectable drugs showed that 1 in 150 samples (0.66%) was contaminated.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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Article Review

The Main Factors Causing the Incidence of Diarrhea in Children: A Meta-Analysis

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ABSTRACT

Environmental factors that cause diarrhea are still under-researched, so researchers are interested analyze the risk factors for the availability of clean water, hand washing, mother's knowledge and the latrine conditions that affect the incidence of diarrhea in toddlers. The meta-analysis method was used in this study with the PICOS technique. Some of the data sources used are Google Scholar, Research Gate and Plos ONE by looking at keywords such as "risk factors" and "diarrhea". 140 articles were obtained, and the articles obtained were then screened and sorted again using clear inclusion criteria. Using cross-sectional study design to filter the articles to the next stage. To process the meta-analysis data, the JASP Version 0.16.3.0 application was used. the findings show that the pooled PR value for the availability of clean water is e 0.82 = 2.270; hand washing of e 0.57 = 1.768; mother's knowledge of e 0.56 = 1.751; and latrine conditions of e 0.53 = 1.699. The results of the study also showed that there was a risk relationship between the variables Availability of clean water, hand washing, mother's knowledge, and latrine conditions on the incidence of diarrhea in toddlers. The variable availability of clean water is the variable that has the highest relationship and risk for the incidence of diarrhea in toddlers, followed by the hand washing, the mother's knowledge and the lowest is the latrine condition variable. Future research is expected to examine the in-depth relationship between the availability of clean water and hand washing by looking at the intermediary factors.

Keywords: Diarrhea, Latrine Conditions, Clean Water, Knowledge, Hand Washing.

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INTRODUCTION

Diarrhea is the main disease that causes death in children, it is estimated that diarrhea has killed 558,000 children aged 1−59 months in 2013[1,2,3,4,5,6]. According to the World Health Organization, more than half a million under-five deaths worldwide are caused by diarrhea[7,8]. In 2019, diarrhea was responsible for around 7.4% of all global causes of death in children < 5 years[9]. About 90% of all diarrhea-related deaths occur in children under the age of five, especially in low- and middle-income countries [10].

Although deaths from diarrhea decreased dramatically annually among children <5 years between 1990 and 2017, the number of deaths from diarrhea remains highest in several developing countries[11]. According to data, Asia is one of the regions with the greatest rates of deaths from diarrhea[12,13]. Although cases of diarrhea occur in many developing countries,

developed countries also experience a significant burden due to diarrhea[13].

Diarrhea is usually defined as watery bowel movements occurring three or more times in a 24-hour period, and causing death by depletion of body fluids resulting in severe dehydration[14]. This disease can generally be easily treated and prevented[15,14,16]. The highest mortality in cases of diarrhea experienced by young children[17,18]. Toddlers (<1 year) occupy the first position affected by diarrhea[13,19]. Diarrhea can have an adverse impact on a child's cognitive growth and development[20]. There are several risk factors that may be responsible for causing diarrhea-related deaths in children. In addition to biological, social, environmental factors, factors such as lack of water supply, sanitation and hygiene are one of the main risk factors that contribute to the cause of death from diarrhea in toddlers[21,22,23,17,24].

In various developing countries, including Indonesia, the third contributor to child morbidity and mortality is diarrheal disease, because the child's immune system is still weak. Estimates of the occurrence of deaths from diarrhea by 3.2 million and 1.3 billion per year[25]. Clean water facilities and excrement disposal are environmental factors that have a major role in the spread of diarrheal diseases because they are directly related to human behavior. If these two factors do not meet the requirements, it will cause diarrheal disease[26]. Washing hands properly according to procedures with running water and using soap has a role in the occurrence of diarrheal disease in toddlers[27]. Efforts to prevent diarrhea in toddlers are expected from the mother's knowledge obtained through her own experience or that of others. Thus, mother's knowledge has a big role in preventing diarrhea in toddlers[28].

The novelty of this study is that researchers are trying to combine all studies from 2012 to 2022 to see the relationship between factors that cause diarrhea. The purpose of this study was to analyze the risk factors for the availability of clean water, the risk factors for hand washing, the risk factors for mother's knowledge and the risk factors for latrine conditions that affect the incidence of diarrhea in toddlers.

METHOD

The meta-analysis method used in this study is the PICOS technique, which combines two or more similar research results to obtain a combination of quantitative data with the same hypothesis to reach a conclusion[29]. Furthermore, meta-analysis is quantitative in nature as it uses numerical and statistical calculations for practical purposes, i.e. collecting and extracting information from large volumes of data[30]. The data source for this study uses Google Scholar, ResearchGate, PlosONE. The keywords used in this research are "risk factors" and "diarrhea". Downloaded articles are articles that have an abstract and full text. The research articles found in this research are 140 journal articles. Then the articles were screened and sorted again using clear inclusion and exclusion criteria. Researchers used a cross-sectional study design to screen for the next stage. The variables of clean water availability, hand washing, mother's knowledge and latrine conditions are the selected variables that influence the incidence of diarrhea in toddlers in Indonesia. Secondary data types from selected articles are used in this study. The incidence of diarrhea in toddlers is the dependent variable, while the risk factors for the availability of clean water, the risk factors for hand washing, the risk factors for maternal knowledge and the risk factors for latrine conditions are the independent variables in this study. The following is a PRISMA flowchart from this study.

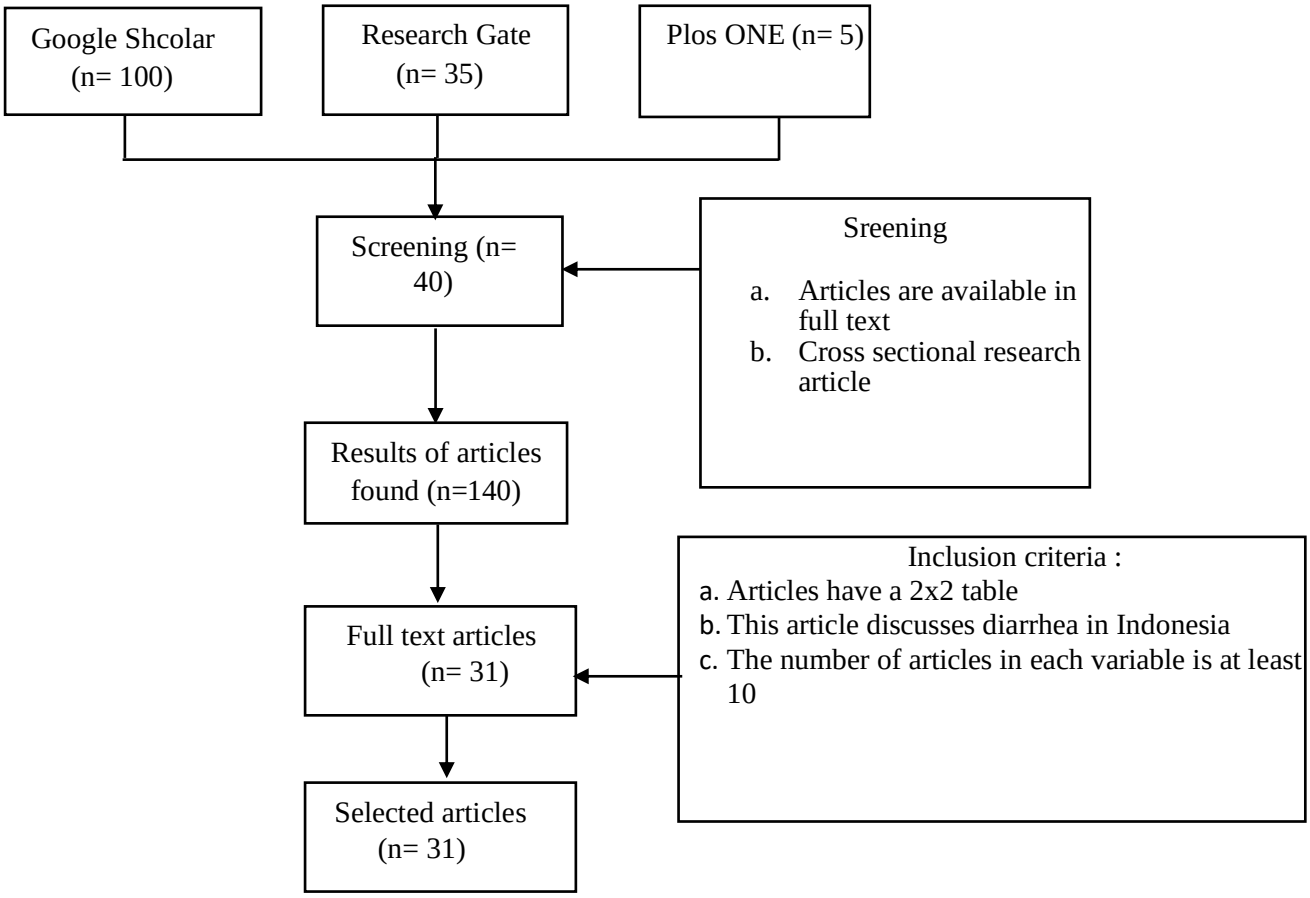
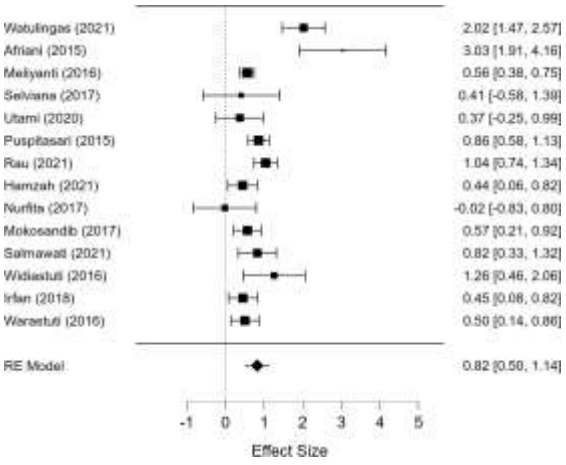


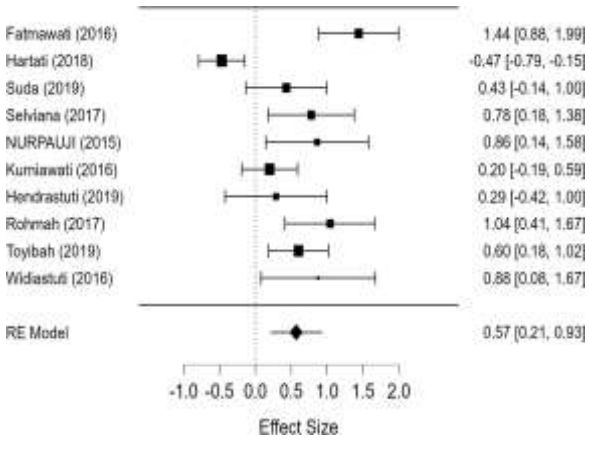
Figure 1. Prisma Flowchart.

The process of doing a meta-analysis typically contains some parts, the first of which is the formulation of the study topic. The next steps are literature gathering based on the planned objectives and evaluation.

RESULTS

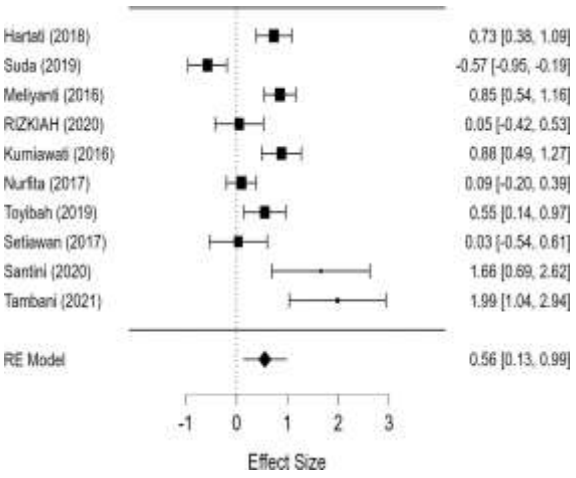


Risk factors for the availability of clean water on the occurrence of diarrheal disease in toddlers.

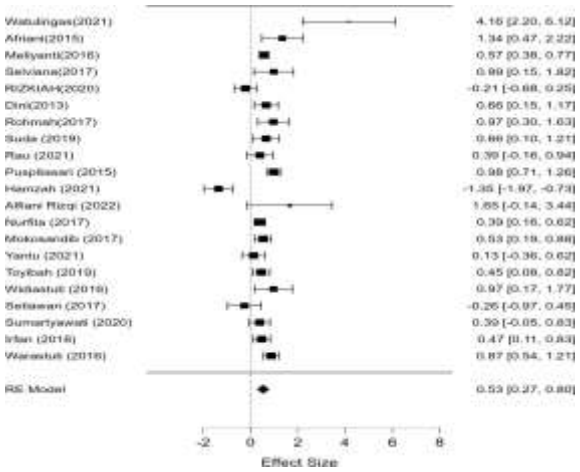


Risk factors for washing hands on the occurrence of diarrheal disease in toddlers.

Risk factors for washing hands on the occurrence of diarrheal disease in toddlers.



Risk Factors Mother's knowledge of the occurrence of diarrheal disease in toddlers.



Risk factors for the condition of latrines for the occurrence of diarrheal disease in toddlers.

Figure 2. Forest plot Risk Factors Availability of Clean Water, Mother's Knowledge of Handwashing, and Latrine Conditions for the occurrence of diarrheal disease in toddlers.

The Restricted ML (RE) model value of the Forest plot on the variable availability of clean water illustrates a Prevalence Ratio (PR) value of 0.82 with values ranging from 0.50 to 1.14 which is a 95% Confident Interval (CI) value. Pooled PR value = e0.82 = 2.270 So it is concluded that the incidence of diarrhea in toddlers has a risk of 2.270 times greater if the variable availability of clean water does not meet the requirements. This is in line with research [31] who stated that diarrhea was mostly affected by poor sanitation facilities and scarcity of clean water being the main cause. Other studies have shown that in 2007–08 in India, improved sanitation and piped drinking water helped reduce diarrhea in children[32].

The Restricted ML (RE) model value of the Forest plot on handwashing without soap and running water variables illustrates a Prevalence Ratio (PR) value of 0.57 with values ranging from 0.21 to 0.93 which is a Confident Interval (CI) value of 95 %. Based on Figure 4, the value of pooled PR = e0.57 = 1.768 is obtained, this shows that the risk is 1.768 times greater for diarrhea in toddlers due to hand washing without soap and running water. The Restricted ML (RE) model of the Forest plot of the mother's knowledge variable illustrates the Prevalence Ratio (PR) value of 0.56 with values ranging from 0.13 to 0.99 which is a 95% Confident Interval (CI) value. Based on Figure 6. The forest plot shows the value of pooled PR = e 0.56 = 1.751. So it can be concluded that diarrhea is 1.751 times more likely to occur in toddlers due to poor mother's knowledge. Studies in India have shown that mothers with good knowledge of hand hygiene can prevent diarrhea by 38.88.% [33,34] and washing hands with soap removes potentially pathogenic organisms from hands as a result of previous toilet washing activities[33]. In Ethiopia, 65.2% of mothers have good knowledge about prevention and management of diarrhea at home in children under five [35,36] and promotion of handwashing with soap has prevented diarrhea[37] .

The Restricted ML (RE) model value of the Forest plot of the latrine condition variable does not meet the requirements describing a Prevalence Ratio (PR) value of 0.53 with values ranging from 0.27 to 0.80 which is a 95% Confident Interval (CI) value. Based on Figure 8, the value of pooled PR = e0.53 = 1.699 is obtained, this shows that toddlers experience diarrhea 1.699 times greater if the latrine conditions do not meet the requirements. Exposure to human feces increases the risk of diarrheal infection [38] and increased inflammation in the gut[39,40,41]. Diarrheal disease contributes to stunting, reduced cognition, and increased child mortality[42]**.** Latrines allow for the safe disposal of human waste and reduce the transmission and ingestion of faecal-oral pathogens [43] Open defecation facilitates transmission of diarrheal pathogens and is associated with a high risk of intestinal parasite infection. Progress in improving sanitation in

developing countries has been slow, although studies have shown latrines to be effective in reducing diarrheal diseases by around 30% 9 and increasing child growth[44]. According to research [45] Among rural and urban families, lack of latrines was associated with history (odds ratio[OR] = 1.23, 95% confidence. interval [CI] = 1.18–1.29, P < 0.0001; OR = 1.20, 95% CI = 1.13–1.27, P < 0.0001) and under-five mortality (OR = 1.29, 95% CI = 1.25–1.31, P < 0.0001; OR = 1.22, 95% CI = 1.12–1.32, P < 0.0001).

Table 1. Heterogeneity test table for independent variables on the occurrence of diarrhea in toddlers.

Variable heterogeneity of availability of clean water on the occurrence of diarrhea in toddlers.

	Q	df	p
Omnibus Test Model Coefficients	25.609	1	<0,001
Heterogeneity Test Residue	58.813	13	<0,001

Heterogeneity Meta-Analysis of Knowledge of Mothers with Diarrhea in Toddlers.

	Q	df	p
Omnibus Test Model Coefficients	6.424	1	0.011
Heterogeneity Test Residue	67.791	9	< .001

Heterogeneity of hand washing variables with the occurrence of diarrhea in toddlers.

	Q	df	p
Omnibus Test Model Coefficients	9.725	1	0,002
Heterogeneity Test Residue	51.980	9	<0,001

Heterogeneity Meta-Analysis of Latrine Conditions and the Occurrence of Diarrhea in Toddlers.

	Q	df	p
Omnibus Test Model Coefficients	15.617	1	<0,001
Heterogeneity Test Residue	91.989	20	<0,001

In the heterogeneity test of articles with the variable availability of clean water, it was found that the p-value was less than α (0.05), namely p = <0.001, (availability of clean water, hand washing behavior, mother's knowledge, and latrine conditions) which indicated that variations in research articles used is heterogeneous so that the Restricted ML model is used in the analysis of this study.

Table 2. Egger test variable availability of clean water, hand washing, mother's knowledge, and latrine conditions on the occurrence of diarrheal disease in toddlers.

Egger test variable availability of clean water on the occurrence of diarrheal disease in toddlers.

	z	p
Sei	1.490	0.136

Egger test of mother's knowledge variable on the occurrence of diarrheal disease in toddlers.

	z	p
Sei	2.224	0.026

Egger test variable Hand washing against the occurrence of diarrheal disease in toddlers.

	z	p
Sei	2.176	0.030

Egger test of latrines condition variables on the incidence of diarrhea in toddlers

	z	p
Sei	2.473	0.013

Based on the Egger test in Table 2, it shows that there is no publication bias in this study because the p-value = 0.136 which means it is greater than the value of α (0.05). These results are in accordance with the funnel plot in

Figure 3, namely symmetry. The meta-analysis shows that the occurrence of diarrhea in toddlers is 2.270 times greater if the variable availability of clean water does not meet the requirements. This risk value is greater than previous research conducted by [46] In this study, the pooled PR value found was 1.85 (95% CI: 1.44 to 2.38), which means that the availability of clean water can be a risk factor for diarrhea in toddlers. It also has the same meaning as research conducted in Indonesia which has the same results, namely the increased risk of diarrheal disease in children under five is influenced by the availability of clean water that does not meet the requirements with a p-value of 0.00[47].

Based on the Egger test in Table 2, it shows that there is a publication bias in the variables of hand washing, knowledge and latrines conditions because the p-value <α (0.05). This result is in accordance with the funnel plot in the image, namely asymmetry. The results of the meta-analysis showed that washing hands without soap and running water had a 1.768 times greater risk of experiencing diarrhea in toddlers. This risk value is greater than previous research conducted by [46], In this study, the pooled PR value found was 1.12 (95% CI: 0.78 to 1.62), which means that hand-washing habits can be a risk factor for diarrhea in toddlers. Also has the same meaning as research conducted by [48], from the results of the study, it was found that the PR value = 2.4 which means the PR value is more than 1.

The results of the meta-analysis calculation showed that the mother's poor knowledge variable had a 1.751 times greater risk for toddlers experiencing diarrhea. This research is in line with research conducted by [49] which states that the mother's knowledge variable has a significant relationship with the incidence of diarrhea in toddlers, this is indicated by the p-value of 0.012. The meta-analysis shows that the occurrence of diarrhea in toddlers is 1.699 times greater if the latrine condition variable does not meet the requirements. This research is in accordance with research from Adani, 2021, that the risk ratio of latrine conditions in increasing the incidence of diarrhea in toddlers is 1.840 (95% CI: 0.48 to 0.75) which means that latrine conditions have a significant relationship to the incidence of diarrhea in toddlers. Also has the same meaning as research conducted by [48],From this study, it was obtained that the value of p = 0.014 and the value of PR = 2.05, which means that the value of PR> 1.

Table 3. Results of the meta-analysis of risk factors for the availability of clean water, hand washing, mother's knowledge, and latrines for the occurrence of diarrhea in children under five in Indonesia.

No	Variable	N	Fixed/Random effect Models	
			PR	95% CI
1	Availability of clean water	14	2,270	0,50 - 1,14
2	Washing hands	10	1,768	0,21 - 0,93
3	Mother knowledge	10	1,751	0,13 - 0,99
4	Latrine conditions	21	1.699	0,27 - 0,80

Based on the results of table 3, the variable availability of clean water is the highest risk factor for diarrheal disease in toddlers in Indonesia. The availability of clean water has a pooled PR value of $e^{0.82} = 2.270$. So it can be concluded that the risk of diarrheal disease in Indonesia is 2,270 times greater due to the availability of clean water that does not meet the requirements.

Table 4. Sensitivity Test Comparison of Fixed Effect Models and Random Effect Models Pooled Prevalence Ratio Fixed Effect Models and Random Effect Models.

No	Variable	N	Heterogenity (pvalue)	Fixed effect Model		Random Effect Model	
				PR	95% CI	PR	95% CI
1	Risk factors for the availability of clean water diarrheal disease in toddlers	14	< 0,001	1,448	0,21-0,53	2,270	0,50-1,14
2	Risk factors for handwashing on diarrheal disease in toddlers	10	< 0,001	1,448	0,21-0,53	1,768	0,21-0,93
3	Risk factors for mother's knowledge of the occurrence of diarrheal disease in toddlers	10	< 0,001	1,537	0,30-0,56	1,751	0,13-0,99
4	Risk factors for latrines to diarrheal disease in toddlers	21	< 0,001	1,699	0,44-0,61	1,699	0,27-0,81

From Table 4 it can be seen that the fixed effect model and the random effect model have different pooled prevalence ratio values. In both models there are also differences in the Internal Confident (CI) range values, this shows that there are variations between studies. There is an increase in PR on the variables of availability of clean water, hand washing and mother's knowledge. Whereas in the latrine condition variable there was no increase in the PR value there was only a difference in the CI value.

CONCLUSION

The findings show that the variable that has the highest relationship and risk of diarrheal disease in children under five in Indonesia is the availability of clean water followed by hand washing; mother's knowledge, and latrine conditions. Of the four variables above, only the variable availability of clean water has no bias. So that it can be ascertained that clean water is an important factor in the incidence of diarrhea. Future research is expected to examine the in-depth relationship between the availability of clean water and hand washing by looking at the intermediary factors.

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CONFLICTS OF INTEREST:
The authors declare no conflict of interest.

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Article Review

Analysis of Environmental Risk Factors for Leprosy in Indonesian Society: A Meta-Analysis

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ABSTRACT

Indonesia is still the third largest contributor of new cases of leprosy in the world. The purpose of this study was to analyze the risk factors for the influence of humidity, occupancy density, and personal hygiene on the incidence of leprosy. Using the Meta-Analytic Method with the PICOS technique. Some of the data sources used are Google Scholar, Research Gate and Plos ONE by looking at keywords such as "Humidity", "Personal Hygiene", and "Occupancy Density". There were 71 articles. The Random Effect value with 95% CI variable humidity is 2.13 with a value range of 1.35 – 2.92. The forest plot results show the value of pooled PR = e2.13 = 8.415. The Random Effect value with 95% CI for the individual hygiene variable is 1.84 with a range value of 1.59-2.10. the results of the forest plot show the value of pooled PR = e1.84 = 6.926. The Random Effect value with 95% CI variable occupancy density is 1.75 with a value range of 1.36-2.14. forest plot results show the value of pooled PR = e1.75 = 5.754. Humidity has greates risk of causing leprosy. Meanwhile, Personal hygiene has a 6.926 times greater risk of causing leprosy. Residential density is at risk 5,754 times greater for experiencing leprosy. The factors that most influence the incidence of leprosy are humidity followed by personal hygiene and occupancy density. It is recommended that further research use qualitative data to look deeper into the intermediary factors that cause leprosy.

Keywords: Humidity, Personal Hygiene, Occupational Density, Leprosy.

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INTRODUCTION

Although the clinical manifestations of leprosy are not striking, it is known that leprosy is still an endemic disease in some areas [1]. This is due to poor knowledge about the transmission of leprosy and the main risk factors involved. People infected with leprosy have the potential to infect much more often than they show symptoms, due to the presence of low pathogenicity bacilli in people infected with leprosy[2,3,4]. Individuals may transmit the bacilli for a long time before the first symptoms begin, that is, in the subclinical incubation period. Therefore, prevention of transmission cannot only rely on early diagnosis from an early age.[5,6,7]. Contact that occurs at the household scale plays an important role in disease transmission [8,9,10,11]. Serologic tests can now identify potentially bacciferous individuals [12,13,14,15,16]. This test has potential for use in primary care, where it is used not only to classify

cases as paucibacillary or multibacillary but also to identify individuals at higher risk of disease[17,18,19]**.** On the other hand, PCR (Polymerase Chain Reaction) seems promising for identifying "appearing" healthy individuals[20,21,22,23,24].

In countries such as Ethiopia and Indonesia, where leprosy is an endemic disease and polychemotherapy schemes have been in place for around 15 years, it is more than 5%. identified population has Mycobacterium leprae DNA. This shows that this disease cannot be eliminated by PCT treatment alone[25,26]. There is evidence to suggest that local population, density and level of endemicity play a role in the emergence of leprosy[26,27]. Another factor that should receive more attention is the microenvironment, such as the number of people per household and per room of the house, poor sanitary conditions, genetic susceptibility, low education levels, local social and cultural dynamics and so on[28,29].

Early diagnosis is expected to help stop the leprosy transmission cycle[30,31,32]. High population densities may be linked to endemic disease, as contact is more common in such groups[33,34]. Several previous studies also stated that there was a significant relationship between the physical conditions of the house such as ceiling, floor type, humidity, and bedroom density ($p < \alpha$) with leprosy cases [35]. Several previous studies have proven that the physical condition of a house has a relationship with the incidence of leprosy. The house as a place to live must meet the requirements of a healthy home following regulations. Leprosy has a relationship with personal hygiene, socioeconomic factors, ventilation area and occupancy density [36]. According to [37] there is a significant relationship between housing sanitation and community characteristics with the incidence of leprosy.

The purpose of this study was to analyze the risk factors for humidity, personal hygiene, and occupancy density which affect the incidence of leprosy. Novelty The novelty of this study is that researchers are trying to combine all studies from 2012 to 2022 to see the interrelationships of factors that cause leprosy.

METHOD

Sources of data from this study using Google Scholar, ResearchGate, and PlosONE. The keywords used in this study were "Humidity", "Personal Hygiene", and "Occupancy Density". Downloaded articles are articles that have an abstract and full text. The research articles found in this study are 71 journal articles. Then the articles were screened and sorted again using clear inclusion and exclusion criteria. Researchers used a cross-sectional study design to screen for the next stage. Variables Humidity, personal hygiene, and occupancy density are the selected variables that influence the incidence of leprosy in Indonesia. Secondary data types from selected articles are used in this study. The incidence of leprosy is the dependent variable, while humidity, personal hygiene, and occupancy density are the independent variables of this study. The following is a PRISMA flowchart from this study

The articles that have been collected are then extracted and synthesized to obtain data that can fulfill the objectives of this study. These data are compiled and analyzed in order to become material for solving problems that are carried out by the Meta-Analysis test. The following illustrates the literature search diagram for data collection through a flow chart (Prisma):

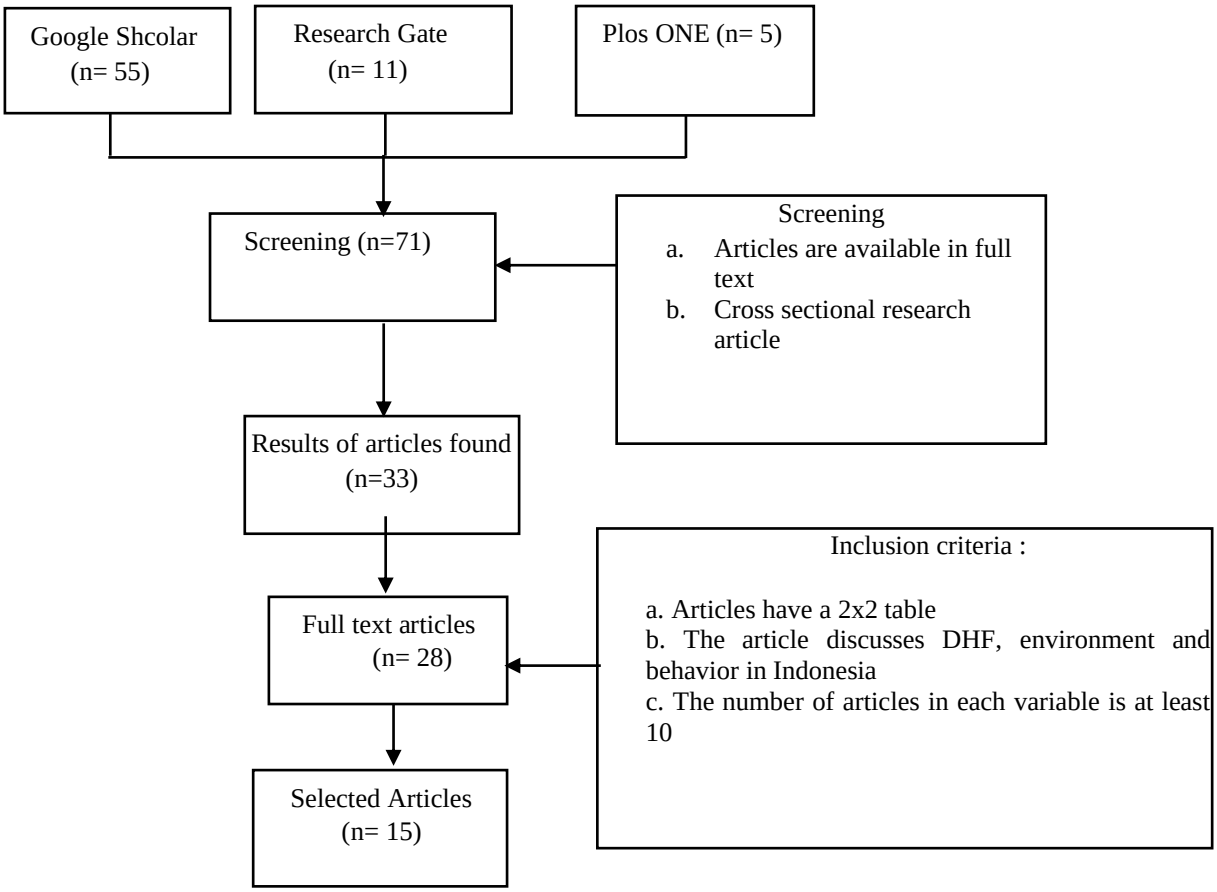
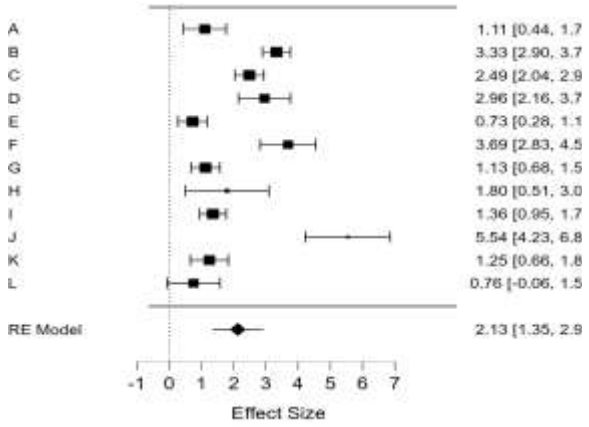


Figure 1. PRISMA Flowchart Risk Factors of Humidity, Personal Hygiene, Occupational Density Against Leprosy in Indonesian Communities.

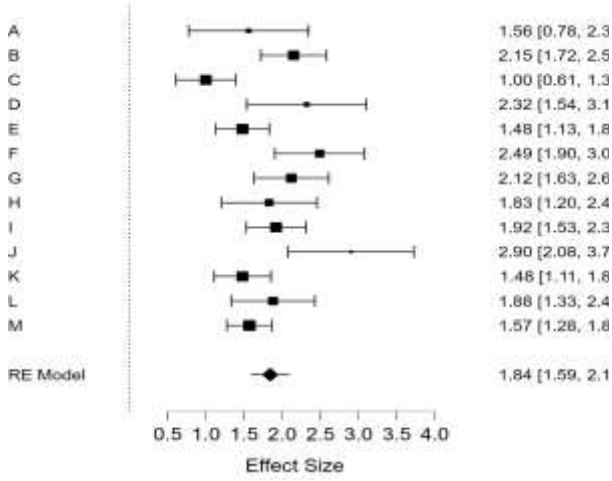
The articles obtained were then meta-analyzed by obtaining 15 research articles. Analysis was performed to obtain the value of the pooled odds ratio estimate using the Mentel – Haenszel method for the fixed effect model analysis and the DerSimonian-Laind method for the random effect model analysis. If the variation between variables is homogeneous or the p-value is heterogeneous and greater than 0.05, the analysis model used is the fixed effect model. Meanwhile, if the variation between variables is heterogeneous or the p-value is heterogeneous less than 0.05, then the random effect model is used. The meta-analysis calculates the Prevalence Ratio (PR) as follows:

1. If the estimated PR value is > 1 and the range of confidence intervals does not exceed 1, it means that this variable is a risk factor between humidity, occupancy density, personal hygiene and the incidence of leprosy in the community
2. If the estimated PR value is <1 and the range of confidence intervals does not exceed 1, it means that this variable is a protective factor between each variable that influences the incidence of leprosy in the community.
3. If the estimated value of PR = 1 and the range of confidence intervals does not exceed 1, it means that the independent variable has no relationship with the incidence of leprosy in the community

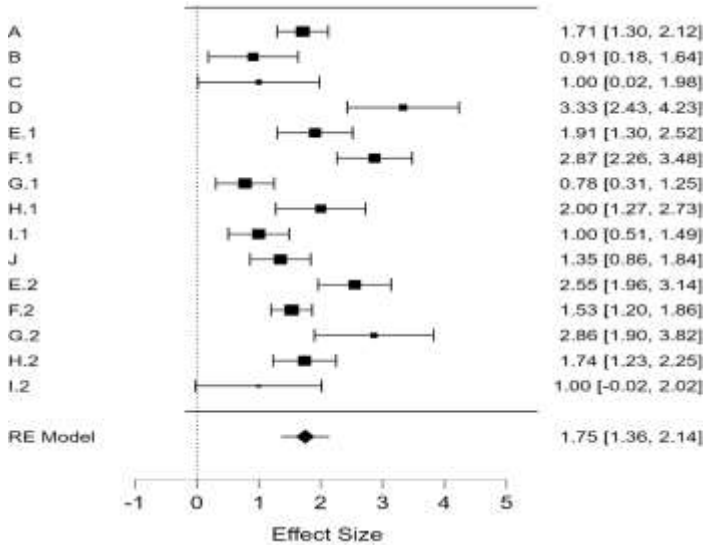
RESULTS AND DISCUSSION



Humidity Against Leprosy in Indonesia



Personal Hygiene Against Leprosy



Occupancy Density Against Leprosy

Figure 2. Forest plot of risk factors for humidity, hygiene, and occupancy density for leprosy

The findings show that in the forest plot the humidity on the incidence of leprosy has a Random Effect Value (RE) The model shows an estimated Prevalence Ratio (PR) showing a 95% CI of 2.13 with a value range of 1.35 – 2.92. The results of the forest plot show the value of pooled PR = $e^{2.13}$ = 8,415. So it was concluded that humidity has a 8.415 times greater risk of causing leprosy to occur in the community. As for individual hygiene forest plots, the Random Effect (RE) Model shows an estimated Prevalence Ratio (PR) with a 95% CI of 1.84 with a range of 1.59-2.10. forest plot results show the value of pooled PR = $e^{1,84}$ = 6,926. It can be concluded that individual hygiene variables have a 6.926 times greater risk of causing leprosy to occur in the community. In line with the other two variables, forest plot occupancy density has a Random Effect Value (RE) Model showing an estimated Prevalence Ratio (PR) with a 95% CI of 1.75 with a value range of 1.36-2.14. forest plot results show the value of pooled PR = $e^{1,75}$ = 5,754. It can be concluded that the residential density variable is 5.754 times more likely to experience leprosy in Indonesian society.

Table 1. Meta-Analytic Heterogeneity Test and Egger's Test Table for Risk Factors of Humidity, Individual Hygiene, and Occupational Density Against Leprosy in Indonesian Communities

Moisture Heterogeneity Test

	Q	df	p
Omnibus test of Model Coefficients	28.311	1	< .001
Test of Residual Heterogeneity	162.562	11	< .001

Egger Table Humidity Test

	z	P
Sei	1.796	0.072

Individual Hygiene Heterogeneity Test

	Q	df	p
Omnibus test of Model Coefficients	196.613	1	< .001
Test of Residual Heterogeneity	42.020	12	< .001

Table Egger Test Personal Hygiene

	z	p
Sei	2.533	0.011

Occupancy Density Heterogeneity Test

	Q	df	p
Omnibus test of Model Coefficients	77.907	1	< .001
Test of Residual Heterogeneity	74.807	14	< .001

Table Egger Occupancy Density Test

	z	p
Sei	0.885	0.376

Note. p -values are approximate

Note. The model was estimated using Restricted ML method

The findings show that the p-value in the heterogeneity test for each independent variable on the incidence of leprosy is less than α (0.05), namely p = 0.001, which means that the variation between studies is heterogeneous, so this analysis uses a random effect model. The findings show that the test results for the p value of the Egger's Test on the humidity variable are > α (0.05), so there is no publication bias on the humidity variable for Leprosy Incidence in Indonesia. The results of the meta-analysis showed that the humidity variable had a 8.415 times greater risk of experiencing leprosy. From the results of the study, it was shown that humidity in a house with leprosy sufferers allowed the entry of M. leprae bacteria into the bodies of respondents who were not sick, then these bacteria grew optimally in homes with unhealthy environmental conditions. and bacteria continue to multiply in the patient's body.

Humidity in the house has a correlation with the incidence of leprosy, therefore it is necessary to condition the house so that it is not damp in order to minimize the incidence of leprosy in the community. This research is also in line with research conducted by [35] there is a significant relationship between the physical condition of the house such as ceiling, type of floor, humidity, and bedroom density (p < α) with leprosy cases. High humidity has the potential for the development of M. leprae bacteria, so that with these unfit housing conditions, there is a risk of leprosy[38]. Previous studies also found environmental factors such as soil, humidity, vegetation, and thermal-hydrological climate also contribute as sources of leprosy transmission[39,2,40,41,42].

It is known that the p-value of Egger's Test on the hygiene variable for the incidence of leprosy is <α (0.05), so the individual hygiene variable for the incidence of leprosy in Indonesia has a publication bias. Individual hygiene has a 6.926 times greater risk of experiencing leprosy in the community. This research is in line with previous studies [43] who argue that there are still many respondents who have poor personal hygiene. they did not know that the habit of sharing personal items (towels and soap) is a means of transmitting leprosy. In addition, there were also many respondents who washed clothes together, there were also respondents who showered without using soap and there were respondents whose beds were made of divans/wood without any ground. Thus it can be concluded that the statistical test

results for the relationship between personal hygiene and the incidence of leprosy obtained a p-value of 0.001 which means there is a significant relationship between the two variables.

The occupancy density variable has a risk of 5.754 times the incidence of leprosy. It is also known that the p-value of Egger's Test for occupancy density for leprosy is > α (0.05), so it is concluded that there is no publication bias. According to Winarsih, overcrowding in a house can cause leprosy to occur in the community so that in the end there will be transmission of leprosy to the community. The variable occupancy density has a significant relationship with the incidence of leprosy. According to the researchers, respondents who live in houses that are densely populated and where there are leprosy sufferers are at risk of developing leprosy. The results of the analysis prove that bedroom density has a significant relationship with the incidence of leprosy. The density of bedrooms that are not suitable for healthy homes has an effect on the transmission of infectious diseases. Crowded bedroom conditions can increase contact between individuals, lack of oxygen and facilitate the transmission of leprosy to other family members[44]. The incidence of leprosy is related to direct contact of a person with leprosy to a healthy person. [45] In this study, 52.6% of the bedrooms of respondents with leprosy were occupied by more than two adults.

Sensitivity Test of Humidity Risk Factors and Factors Influencing the Incidence of Leprosy in Indonesian Society

The sensitivity test is used to identify heterogeneity, interpret the effect of research quality and prove the results of the meta-analysis are relatively stable. The sensitivity test that can be done is to compare the pooled prevalence ratio fixed effect model and the random effect model. Sensitivity tests were performed according to the least number of meta-studies.

Table 2. Comparison Sensitivity Test of Pooled Prevalence Ratio Fixed Model and Random Model

No	Research variable	N	*Heterogenity (p-value)*	*Fixed effect Models*		*Random Effect Model*	
				PR	**95% CI**	**PR**	**95% CI**
1.	Risk Factors of Humidity for Leprosy	11	<0,001	1,86	1,70 – 2,03	2,13	1,35 – 2,92
2.	Risk Factors of Personal Hygiene for Leprosy	14	< 0,001	1,73	1,60-1,86	1,84	1,59 – 2,102
3.	Risk Factors of Occupancy Density for Leprosy	15	< 0,001	1,64	1,50 – 1,79	1,75	1,36 –2,14

Table 2, it can be seen that there are variations in the independent variables between studies, with an increase in the pooled PR value from the fixed effect model to the random effect model and the wider Confident Interval. The humidity variable has a pooled PR value from the fixed effect model to the random effect model and the confidence interval is quite different. Meanwhile, the individual hygiene and occupancy density variables varied between studies conducted by meta-analysis, as seen by the significant increase in the value of pooled PR from the fixed effect model to the random effect model and the widening of the Confident Interval range of 95%.

CONCLUSION

Humidity has an 8.415 times greater risk of causing leprosy to occur in the community. Personal hygiene has a 6.926 times greater risk of causing leprosy to occur in the community. Residential density is at risk 5,754 times greater for experiencing leprosy in Indonesian society. It is recommended that further research use qualitative data to look deeper into the intermediary factors that cause leprosy.

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CONFLICTS OF INTEREST:

The authors declare no conflict of interest.

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Article Review

The Effect of Childbirth Education in Reducing Anxiety in Facing Childbirth in the Third Trimester Pregnant Women: Scoping Review

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ABSTRACT

Mothers unable to fight anxiety and fear, especially third-trimester pregnant women, will experience the release of catecholamine hormones in high concentrations and experience increased labour pain, obstructed labour, and discomfort during labour. The purpose is to analyze the effect of childbirth education in Reducing Anxiety in Facing Labor in Third Trimester Pregnant Women by including relevant sources of evidence from each article. The method in this study uses databases, namely Pubmed, ScienceDirect, and Wiley, published between 2012-2022. The results showed that of the nine articles reviewed, seven reports came from developing countries, namely Indonesia and Iran. Two words came from developed countries, namely Australia and that the existence of childbirth education would significantly reduce the level of maternal anxiety so that the delivery process could run smoothly and childbirth education will reduce the desire of pregnant women to give birth by SC. While previous research stated that the cause of anxiety in facing childbirth is, experience and stress can be influenced by family support, marital status, history of disease, mother's age and level of education.

Keywords: Childbirth Education, Pregnancy, Anxiety Reduction.

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INTRODUCTION

Causes of anxiety in dealing with labour in Pregnancy there is experience and education. Stress that is not handled correctly can cause complications such as obstructed labour[1]. When approaching delivery, the level of anxiety is two times higher. Where if the pressure continues to increase, the mother's appetite will also decrease, which has an impact on the baby's nutrition and causes the baby to be born with an LBW condition, where the third trimester is the moment closest to the time of delivery so that it can cause fear getting more prominent [2]. Mental disorders have also been shown to be frequently experienced by pregnant women, especially third-trimester pregnant women [3]. According to WHO, deaths in pregnant women during the process of waiting for labour are caused by complications such as experiencing hypertension during Pregnancy, bleeding, infection complications from childbirth, and illegal abortions, and according to WHO 2019 data, 75% of deaths are due to high blood pressure during Pregnancy. And in terms of research results,[4].

Then the percentage found that 57.8% of mothers had hypertension with a high level of anxiety, and 52.7% of pregnant women with pre-eclampsia had a moderate level of anxiety [5]. The percentage of pressure before giving birth in Indonesia is 28.7% of 107,000,000, according to research which states that 53.3% of mothers experience Childbirth anxiety [6]. According to [7], stress will affect the safety of mothers and babies. A subsequent study concluded that it psychologically impacted the mother before the birth process [8]. The cause of anxiety in facing childbirth is experience and education.

Furthermore, it states that stress can be influenced by family support, marital status,

history of disease, mother's age, and level of education [5]. The steps taken to reduce MMR are made so that mothers can quickly get adequate health service facilities, so that mothers get health assistance during Pregnancy, right up to delivery, mainly if complications occur, and get referrals to help immediately, even after delivery, for maternal health and babies and continue family planning services so that it is realized (P4K) [9]. Midwives are health workers who are most expected to be able to convey information about Pregnancy, Childbirth, post-partum, newborns, and family planning. Tadabbur AL-Qur'an therapy can reduce maternal anxiety when facing labour. The Scoping review aims to map existing evidence about the Effect of Childbirth Education in Reducing Anxiety Facing Labor in Third Trimester Pregnant Women by selecting sources -sources obtained as relevant evidence from each article filtered according to charting data.

METHOD

Scoping this review uses the Prism-Scr Method to determine scope according to this theme [10]. The scoping review aims to broaden knowledge or information about research activities related to the desired theme and map the literature with the intended topic; it also seeks to synthesize a study [11]. The method is to recognize the scoping review to see the results broadly and in-depth. The framework aims to identify the scope of the study as a viable and scientifically proven method for conducting a literature review. As suggested by Arksey and O'Malley, The steps of the process used in writing this scoping review consist of (1) identifying how questions from the scoping review, (2) identifying the inclusion and exclusion criteria of the selected articles (3) filtering articles according to the topic the target (4) conducts data charting (5) reports after compiling the data and results in [12].

Identify Scoping Review Questions

Researchers use the Population, Exposure, Outcome, and Study Design (PEOS) framework to expand the topic focus and literature search method to formulate scoping review questions. PEOS is used to make it easier to identify more specific keywords that match the interests of the direction of the review, expand terms in the desired search to develop problems and determine inclusion and exclusion criteria[13].

The following is a framework as a reference for inclusion and exclusion criteria Scoping review:

Table 1. Framework PEOS

P (Population)	I (Exposure)	C (Outcome)	O (Study Design)
Pregnant mother	Childbirth education	Birth education is not given	Anxiety Level

Based on the above framework, the Scoping review question is: How Does Childbirth Education Influence Reducing Anxiety in Facing Childbirth in Third Trimester Pregnant Women?

Identify Relevant Articles

After identifying the scoping review questions, the reviewers identified relevant articles using the inclusion and exclusion criteria as follows:

Table 2. Eligibility Criteria

Inclusion Criteria	Exclusion Criteria
1) Published in the last ten years (2012-2022) 2) Published in Indonesian or English *3)* Original research article *4)* Full-text article *5)* Open access articles *6)* Articles that discuss anxiety in pregnant women	1) Article Reviews 2) Opinion Article 3) Specific formal documents/reports/draft policies/organizations

Data Bases

1. PubMed

PubMed is a service of the National Library of Medicine, which includes more than 20 million citations for biomedical articles. PubMed includes links to many sites providing the full text of related articles and resources.

2. Wiley

Wiley is John Wiley & Sons' international scientific, technical, medical, and publishing business, with strengths in every central academic and professional area and partnerships with many of the world's leading societies. Wiley's OnIine Library houses the world's largest and deepest collection of multidisciplinary online resources covering the life, health, and physical sciences, social sciences, and humanities.

3. ScienceDirect

Science Direct is a website that provides subscription access to scientific and medical research databases.

4. Google Scholar

Google Scholar provides services to get scientific journals from various countries so that they can strengthen research that can be used as a reference.

Literature Searching

Articles are searched using Booleans, namely AND, OR, NOT, and Truncation (*) as connectors to combine or exclude keywords to obtain more focused and relevant results. The keywords used in the search process are effect* AND Childbirth education* AND pregnant* AND anxiety reduction*.

Literature Selection

PubMed, Wiley, Science Direct, and Google Scholar were used as sources of literature obtained through searches using several search engines. The search engines in question consist of PubMed, Wiley and Science Direct, and Google Scholar. In writing this scoping review, the researcher documented a literature search following the Meta-Analyses (PRISMA) guidelines. The stages of data filtering use the PRISMA flowchart:

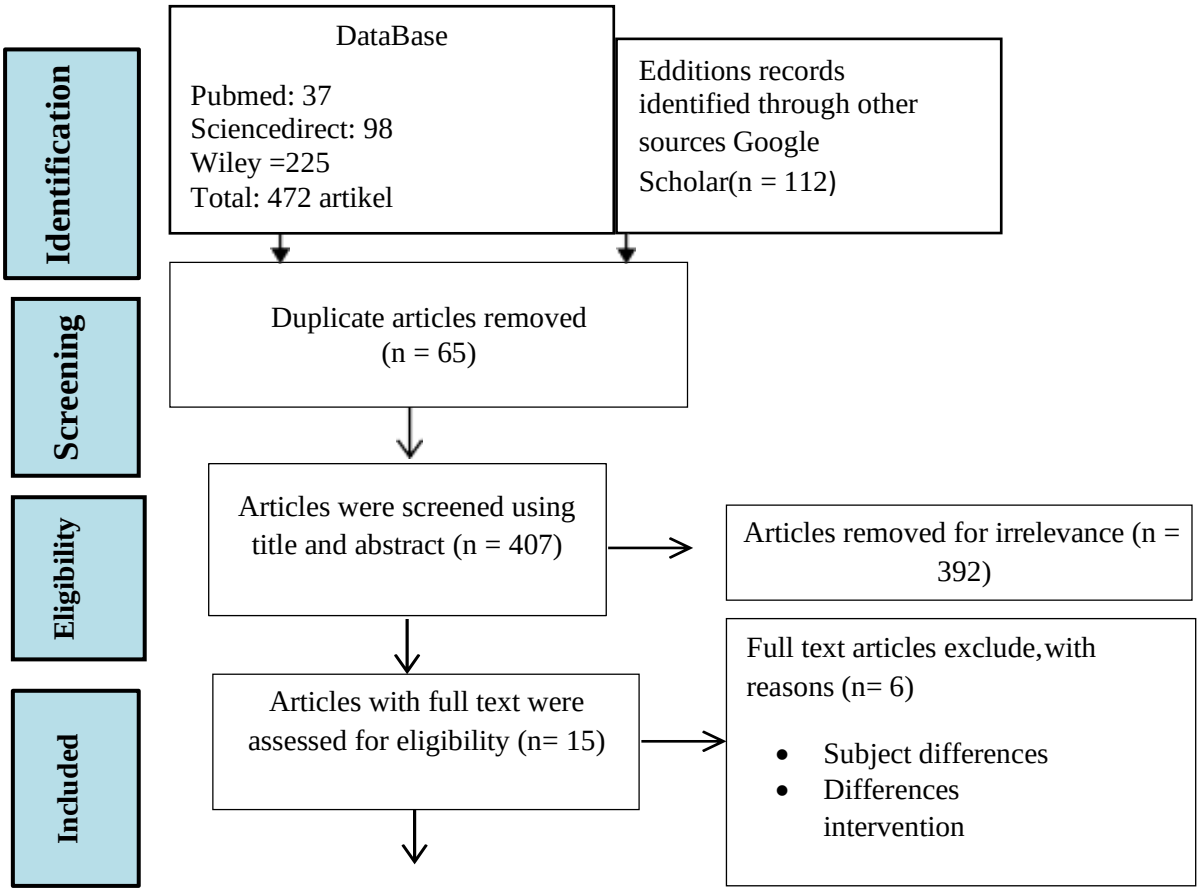

Figure 1. Flow chart PRISMA-ScR Flow Chart

Charting Data

Data from 9 articles were included in the table according to predetermined inclusion criteria. The author records information independently and compares the data reviewed.

Table 3. Reference Article Code

No	Article Code	Article Reference
1	A1	(Tahereh Baloochi Beydokhti et al., 2020)
2	A2	(Jocelyn Toohill et al., 2014)
3	A3	(Eti Surtiati dan Yunani Sri Astuti., 2020)
4	A4	(Nunung Ernawati dan Desant.,2015)
5	A5	(Jennifer Fenwick et al., 2015)
6	A6	(Siti Pangarsi et al., 2022)
7	A7	(Theresia Eugenie et al., 2014)
8	A8	(Mukhoirotin et al., 2020)
9	A9	(Ganda Agustina et al., 2021)

Table 4. Data Charting

No	Title/author/year	Country	Objective	Types of research	Metode	Results
1	Effect of educational-counselling program based on precede proceeds model during Pregnancy on post-partum depression.	Iran	To find out whether there is an effect of Precede-Proceed Education extension programs on post-partum anxiety	This was a randomized clinical trial (RCT).	Data was collected using predisposing, reinforcing, and supporting factor questionnaires, GHQ, and Edinburgh Postnatal Depression. Scale (EPDS). 130 pregnant women were selected and randomly assigned to the intervention and control group.	Childbirth Education with Precede-Proceed Model supports the effectiveness an educational intervention to reduce post-partum depression and demonstrated that implementing this training during Pregnancy led to a reduction in the rate depression
2	A Randomized Controlled Trial of aPsycho-Education Intervention by Midwives in Reducing ChildbirthFear in Pregnant Women	Australia	Psycho-educational intervention by midwives in Reducing Childbirth Fear in Pregnant Women	Randomized controlled Trial	All women receive assistance with decision-making with a booklet on birthing options. Counselling intervention via telephone She was given at 24 and 34 weeks of gestation. The control group received the usual care offered.	Statistically, there was no significant effect on the control group, 48.5%, and the intervention group, 55.4%, but mothers experienced

						decreased anxiety.
3	Influence Psycho-education	Indonesia	To know influence	Quasi experimental	Here, mothers who received psycho-education were used as the intervention group, and mothers who did not receive psycho-educational interventions were used as the control group.	There are differences in the level of anxiety of pregnant women from the results of the pretest and post-test
4	The Influence of Health Education About the Childbirth Process on the Anxiety Level of Trimester III Primigravida Mothers	Indonesia	To determine the effect of psycho-education on reducing anxiety in facing childbirth	Experiment with pretest and posttest	The anxiety scale was taken using the Zung scale (ZSAS). Then it was analyzed using the Wilcoxon test. Where is the population of pregnant women with a sample of 12 respondents	Pretest results in 7 mothers with mild anxiety and five mothers with severe anxiety, The post-test results of 9 mothers with mild anxiety, and three people with moderate pressure, the test was carried out with the Wilcoxson test with a level of 0.05 From the results obtained, there is a significant effect.
5	Effects of a midwife psycho-education Intervention to reduce childbirth fear on Women's birth outcomes and post-partum psychological well-being	Australia	reducing fear of Childbirth on Women's Birth outcomes and Well-being post-partum psychology	This was a randomized clinical trial (RCT).	Women in their second trimester of Pregnancy were recruited. Woman with a fear score of ≥ 66 on the Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ) were randomized to receive telephone psycho-education by a midwife or regular maternity care. (n = 339) randomized women (intervention n = 170; controls n = 169)	Women who received psycho-education had lower CS rates compared to controls,

6	The Effect of Labor Preparation Classes with Anxiety Before Delivery to Third-Trimester Pregnant Women at a Clinic in Indramayu	Indonesia	There is an influence from the class of pregnant women on reducing the anxiety of TM III pregnant women.	Experiment Pretest and posttest	Primary data was obtained by the researcher from the subject directly and conducted preparation classes for pregnant women two meetings with one week distance each.	The results found that there was a significant effect on the level of maternal anxiety with the delivery preparation class; the anxiety level decreased.
7	The Influence of Health Education on Primigravida Anxiety in Facing Childbirth	Indonesia	determine the effect of health education on primigravida anxiety levels	Quasi-experiment with pretest and post-test design with the control group	66 respondents were then divided into 2, where the control group (n=33) was given health education, and then the intervention group (n=33) was assigned health education interventions and booklets	The pretest results for both groups were the same (p>0.05). Then the post-test results showed a significant decrease in scores for the intervention group, 36.79-29.79, and for the control group, 36.85-32.03 (p <0.05) independent t-test.
8	The Effect of Health Education on Primigravida Anxiety in Facing Labor	Indonesia	To know The effect of health education on maternal anxiety when wanting to give birth in this study was also only for primigravida mothers	quasi experiment	Data Collection was Obtained from the subject of primigravida pregnant women directly for the intervention group of 30 people and the control group of 30 people	, there is a difference in the average level. The results show that the mean pretest for the control group is 41.97, and the intervention group is 40.33. The results for the post-test with the results for the control group are 42.87 and for the intervention group 31.63, so it can be

						concluded that there is a significant effect. An independent t-test was carried out.
9	Mother Class Influence Pregnant Against Worry Face Labour In Mother Pregnant at Risk	Indonesia	know mother class influence pregnant for anxiety level	quasi experiment with design pretest and post-test	The group is divided into Two groups of groups control where group intervention gets class pregnant women and groups control did not get the class of pregnant women. a sample of 30 on experimental group and 30 in the control group	got there that influence significant treatment pregnant women class against rate mother's anxiety in dealing with childbirth, with mean value 36.10 and the standard deviation of 9.397 and p-value = 0.00 paired t-test was performed

Presentation of data/results, discussions, and conclusions

The data extracted from the articles obtained by IaIu are organized into several themes. The themes that have been included in the purpose of this article include, among others.

Table 5. Data Map

No	Theme	Sub-Themes	Article No
1	Forms of childbirth education	a. Health Education b. Pregnant class	A2,A4, A5, A8,A9 A1,A6,A7
2	Anxiety Level	a. Instrument used b. Level of Anxiety	A1, A2, A3, A4, A5, A6, A7, A8, A9 A1,A2,A3,A4,A5,A6,A7,A8,A9

Based on the nine selected articles, there are several characteristics, namely country characteristics and type of research:

1. Characteristics of articles by country of the nine articles obtained, seven pieces came from developing countries, namely Indonesia and Iran, and two reports came from developed countries, namely Australia.

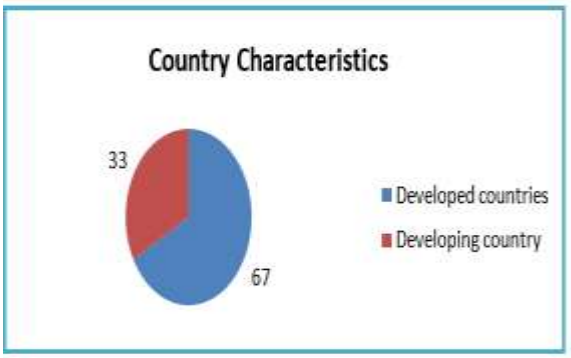

Figure 2. Country Characteristics Diagram

2. Developed country's Characteristics Based on the type of article, Of the nine pieces that have carried out charting data, there are 3 Quantitative RCTs and 6 Quantitative Quasi experiments.

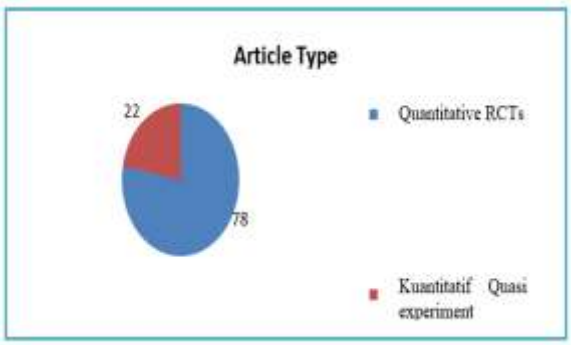

Figure 3. Research Methods Diagram

RESULTS AND DISCUSSION

The researcher uses nine articles following the scoping review's purpose in this review. Based on the nine selected articles, several results were obtained regarding the Effect of Childbirth Education in Reducing Anxiety in Facing Labor in Third Trimester Pregnant Women, namely as follows:

Forms of Childbirth Education

Health Education

Based on article (A2) Health education process, all women receive decision assistance and a booklet about birth options. Telephone counselling interventions are offered in the second trimester, namely 24 weeks and 34 weeks of Pregnancy. This intervention is carried out to strengthen a mother's belief that Pregnancy is a natural process that does not need to be worried about so that negative thoughts and fear can be minimized. The standard delivery process can run smoothly [14]. The intervention was carried out in two sessions, the intervention lasted about 58 minutes (range = 22–125 minutes) and 45 minutes for the second session (Range = 10–104 minutes), and the control group received the usual care offered by the Australian public because learning will change a person's knowledge so that it also changes the person's behaviour.

In the article (A3), there are two groups, namely the intervention group and the control group, where the intervention group is given psycho-education and the control group is not given psycho-education [15]. The form of intervention is in the form of material about anxiety and dangerous signs in Pregnancy and preparation for the birth of a baby. Here, mothers can express their problems and exchange opinions [5]. As described in the article (A4), This research provides psycho-education discussing popular/simple psycho-education, development, and delivering information (dissemination) where it is concerned about the birth process and the mother's anxiety about how her life and the baby will be worried about whether the baby can be born with a standard delivery process. Pregnant women are also given leaflets so mothers can read and understand when they want so that their anxiety levels decrease when facing labour. In this study, there was no control group [16].

As described in article (A5), Women who take part in the intervention group receive psycho-education via telephone media led by midwives during Pregnancy; midwives provide psycho-education at 24 weeks and 34 weeks of gestation, which are scheduled according to their approval and the time they want and after six weeks post-partum they will report their level of anxiety, through the questionnaire given, the psycho-education session lasts about 1 hour (Range of the first session: 22-125 minutes, Range of the second session: 10-104 minutes) than the control group only gets regular maternity care at the facility they are interested in [17].

As described in article (A8), the intervention group was given health education and booklets, with the intervention of childbirth education discussing what childbirth is, what the signs are, when it's time to give birth, and what needs to be prepared when about to give birth. And efforts to reduce pain and given opinion session [18]. each has the opportunity to participate and is then given a questioning session for things that are not understood [19].

The researcher taught me how to reduce pain during the opening process. The intervention group also received a booklet containing health issues so that he could read whenever he wanted, but the control group was only given health education [20]. It goes on to explain that there are two groups. In the intervention group, mothers received class health education for pregnant women who attended at least three meetings, and in the control group only received pregnancy care [21].

Pregnant Women Class

Based on article (A1), the educational intervention program according to the PRECEDE–PROCEED model was conducted for five groups (n = 12), with each session being held once a week and the program is held for four consecutive sessions (60-90 minutes) [22]. Topics covered include changes in maternal anatomy and physiology during Pregnancy, prenatal and postnatal care, mental health during Pregnancy and after, events during Pregnancy and after delivery, feelings and thoughts of the mother, and post-partum and control groups only given prenatal care [13].

Based on article (A6), a pretest was carried out first, then childbirth preparation education with a (treatment) post-test after the intervention was carried out two times with an interval of 1 week; in this study, there was no control group. Whereas with childbirth preparation classes given two meetings, with a time of 1 week, it was found that there was research in Italy which stated that childbirth preparation classes significantly reduced maternal anxiety in facing labour [12].

Then in the article (A7), Women who take part in the intervention group are pregnant women who attend classes for pregnant women, which are held three times every Tuesday, then as a control group, namely pregnant women who take part in ANC every Friday at least 3. the case and control groups are given a pretest after that the class for pregnant women in the case group and the control group carried out a pregnancy examination two weeks later it was scheduled as a second visit for the course for pregnant women while the control group was only one week apart [1].

Level of Anxiety

Instruments used

As described in the article (A1), the Instrument in this study used a questionnaire asking questions in three domains: knowledge of post-partum depression, knowledge of symptoms, and how to control post-partum depression and its symptoms. Each correct answer is given one; if not, no points are awarded. A score of 5 indicates the highest level of positive attitude, while the lowest is marked by a score of 1. The Instrument used is EPDS [10]. Furthermore, the article measuring anxiety levels in childbirth uses the Wijma Delivery Expectancy/Experience Questionnaire Version A (W-DEQ A) with the help of an interpreter [24].

It was explained further that the research instrument used a questionnaire and the Hamilton Anxiety Rating Scale (HARS) parameters to measure the level of anxiety from the assessment results. Moderate and a score of 28-41 is concluded as severe anxiety;f the score is 42-56, it is completed as panic [21]. And the Instrument used here is the Zung anxiety scale questionnaire (ZSAS) to test the hypothesis using the Wilcoxon test with a significance level of 0.05 [5].

In the article (Balasoiu et al., 2021), instruments for the trend of reducing the use of decision conflict (DCS) and depressive symptoms (EPDS) and decreasing the level of prenatal fear (W-DEQ) then increasing self-efficacy of Childbirth (CBSEI). In the article, The method used is quasi-experimental, with a questionnaire and the measurement scale used by Shapiro-Wilk using SPSS 24 software for Windows using a questionnaire. In the article, the method used uses the results from the pretest and post-test using the quasi-experimental method, and so does the control group. The Instrument used is the questionnaire referring to the HARS scale. In Article [1], the method used was a quasi-experiment with a pretest and post-test design using the Zung Self-Rating Anxiety Scale instrument. The Instrument used was a questionnaire with pretest and post-test [20].

Anxiety Level

In the article (A1) from the research showed the results of the post-test with the average mark for the group of pregnant women who attended classes for pregnant women, namely 38.12 and for the control group who did not attending the class for pregnant women was 47.44 so that it could be concluded that the group used as an experiment had decreased anxiety levels from moderate to mild and for the control group the results tended to be the same, and the results of the paired t test showed a decrease in anxiety for mothers taking part in the pregnant class [22] Decreased anxiety in the intervention group with a percentage (n = 56/101, 55.4%) compared to controls (n = 47/97, 48.5%) but statistically there was no significant change, but women who received the intervention reported a reduction fear of giving birth at 36 weeks of gestation so that from the results obtained there was a decrease for CS deliveries [23].

The result significantly influences the anxiety level of pregnant women who receive psycho-education interventions with a p-value of 0.047. For the results of the pretest mean value obtained was 23.15 after being given the intervention; there is a decrease of 10.24 [24]. Before the intervention, seven mothers were experiencing severe anxiety, and five people had mild anxiety; after the intervention, the results obtained were nine mothers with mild anxiety and three mothers with moderate anxiety levels. Then statistically, a value of 0.038 <0.05 was obtained to conclude that psycho-educational interventions had an effect[24].

It was further explained that Fewer women in the intervention group chose cesarean section for their subsequent Pregnancy (18% vs 30%, p = 0.04), and postnatal women reported that they felt that the intervention reduced their fear (53% vs 37% P =0.02) [5]. And the statistical test results from the research in this article obtained a p-value of 0.000 (p-value <0.05). It can be concluded that this class for preparing pregnant women is very effective in reducing maternal anxiety in facing childbirth so that it can prevent unwanted complications, in line with research in Italy that childbirth preparation classes minimize stress about the delivery process [16].

And for the results obtained statistically using the independent t-test after there was a mother's class which was carried out three times, it was found that there was a significant difference (p <0.05), meaning that in this study, it was found that there was a good influence for the level of maternal anxiety to decrease [20]. In the research in this article, the statistical results obtained from the two groups were comparable (p> 0.05). Still, this score decreased significantly after treatment from 36.79-29.79 in the treatment group and from 36.85-32, 03 in the control group [12]. Furthermore, from the results obtained in this experimental study, mothers with "moderate" anxiety were around 46.7%, while there was a "low" anxiety class for pregnant women, around 83%.

CONCLUSION

Based on the nine articles reviewed, seven reports came from developing countries, namely Indonesia and Iran, and two words came from developed countries, namely Australia and Childbirth education will significantly reduce maternal anxiety so that the delivery process can run smoothly. Childbirth education will reduce the desire of pregnant women to give birth by SC.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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Article Review

The Effect of Back Massage on Increasing Breast Milk Production: Scoping Review

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ABSTRACT

Exclusive breastfeeding begins within one hour after birth until the baby is six months old. Early initiation of breastfeeding and exclusive breastfeeding can help children survive and have antibodies to protect against common diseases, such as diarrhea and pneumonia. Breastfed children perform better on intelligence tests and are less likely to develop obesity and diabetes. This scoping review aims to review the evidence base regarding the effect of back massage on increasing milk production. Inclusion criteria: the criteria included in this review were Indonesian or English articles published within the last five years. These articles focused on the effect of back massage on increasing milk production. The method that will be used in this review is the scoping review technique, which is a systematic exploratory method by mapping the available literature in an article, topics, theories, and sources that have been obtained. The results of the study show that back massage can increase milk production. The most dominant factor in increasing milk production was in the group that did back massage, while the control group did not experience smooth milk production due to a lack of increase in milk production. Increased milk production can also be influenced by nutrition, rest, baby sucking, and breast care performed by the mother.

Keywords: Back Massage, Breast Milk Production, Scoping Review.

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INTRODUCTION

Exclusive breastfeeding begins within one hour after birth until the baby is six months old [1]. Initiation of early breastfeeding or exclusive breastfeeding can help children survive and have the antibodies needed to protect against common diseases, such as diarrhea and pneumonia [2]. Breastfed children show better results on intelligence tests and are less likely to experience obesity and diabetes [3]. In addition, breastfeeding also provides health, nutritional and emotional benefits for children and mothers[4].

Increasing the rate of exclusive breastfeeding (EBF) in the first six months of life to 50% is one of the six main global targets set by the United Nations (UN) Decade of Nutrition, and increasing the rate of exclusive and sustainable breastfeeding is critical to achieving development goals[5]. (SDGs) to eradicate hunger and end malnutrition by 2030. If implemented globally at near-universal levels (>90%), optimal breastfeeding practices could reduce child deaths globally by more than 800,000, making breastfeeding a most effective preventive intervention to increase infant mortality [6].

In South Africa (SA), the EBF rate among infants under six months was 31.6% in the latest Health and Demographics survey conducted in 2016. Results showed a substantial increase from the previous estimate of 7% in 2003. However, early cessation of breastfeeding, mixed feeding, and the addition of complementary foods in the first six months remain the norm among mothers in South Africa. Tre is few valid estimates of age-specific breastfeeding rates [7].

Babies who get exclusive breastfeeding

(ASI) are 14 times less likely to die than babies who are not breastfed. Optimal breastfeeding is so crucial that it can save the lives of more than 820,000 children under the age of 5 every year. Data from the World Health Organization (WHO) in 2019 showed that around 41% of babies get exclusive breastfeeding, while WHO targets at least 50% of babies to get exclusive breastfeeding in 2025 [8].

Based on the 2018 Riskesdas, the proportion of breastfeeding patterns for infants aged 0-6 months in Indonesia is 37.3% exclusive, 9.3% partial, and 3.3% predominant breastfeeding [9]. Based on the 2018 Riskesdas report, the prevalence of IMD in Indonesia was 58.2%, and exclusive breastfeeding was 37.3%[10].

Based on the background above, it is necessary to do topic scoping using the Scoping Review Protocol, which specifically discusses the effect of back massage on increasing exclusive breast milk production [11]. The purpose of this Scoping Review is to find out the impact of back massage compared to not massaging on increasing milk production by including relevant sources of evidence from each article found [12].

Back massage is a back massage that starts from the lower part of the neck, 5-6th rib to the scapula along both sides of the spine, both circularly with an emphasis using both thumbs, which can provide a somatic sensory stimulation through afferent pathways, thereby stimulating the posterior pituitary to release the hormone oxytocin which is a hormone that plays a role in the process of removing breast milk, where oxytocin will produce the letdown reflex so that the milk ejection process occurs from the alveoli and lactiferous ducts which automatically milk comes out [13]. In addition, back massage can also increase relaxation, thereby preventing stress and depression in postpartum women, which can result in lowering serum prolactin levels [14].

METHOD

The method that will be used in this review is the scoping review technique, which is a systematic exploratory method by mapping the available literature in an article, topic, theory, and sources that have been obtained.

Doing this scoping review will use a grouping method according to Arksey and O'Malley, which has several stages as follows:

1. Identify scoping review questions.
2. Identify relevant articles.
3. Choose and determine the pieces to be used.
4. Perform data charting.
5. Compile and summarize and report the results that have been obtained [15].

Inclusion and Exclusion Criteria

1. The inclusion criteria used in this scoping review are original articles with articles that were published five years after publication, using Indonesian or English, discussing the effect of back massage on increasing breast milk production.
2. Exclusion criteria on these criteria that cannot be used in reviews such as opinion papers.

Database Selection

Step 2 is to create inclusion and exclusion criteria for an article using step 3, such as determining the database of article search websites. In searching for essays through the website, researchers will look for pieces that affect back massage and increase breast milk production by using PubMed ScienceDirect and Wiley Online Library.

Article Selection

In this scoping review, 253 articles were found from the database of 7 papers from PubMed, two pieces from the Wiley Online Library, and 1 article was obtained from ScienceDirect.

The researcher conducted this search on January 4, 2023; evidence of the investigation is already in Table 3. The next step is that all 253 articles were obtained, entered into the Zotero software, and found 61 duplicate reports. After the same articles were discarded, the paper will begin to select to determine pieces that follow the title to be examined for use in this review.

Table 1. PICO framework

P	I	C	O
Breastfeeding mothers	Back Massage	Comparison	There is an effect of back massage on increasing milk production

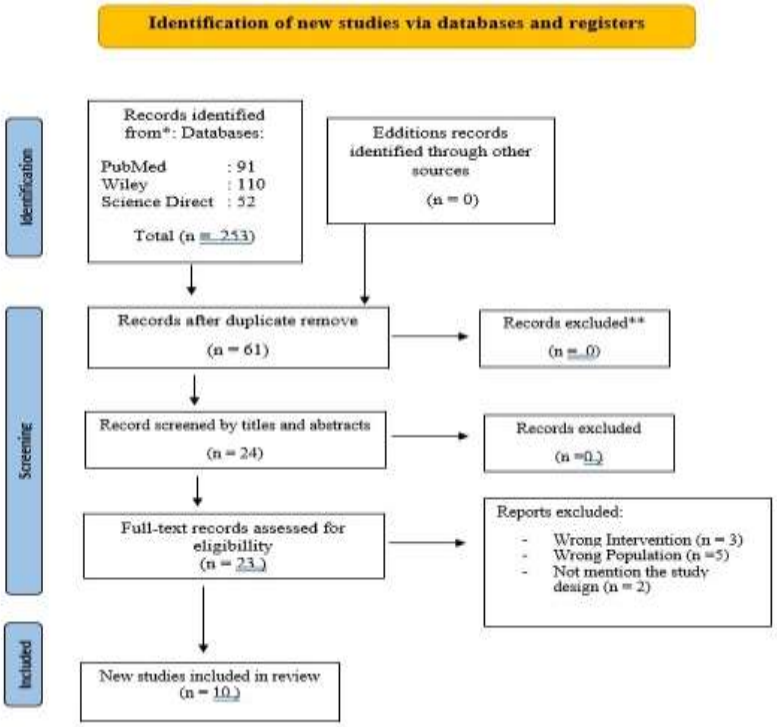

Figure 1. PRISMA flow chart (Page et al., 2021)

Selected Articles

After checking the eligibility level, 23 articles were found that could be used as sources. Still, after the author read all the articles one by one, it turned out that only ten articles could be used based on eligibility. Then the piece is entered into the charting data table, which is arranged starting from the article number, title, author's name, country, purpose, method, and results, which have been attached in Table 4.

Table 2. Data Charting

No	Title/Author/Year	Country	Research purposes	Method	Results
1	Oral galactagogues (natural therapies or drugs) for increasing breast milk production in mothers of non-hospitalized term infants [10]	Malaysia	The focus of the current review is on lactation-inducing substances that are absorbed via the gastrointestinal tract. We have excluded galactagogues absorbed exclusively in the oral mucosa, such as the sublingual or buccal route. In general, oral galactagogues can be divided into	We included randomized controlled trials (RCTs) and quasi-RCTs (including published abstracts) that compared oral galactagogues with placebo, no treatment, or other oral galactagogues in healthy nursing mothers of term infants. We also	There is low-certainty evidence that pharmacological galactagogues can increase milk volume. There is some evidence from subgroup analyses that natural galactagogues may benefit infant weight and milk volume in mothers with healthy-term

			pharmacological and natural. No drugs have been produced to stimulate lactation; all off-label uses.	included cluster randomized trials but excluded cross-trials.	infants. Still, because of the substantial study heterogeneity, measurement imprecision, and incomplete reporting, we are very unsure about the magnitude of the influence.
2	The Impact of Human Milk on Necrotizing Enterocolitis: A Systematic Review and Meta-Analysis [12]	Italy	1. To update the systematic review and meta-analysis to evaluate the association between feeding and necrotizing enterocolitis (NEC) in low-weight preterm infants; 2. to perform a meta-regression analysis by subgroups; 3. Describe the geographical distribution of milk banks in the world. Method. The papers included in the meta-analysis were updated as of June 2019.	The random effects model was used to explain the various sources of variation between studies.	The results of the subgroup analysis showed that the risk reduction was statistically significant only for studies in which preterm infants were given self- and donated breast milk. Conclusion. The possibility of preserving breast milk and promoting donation ensures improved health of the newborn.
3	Breastfeeding practices and associated factors at the individual, family, health facility, and Environmental levels in China [13]	China	To inform about breastfeeding practices and factors related to individuals, families, health facilities, and the environment in China.	A stratified cluster sampling approach was used for survey sample selection. We selected 12 counties/counties from the seven regions and included 12 of the 34 provincial-level administrative divisions taking into account population size, executive capacity, and provincial-level CDC collaboration in China. These districts/districts represent three	The results of this study are given. Lactation support in the form of education or counseling about exclusive breastfeeding can increase the prevalence of exclusive breastfeeding. 1. Breastfeeding mothers who receive support from their husbands are likelier to continue breastfeeding. 2. Delivery by SC is very

				strata: big cities (four districts/districts), medium and small cities (four districts/districts), and rural areas (two districts/districts that are generally rural and two in poor rural areas). One section in a rural area was deliberately chosen to provide baseline data for CDRF project interventions.	influential in exclusive breastfeeding 3. Support for breastfeeding mothers by creating a particular room for breastfeeding in public places is needed by breastfeeding mothers because breastfeeding mothers feel uncomfortable breastfeeding in public places. 4. Support from the workplace, such as paid maternity leave, supports mothers in giving exclusive breastfeeding.
4	Experiences with peer support for breastfeeding in Beirut, Lebanon: A qualitative study [7]	Lebanon	To explore the experiences of breastfeeding mothers and peer support providers with the breastfeeding support process, and the effect of interventions on social support systems	Using a qualitative methodology, a purposive sample of breastfeeding and supporting mothers was accessed from those who completed their six-month interview in the trial at two hospitals in Beirut, Lebanon. Data were collected from 43 participants using in-depth interviews and following the principle of data saturation. All discussions were audio recorded and transcribed verbatim. Thematic analysis was carried out, guided by grounded theory	1. Lactation support is provided by International Board Certified Lactations Consultants (IBCLC). 2. Peer support is considered necessary in encouraging the continuation of breastfeeding, while support from IBCLCs is influential in problem-solving. 3. The forms of support are the following five forms: informative, emotional, face-to-face, instructional,

				principles.	and self-support. 4. The form of support from IBCLCs is by providing instructional support through education through home visits, telephone calls, and text messages to breastfeeding mothers about exclusive breastfeeding. In contrast, the state of support provided by peers is emotional support by telling personal experiences about exclusive breastfeeding.
5	A multi-component intervention to support cold Lebanese breastfeeding: Randomized linear trial [5]	Lebanon	To investigate the effect of multi-component breastfeeding support interventions provided at the hospital and home visits on exclusive breastfeeding	This was a parallel-group, randomized clinical trial in which 362 healthy pregnant women with singleton pregnancies were randomized to a multi-component intervention that included antenatal, professional, and peer support breastfeeding education delivered in hospital and home settings for six months (experimental). , n = 174), or standard care (control, n = 188). The primary outcome is the six-month EBF rate. Secondary outcomes were rates of exclusive and any	The results of this study are 1. Support in the form of education about breastfeeding provided during pregnancy can increase the mother's knowledge about breastfeeding. 2. Health worker support provided in the postnatal period can increase the mother's knowledge about correct breastfeeding techniques and increase the mother's self-efficacy. 3. Peer support can provide

				breastfeeding at one and three months, mothers' breastfeeding knowledge, attitudes, and behavior at six months, and satisfaction with the intervention.	emotional support to breastfeeding mothers.
6	Effect of a baby-friendly workplace support intervention on exclusive breastfeeding in Kenya [8]	Kenya	It aims to assess the effectiveness of a baby-friendly workplace support intervention on exclusive breastfeeding in Kenya.	The study involved 270 and 146 mother-child pairs in the no-treatment (pre-intervention) and treatment (intervention) groups. The prevalence of EBF was higher in the treated group (80.8%) than in the untreated group (20.2%), corresponding to a four-fold increased likelihood of EBF [risk ratio (RR) 3.90; Confidence interval (CI) 95% 2.95-5.15]. The effect of the intervention was more potent in children aged 3-5 months (RR 8.13; 95% CI 4.23-15.64) than in children aged <3 Months (RR 2.79; 95% CI 2.09-3.73). Infant-friendly workplace support interventions promote EBF, especially after three months in this setting.	From the research results, the forms of support in exclusive breastfeeding are: 1. There is workplace support and program interventions, including providing flexible time for breastfeeding and rest for breastfeeding mothers; 2. There is a daycare center for babies near the workplace and a lactation center with facilities for expressing and storing breastmilk. 3. Create awareness about the workplace support available for breastfeeding 4. There is nutritional counseling for pregnant and lactating women
7	Determinants of exclusive breastfeeding practice among mothers in the Sheka Zone, Southwest	Ethiopia	To identify the determinants of exclusive breastfeeding practices in the Ethiopian Sheka zone	A random sample of 630 women was selected by stratified cluster sampling using Kebele (administrative	The prevalence of exclusive breastfeeding decreases with the baby's age, so health workers' support at health

	Ethiopia: A cross-sectional study [3]			unit) as the cluster. Data were collected using a questionnaire administered by interviewers between June and July 2017. Descriptive statistics were used to assess the prevalence of EBF. A multivariable logistic regression model was used to identify the determinants of EBF practices.	centers and hospitals is to provide optimal counseling about exclusive breastfeeding at Post Natal Care (PNC) and immunization visits to infants.
8	Individualized versus standard diet fortification for growth and development in preterm infants receiving human milk [6]	United States of America	Aim To determine whether individual fortification of breastfeeding in response to infant blood urea nitrogen (adjustable fortification) or macronutrient content of breast milk as measured by a milk analyzer (targeted fortification) reduces mortality and morbidity and improves growth and development compared with standard, fortified non-individual for premature infants receiving breast milk at <37 weeks of gestation or with birth weight <2500 grams.	Selection criteria We considered randomized, quasi-randomized, and cohort randomized controlled trials of exclusively breastfed preterm infants comparing standard non-individual fortification strategies with individual fortification using targeted or customized plans.	We found moderate to low certainty evidence showing that individualized (either targeted or adapted) enteral feeding fortification in deficient birth weight infants increased the growth rate in weight, length, and head circumference during the intervention compared with nonstandard.
9	Effects of Dairy Product Consumption on Height and Bone Mineral Content in Children: A Systematic Review of Controlled Trials [13]	English	This study aimed to evaluate the effect of a mother's milk and milk consumption on pregnancy and lactation outcomes in healthy women. This report mainly focuses on the impact of intake of mother's milk products on birth weight and length,	articles were analyzed individually. The risk of bias was classified as high, uncertain, or low depending on random ordering (selection bias), allocation concealment (selection bias),	The effect of the consumption of dairy products on health has received significant attention in the last decade. However, several prospective cohort studies have shown conflicting results, leading to uncertainty about

			fetal femur length, head circumference, weight gain during pregnancy, preterm birth, spontaneous abortion, consumption of breast milk, and nutritional value of breast milk	participant and personnel blinding (performance bias), and blinding of assessment results (detection bias). , incomplete outcome data (attrition bias), and selective reporting (reporting bias)	the health effects of dairy products. We performed an overview of existing systematic reviews and meta-analyses to examine the association between the consumption of dairy products and the all-cause risk of death.
10	Metoclopramide for Milk Production in Lactating Women: A Systematic Review and Meta-Analysis [5]	Korea	This study assesses metoclopramide's effectiveness in increasing milk production in lactating women.	We searched the Cochrane Central Register of Controlled Trials and MEDLINE for randomized controlled trials comparing metoclopramide with a placebo, no treatment, or other galactagogue drugs. We included breastfeeding women with full-term or premature infants.	We retrieved 164 records from our search of electronic databases and 20 papers from other sources. After assessing eligibility criteria, eight trials involving 342 breastfeeding women using metoclopramide were included in this review. A meta-analysis of these trials revealed that metoclopramide did not increase milk volume in the intervention group compared to the control group. There was a significant increase in serum prolactin concentrations when the mother was given metoclopramide. No significant side effects were reported.

Critical Appraisal

Critical appraisal in the scoping review uses the Joanna Briggs Institute (JBI) for all research study designs used in the ten predetermined articles. It makes the total value for each piece to be obtained based on the critical appraisal results.

In determining the value above, the author uses the matter by:

Grade A = Good
Grade B = Fairly good.
Grade C = Not good.

Each assessment is carried out, starting with numbers 1-4, with the following qualifications:
1= Not applicable
2= Not stated
3 = Stated but unclear
4= Clearly stated [16].

Table 3. Critical Appraisal

No	Method	Assessment Instrument	Grads'e
A1	Randomized controlled trials	JBI	A
A2	Randomized controlled trials	JBI	A
A3	Cross-sectional studies	JBI	A
A4	Qualitative research	JBI	A
A5	Randomized controlled trials	JBI	A
A6	Quasi-experimental studies	JBI	B
A7	Randomized controlled trials	JBI	A
A8	Randomized controlled trials	JBI	A
A9	Randomized controlled trials	JBI	A
A10	Randomized controlled trials	JBI	A

RESULTS

The data obtained from the article is organized into several themes, where the pieces of the report include: the effect of back massage and factors increasing milk production [17]. The sub-themes regarding the outcome of back massage are age, knowledge, and work. The sub-theme for increasing milk production is nutrition, mother's rest, baby suckling, and breast care.

Article characteristics

In the articles that have been found, the reports are obtained chiefly from developed countries and developing countries such as developed countries (n = 5; A2, A7, A8, A9, A10); in developing countries, it consists of (n = 5; A1, A3, A4, A5, A6). In the method, seven articles use a randomized controlled trials design and 1 article uses a cross-sectional design, and 1 article uses a quasi-experimental studies design.

Article Assessment Results

According to the assessment carried out on each article using the JBI and MMAT instruments, there were nine articles with grade A grades or good grades such as (A1, A2, A3, A4, A5, A7, A8, A9, A10) and there was 1 article with grade B or good enough, namely in article (A6), with the highest score obtained 39 (A) included in the excellent category, namely in article A1, the lowest score was 24 (B) in article A6.

Article A1 has advantages. Apart from the points, the questions raised following the critical appraisal, this article has also been well structured, such writing; the questionnaires are made following the protocols of each state, making data on respondents who do not answer questions thoroughly, and providing benefits to respondents by holding a lottery.

Meanwhile, article A2 has a drawback where the article's writing is not well structured and does not have inclusion and exclusion criteria; there are some missing data, so the results found in the research are coincidental.

Below are some characteristics of the ten selected articles, such as country characteristics, research methods, data collection, and article grade.

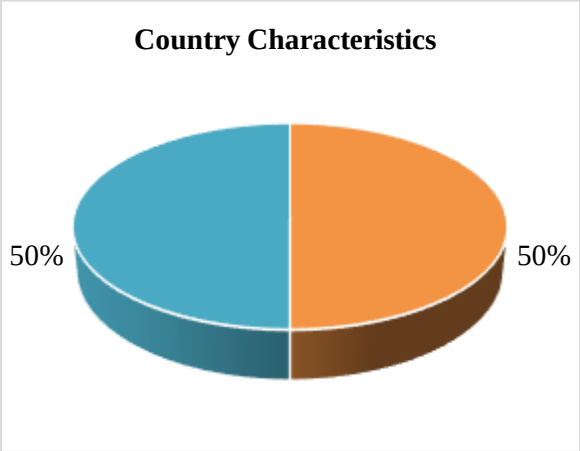

Figure 2. Country Characteristics Diagram

In the picture above, the country-based characteristics of the ten articles include five developed countries, such as the United Kingdom, the United States, Korea, and Ethiopia, and five developing countries, namely Malaysia, China, Lebanon, Kenya, and Lebanon.

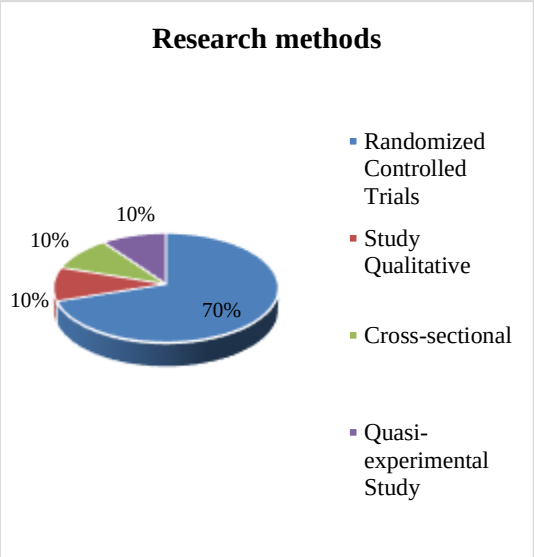

Figure 3. Research Methods Diagram

Characteristics based on research methods in 10 articles, seven articles used the design or form of the randomized controlled trial, 1 article used the qualitative study method, 1 article used cross-sectional, and 1 article used the quasi-experimental study method.

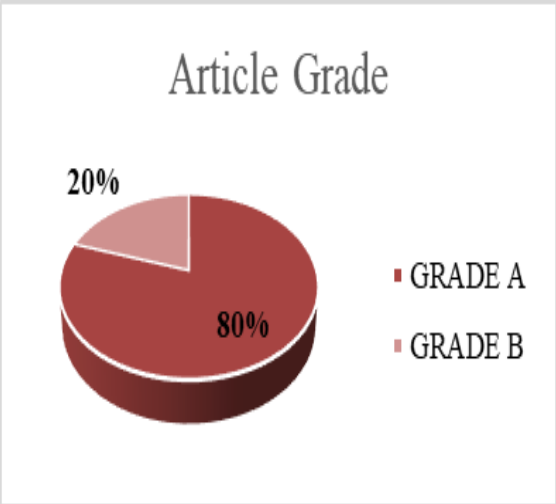

Figure 4. Grade Characteristics Diagram

Based on the characteristics according to the grade of the article, it is known that out of 10 pieces, there are nine articles with a grade of A (good value) and one writing with a grade of B (reasonably good).

Theme Analysis

In this scoping review, researchers used ten articles that fit their purpose with the scoping study. The ten articles found some of the effects of back massage on the increase in milk production. As in the theme of the impact of back massage, there are sub-themes of age, knowledge, and work [18]. At the same time, the factors affecting the increase in milk production are in the sub-themes of nutrition, mother's rest, baby sucking, and breast care.

RESULTS AND DISCUSSION

In this scoping review, researchers used ten articles that fit the purpose of the scoping study. Based on the ten articles that have been obtained, some of the themes that the researcher has determined are as follows:

Effects of Back Massage

In the review, several articles discussed the effect of back massage on increasing milk production, such as age, knowledge, and work.

1. Age

Age will also be able to affect an increase in breast milk production; where if a person's age has not yet reached the age of maturity and the information obtained will affect a person's mental and physical readiness to prepare well knowing pregnancy, childbirth, the puerperium that is being lived as well as caring for the baby as an effort to fulfill Breast milk for babies. [19.]

2. Knowledge

In fulfilling breast milk for babies, mothers need to know the benefits and importance of breast milk for the baby's needs. With good knowledge about the use of breast milk, the mother's efforts to increase milk production are significant and exclusive breastfeeding for six months. Breastfeeding also reduces the risk of gastrointestinal infections, obesity, otitis media, respiratory infections, and diabetes [20].

3. Jobs

Breastfeeding for infants will be disrupted if the mother is a worker, especially in exclusive breastfeeding for six months so that the baby does not get exclusive breastfeeding. However, work can also hinder the adequacy of breast milk because mothers do not have time to rest, and there is no effort to increase milk production in line with research conducted by Emmott, who said that working mothers affected breastfeeding and less time to increase milk production caused by mothers' work being too busy [21].

Breast Milk Production Increase Factor

1. Nutrition

After giving birth, the mother will carry out the postpartum period. During the postpartum period, the mother must consume a balanced diet with adequate nutrition to restore energy, and silk production can increase [22]. Food significantly affects the increase in milk production during breastfeeding. In families with an economy that does not meet the mother's nutrition while breastfeeding, it will affect the baby's breast milk so that the baby's needs are insufficient[19, 23].

2. Rest Mother

During the breastfeeding period, the mother needs a good sleep pattern and sufficient sleep time to restore energy and be able to carry out everyday activities [4]. Adequate rest and good sleep patterns can increase milk production where; when the mother rests and sleeps, the body will experience relaxation by relaxing all the body's organs, and there is an increase in energy, so breast milk will increase if you have enough sleep [5]. Sleep patterns are the same as an essential need for growth and a mother's thinking, mental stability, and emotional stability [16].

3. Baby Suction

Baby suction dramatically affects the mother's health, especially in preventing breast cancer. The frequent sucking of the baby will help the mother recover the uterus and trigger milk production, increasing the amount of milk[2]. In line with Arumsari's , et al., (2018) research, baby sucking affects milk production and helps mothers avoid breast cancer and breast milk, which is very beneficial and nutritional for the babies needs [24].

4. Breast Care

Even before giving birth and during the postpartum period, taking care of the mother's breasts is necessary. This aims to maintain the mother's breast's cleanliness and milk volume and detect abnormalities in the breast [25]. In breast care, the mother's knowledge is needed that the mother can do it herself at home [26]. Breast care affects an increase in milk production; this is also because the treatment or massage performed on a breast will stimulate the hormone prolactin and oxytocin massage, which can increase milk production so that it can help mothers meet the needs of breast milk in babies [27].

CONCLUSION

Based on ten articles that have been reviewed, it was found that back massage can affect increased milk production. The most dominant factor in increasing breast milk production was in the group that did back massage, while the control group did not experience smooth milk production due to a lack of increase in milk production. Increased milk production can also be influenced by nutrition, inu rest, baby sucking, and breast care performed by the mother.

Limitations

The limitations in the scoping of this review are the search for articles; there are not too many studies discussing the effect of back massage on increasing breast milk production, so the author has a little difficulty collecting articles on this topic. Pieces entirely in English only make the scope of articles with a limited language. Another limitation is that most articles come from Western culture, so they cannot describe other cultures that differ from the rules and culture in the study articles. Most of the themes found are in the form of reports. This study had only one qualitative piece, so there was less evidence of their experience in obtaining breast milk production.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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Case Study

Leukocytosis as a Predictor of Clinical Worsening and Complications in Children with Pertussis: A Systematic Review of Case Study

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ABSTRACT

Pertussis is a highly contagious disease with clinical features ranging from mild to severe and various complications. Hematological examination, especially the leukocyte count, can predict the possibility of clinical deterioration with several complications, such as pneumonia. This case study aimed to assess whether leukocytosis could indicate the clinical worsening of pertussis in children. This research method is a systematic review on a case study. The subject of this case study is a child with pertussis experiencing clinical deterioration. Prominent laboratory data in this case study includes leukocytosis. This systematic review aims to analyze the association between leukocytosis and the clinical deterioration of this case study. Literature search procedure using PubMed, Cochrane, and Google Scholar search instruments. The keywords used are "pertussis," "risk factor," and "and children." Using the limitations of randomized controlled clinical trials, systematic reviews, meta-analyses, cohorts, and cross-sectional or case series, the language of instruction is English, and publications within the last 20 years. Overall, 16,666 articles were obtained, consisting of 43 pieces from PubMed; only two papers were valid. Of the 3,123 articles on the Cochrane, only two are valid. Likewise, out of 13,500 articles on Google Scholar, only two are valid. Furthermore, it was traced based on the aspect of duplication, then three papers were found, which were cohort studies. It was concluded that leukocytosis predicts clinical deterioration and complications in children with pertussis.

Keywords: Pertussis, Clinical Deterioration, Pneumonia, Leukocytosis.

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INTRODUCTION

Pertussis is a highly contagious disease with clinical features ranging from mild to severe and various complications [1,2]. From various reports, pertussis is also a disease with a high mortality rate. World Health Organization (WHO) estimates that pertussis affects nearly 240 million children under five years of age each year and causes 160,000 deaths in this age group, with a mortality rate of 4%. In one study in infants, mortality was 70% and higher in infants under 6 weeks (84%) [3]. The infant mortality rate in the United States is 2.4 per 1 million, and 90% of all deaths from pertussis occur in infants under six months of age [4,5].

Pertussis is a highly contagious respiratory tract infection most commonly affecting young, unimmunized, or incompletely

immunized infants [6–8]. The typical clinical features of pertussis include recurrent paroxysmal coughing, inspiratory whoops, and vomiting after coughing. The classic disease characterized by three phases (catarrhal, paroxysmal and convalescent) has been seen less frequently since the start of immunization [6,9,10]. This clinical picture varies in each child, depending on the phase of the disease. In severe infections, pertussis causes several complications that begin with clinical worsening. One of these clinical worsening occurs when pertussis causes difficulties in the form of pneumonia (lung infection) [6,11,12].

Clinical worsening of pneumonia must be anticipated as an effort to prevent complications so that death does not occur. Because of this, clinical data must be sought which can be used as indicators for predicting clinical worsening of pertussis in children [1,12]. In several cases of pneumonia that occur as a complication of pertussis, an increase in leukocyte levels (leukocytosis) is always found. The clinical question here is whether the laboratory picture of leukocytosis can be used as an early indicator in predicting clinical worsening in children with pertussis. [1,10]. Therefore, this case study aimed to see whether clinical worsening or severe complications in pertussis were caused by leukocytosis. This pertussis case study was conducted using a systematic review approach.

METHOD

We conducted this case study with a focus on investigating the relationship between increased leukocytosis as a predictor of the likelihood of clinical deterioration in a child with pertussis. The research methodology employed in this study is a systematic review of a case study. The subject of this case study is a child with pertussis who experienced clinical deterioration. Prominent laboratory data includes leukocytosis. The association between leukocytosis and clinical deterioration in this case study is analyzed using systematic review procedures.

A systematic review of case study was carried out to answer whether leukocytosis indicates clinical deterioration in children with pertussis. Literature search procedure by searching literature online, using PubMed, Cochrane, and Google Scholar search instruments. The keywords used are "pertussis," "risk factor," and "and children." Using the limitations of randomized controlled clinical trials, systematic reviews, meta-analyses, cohorts, and cross-sectional or case series, the language of instruction is English, and publications within the last 20 years.

RESULTS

Pertussis is a highly contagious disease with clinical features ranging from mild to severe and various complications. The disese caused by infection with Bordetella pertussis can be divided into three phases: catarrhal, paroxysmal, and convalescent. A definite diagnosis is made based on laboratory tests, namely the finding of Bordetella pertussis, either by culture, Polymerase Chain Reaction (PCR), or serological examination. [6–8].

A 12-year-old girl was brought to the Emergency Room (IGD) at Zainoel Abidin General Hospital, Banda Aceh. This patient was a referral from the Teungku Chik Ditiro Hospital, Sigli, Pidie District, with a diagnosis of pneumonia, with a clinical picture of shortness of breath, who had previously been treated for four days. On examination at the Emergency room of Zainoel Abidin General Hospital, information was obtained that the child had before shortness of breath. Every cough experience feels continuous for a long time, followed by vomiting after every cough. The cough had been experienced for about two weeks before being treated at the Teungku Chik Ditiro Hospital. On physical examination at Zainoel Abidin General Hospital, it was found: blood pressure 110/70 mmHg, pulse 110 beats per minute, rapid respiration of 50 times per minute. The chest appeared retracted, and lung crackles were found on auscultation. The laboratory examination results showed Hb: 12.5gr/dL. Hematocrit: 37%, leukocytes: 20,400/mm3. Lung x-rays showed infiltrates in both lung fields.

Due to a history of severe, persistent cough and shortness of breath, this patient was diagnosed with pertussis and pneumonia. Other data that supporting pneumonia are of crackles on auscultation and an infiltrate is found on a chest X-ray. Concerning a loud cough, it must be proven whether it is caused by pertussis. Therefore, the Polymerase Chain Reaction (PCR) was examined against the Bordetella

Pertussis bacteria to determine the cause of pertussis. From the laboratory examination, the results were found: a positive PCR was found for Bordetella pertussis. With the discovery of these laboratory results, the definite diagnosis is pertussis. Pneumonia that occurs, in this case, is a clinical worsening and complications of pertussis. Because the diagnosis is pertussis and pneumonia, the therapy is antibiotics following causative germ, namely Bordetella pertussis.

The selected antibiotics are Azithromycin and Cefotaxime. These two antibiotics were chosen to anticipate the possibility of other bacteria causing pneumonia. Lang's selection of antibiotics is intended to prevent further deterioration, which can result in respiratory failure. Uncontrolled clinical worsening with the occurrence of respiratory failure can cause death. Other procedures for this patient during treatment include administering oxygen, traditional healers, and multivitamins. This patient was treated at Zainoel Abidin General Hospital for one week. Because it showed an excellent improvement, the infusion was stopped. Antibiotics was stop. Other medicines are only in the form of multivitamins. The patient was discharged from the hospital and was advised to seek outpatient treatment. Five days later, the patient returned to the children's polyclinic, Zainoel Abidin General Hospital. At the last examination, the patient was very healthy.

In this case, pneumonia was found in a child with pertussis as a form of clinical deterioration complication. Laboratory examination revealed the presence of leukocytosis. A systematic review was conducted to investigate whether leukocytosis can be used as a predictor of clinical deterioration.

Through the search method with the above criteria, a total of 16,666 articles were obtained in the early stages. Of the 43 articles searched with PubMed, two were valid. Of the 3,123 articles on the Cochrane, only two are valid. Likewise, out of 13,500 articles on Google Scholar, only two are valid. So only six papers are useful in the initial stage.

Furthermore, screening of titles and abstracts was carried out to determine articles that were relevant to the previous problem. However, when traced based on the duplication aspect, three papers were found: cohort studies (see Figure 1). The articles obtained are then summarized in Table 1.

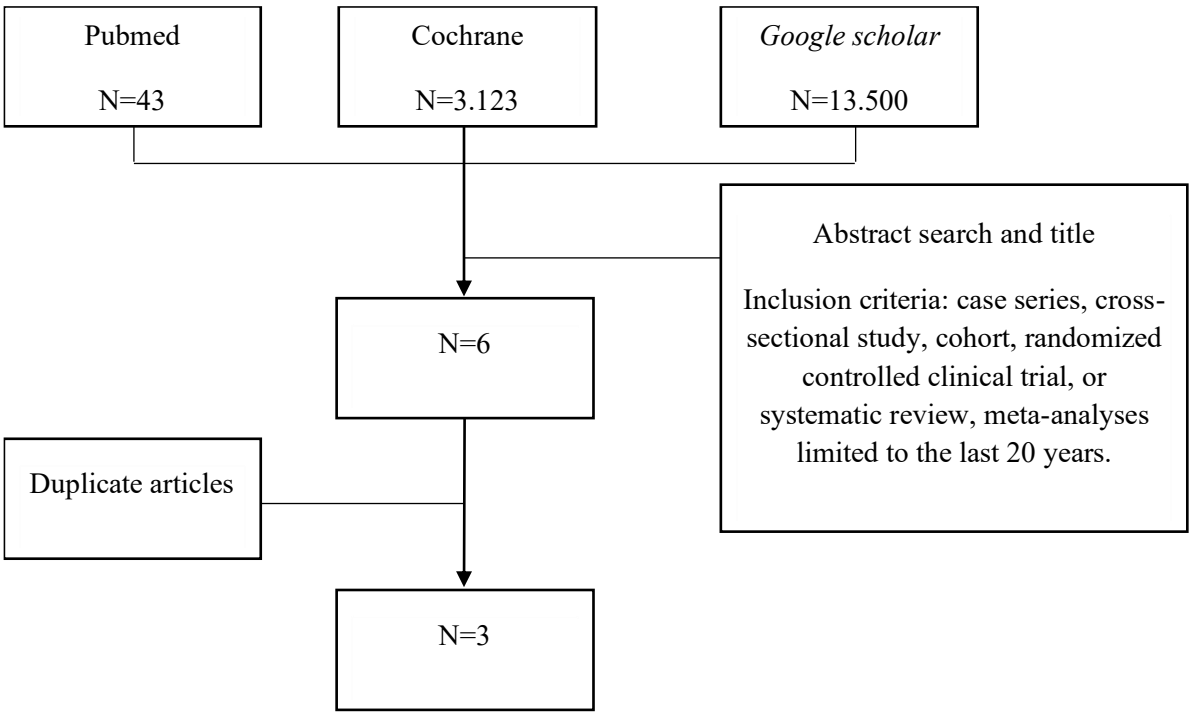

Figure 1. Literature selection flow

Table 1. Summary of Characteristic and Outcome of Included Studies.

Article	Kang, et al.,[2]	Shi, et al.,[3]	Palvo, et al.,[13]
Title	Clinical characteristics of 967 children with pertussis: a single-center analysis over an 8-year period in Beijing, China	Mortality risk factors among hospitalized children with severe pertussis	Severe pertussis infection A clinic pathological study
Design	Retrospective Cohort Study	Retrospective Cohort Study	Retrospective Cohort Study
Publication	2021	2021	2017
Location	Beijing, China	Guangzhou, China	Brazil
Aims	Knowing the clinical symptoms of severe pertussis, describing pertussis in infants under three months, assessing risk factors for severe pertussis.	Assessing risk factors for mortality in patients admitted with severe pertussis	Assessing the epidemiology and clinical symptoms of children with severe pertussis who were hospitalized in Brazil, investigating the risk factors for PICU admission and death, and evaluating the autopsy findings of children who died with pertussis.
Participant	967 children	144 children	55 children
Outcome	• Vomiting after coughing, paroxysmal cyanosis, decreased post-tussive heart rate, hypoxemia, severe pneumonia, and mechanical ventilation were significantly higher than in the ≥ three months group ($p < 0.05$). • Paroxysmal cough, post-tussive vomiting, paroxysmal cyanosis, flushing/cyanosis/fever during coughing, increased leukocytes (leukocytosis), and chest X-ray showing pneumonia/consolidation/ • atelectasis are essential indications of severe pertussis.	• The mortality for severe pertussis was 34.2%, with • patients younger than six • weeks making up most deaths. • WBC > 70.0 × 109/L and PH are independent prognostic variables associated with death.	• Leukocytosis on admission is associated with morbidity and mortality in children treated with pertussis. • Implementation of prevention strategies is crucial to reduce the incidence of disease, especially in young infants who are not immunized.

DISCUSSION

The first study was a retrospective cohort study conducted by Kang et al. [2] on 227 children with pertussis who were treated between March 2011 and December 2018. The researchers divided them into two groups, namely the severe and non-severe pertussis group. Patients with severe pertussis were defined as having any symptoms: recurrent apnea, hypoxemia (PaO_2 <80 mm Hg), pertussis encephalopathy, or cardiac compromise. Inclusion criteria in this study were age <18 years, symptoms with pertussis diagnostic criteria, and positive PCR results for pertussis. While the exclusion criteria were the emergence of cough due to congenital abnormalities of the airways, the appearance of cough due to airway compression due to various causes, personal or family history of allergic reactions and non-specific inflammatory reactions such as allergic cough or asthma, postnasal drip syndrome, eosinophilic bronchitis, and cough due to gastroesophageal reflux, cytomegalovirus pneumonia, and pulmonary tuberculosis.

The second study was a Randomized Controlled Trial study conducted by Shi et al. [3] On 144 pertussis patients treated at Guangzhou Women and Children's Medical Center China from January 2016 to December 2019. The recerchers divided them to into two outcame groups, namely group of patients who survived and who died during treatment. Criteria for severe pertussis include children aged 0-18 years with laboratory results confirming pertussis. They are included if there is treatment in the Pediatrics Intensive Care Unit (PICU) for at least 24 hours or death, hyperleukocytosis in the form of leukocyte values $\geq 50x10^3/mm^3$, pulmonary hypertension based on criteria from the European Society of Cardiology (ESC) and European Respiratory Society. The inclusion criteria in this study were that patients had to undergo all the following examinations: All patients must be positive for Bordetella pertussis based on the PCR test. All patients should undergo an immunofluorescence virus test for nasopharyngeal secretions in the acute phase. All patients should have a chest X-ray done. Patients with incomplete data were excluded from this study.

The third study was conducted by Palvo, et al. [13] , a randomized controlled trial on 55 patients treated at a tertiary-care university hospital in Brazil from 1 January 2008 to 31 December 2014. The researchers divided them into two groups, namely, the group of patients who died and recovered. The inclusion criteria were all children aged 0-18 years who were treated with laboratory confirmation of pertussis. Laboratory confirmation includes isolation of B. pertussis from nasopharyngeal aspiration with positive pertussis culture and/or PCR. Patients with clinical symptoms suspicious of pertussis but without laboratory confirmation were excluded from the study.

The World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) provide case definitions of pertussis. A clinical case can be defined as a person with a cough for at least two weeks and any of the following symptoms: paroxysmal cough, inspiratory whoop, or post-cough vomiting. Confirmed cases are described as suspected by one of the following laboratory tests: (1) positive culture from the nasopharyngeal sample, (2) positive PCR test, and (3) positive serology result [14]. Diagnosis is often delayed or missed because pertussis mimics symptoms of respiratory tract infections. Upper infections caused by viruses and sometimes appear atypical 15–17 [15–17].

In this case study, the patient was referred from the district hospital with complaints of shortness of breath. The definite diagnosis of shortness of breath is pneumonia. The sound of crackles on lung examination reinforced this. An X-ray examination also found infiltrates in both lung fields. However, the diagnosis of pertussis in this patient was suspected due to the presence of persistent and persistent cough. A definite diagnosis of pertussis was obtained from the results of laboratory tests, namely a PCR examination with a positive outcome for Bordatella pertussis [1,12].

Clinical manifestations of pertussis are influenced by age, disease stage, previous immunization or infection history, passive immunity, and previous antibiotic treatment [18]. Studies show that the most common clinical symptoms of pertussis infection in children are paroxysmal cough, inspiratory whoop, and post-cough vomiting, with less common signs such as cyanosis and apnea. Cases of B. pertussis are often reported in spring and summer, according to those reported in several studies [1,14,19].

Infection caused by B. pertussis can be divided into three phases: catarrhal, paroxysmal, and convalescent [20]. The first phase is the catarrhal phase which begins 1-2 weeks after exposure and lasts 7-14 days. This condition is indistinguishable from an upper respiratory tract infection, and the symptoms include rhinorrhea, mild cough, malaise, and low-grade fever. The second phase is the paroxysmal phase. This phase lasts 1-4 weeks and is dominated by a heavy cough. This phase is characterized by paroxysmal coughing or a series of coughing during a single expiration, which causes a decrease in lung volume. Paroxysmal cough followed by forceful inspiration, which, in infants and children with the smaller trachea, is associated with the whooping sound characteristic of "whooping cough." Paroxysmal cough is often associated with vomiting and post-cough fatigue. The third phase is the recovery phase. This phase occurs after 2-3 months, and severity of the cough gradually decreases [10,15,21].

The incubation period for pertussis is usually 7-10 days, ranging from 4-21 days. However, in households, one-fifth of cases occur more than four weeks after the onset of

symptoms in the primary case. B. pertussis adheres to the mucosa of the nasopharynx, trachea, bronchi, and bronchioles, increasing the secretion of mucus, which is initially thin and thick. The classic disease is most often seen in non-immunized children, lasts 6-12 weeks, and is clinically divided into three stages: catarrhal, paroxysmal, and convalescent [10,16,20].

A meta-analysis study from Moore [22] states that "Posttussive vomiting" is a clinical symptom that can establish a clinical diagnosis in a sample of children with a sensitivity of 60% and a specificity of 66% with a CI of 95%, "Positive Likelihood Ratio" 1.76 and "Negative Likelihood Ratio" 0.6 . Other previous meta-analyses studies also showed similar results, namely the study of Cornia et al., providing results of clinical symptoms that can be used as a reference for establishing the diagnosis of pertussis. Paroxysmal cough with a sensitivity of 86% and a specificity of 24%, "Positive Likelihood Ratio" 1.1. “Posttussive vomiting” with 70% sensitivity and 61% specificity, “Positive Likelihood Ratio” [1,8]. While Inspiratory whoop with 50% sensitivity and 73% specificity, "Positive Likelihood Ratio" [4].

Pertussis is a disease caused by Bordetella pertussis. Therefore, the focus of laboratory tests to establish the diagnosis of this disease is to find evidence of infection with Bordetella pertussis. Another examination is to look at the hematological picture of the patient. The leukocyte count, for example, usually increases between 15,000 and 20,000/mm3 but can be normal or as high as 60,000/mm3. From the leukocyte count, usually, 60-80% are lymphocytes. Leukocytosis with a white blood cell count of more than 25,000/mm3 was seen in 40% of children [20].

Several complications may occur in pertussis with severe infection due to clinical deterioration. A series of rapid coughing characterize paroxysms without taking a breath, followed by a characteristic whoop, an attempt to inhale through a swollen glottis. During the paroxysmal phase, the patient may experience cyanosis and vomiting. Several paroxysmal steps may occur successively within minutes and can leave the patient exhausted. Paroxysms can be caused by stimuli such as eating, laughing, or crying, and are usually worse at night. During the paroxysmal phase, the patient may appear to average [23]. Pertussis is usually not associated with fever but with lymphocytosis, especially in infants and young children. A non-paroxysmal cough may persist for weeks 1,12,24 when the disease is cured. [1,12,24].

Clinical worsening of pertussis can be prevented by providing adequate therapy, especially by choosing the right antibiotics, which can be: erythromycin, azithromycin, or lincomycin. If leukocytosis is found (the number of leukocytes above average), it is anticipated immediately by looking at additional clinical possibilities or the possibility of early complications [16]. Antibiotics combine one of the standard antibiotics (erythromycin, azithromycin, or lincomycin) with other antibiotics, such as cefotaxime. This effort is more to minimize the risk of complications or clinical worsening [10,11,17,25].

CONCLUSION

Leukocytosis in children with pertussis can serve as a predictor for the likelihood of clinical deterioration and complications. Therefore, laboratory examinations (hematology) should be consistently performed in every child diagnosed with pertussis to facilitate adequate therapeutic planning, thereby preventing clinical deterioration and complications. Clinically, pertussis caused by *B. pertussis* infection is a highly contagious disease with clinical features ranging from mild to severe and various complications.

Due to the proven risk factor for the clinical worsening of pertussis, namely, increased levels of leukocytosis, managing pertussis patients requires hematological examination, especially the number of leukocytes. If leukocytosis is found, the selection of antibiotics must be adequate by combining standard drugs (Azithromycin, Erythromycin, or Lincomycin) with other antibiotics, such as a combination with cefotaxime.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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