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Original Research

Using An Electrical Toothache Salvadora Perisca To Increasing Oral Health Quality: A Manikin Trial

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ABSTRACT

Background: *The most effective way of oral care in patients with decreased consciousness is not yet known. Electrical toothache salvadora perisca has the potential to improve oral hygiene because it has an antibiotic effect, and is easy to use. Aim of study is to know the effect of electrical toothache salvadora perisca on oral health quality.*

Methods: *A pre-experimental study in a laboratory using manikins in 2021. The study was conducted by 6 respondents in which each respondent performed 2 oral treatments using an electrical toothache salvadora perisca on the mouth of a manikin that had been dirty make-up using Ky Jelly. The toothbrush was operated for 1 minute evenly on the teeth, and foam sticks are used to clean the lips and oral mucosa. Oral hygiene was measured with a modified Beck Oral Assessment Scale (BOAS) instrument, and the scores of conditions before and after oral care were compared using the Wilcoxon test.*

Results: *Wilcoxon test showed a value of 0.002, which means that there was a difference in the BOAS score between before and after treatment. Electric toothbrushes clean teeth better, and foam sticks are able to clean the inside and soft of the patient's mouth.*

Conclusion: *Electrical toothache salvadora perisca can increasing oral health quality. The implication is need to find and try out the most effective way of doing oral care.*

INTRODUCTION

Patients in critical care and nervous system disorders tend to experience impaired oral hygiene. Oral cavity infections can be a potential source of infection that can lead to various systemic diseases, especially in patients with an endotracheal tube (ETT) in the Intensive Care Unit (ICU) (Anggraeni, Hayati, & Nur'aeni, 2020). The ETT in the mouth of an intubated patient can be the entrance and site for bacterial colonization that causes Ventilator Associated Pneumonia (VAP) which is one of the causes of patient death in the ICU (Cooper, 2021).

The endotracheal tube interferes with clearing mucus and the patient does not have a cough reflex so that microorganisms grow in the respiratory tract. The increased number of organisms in the respiratory tract can cause pneumonia, and lead to long treatment times and increased costs (Cooper, 2021; Zhao et al., 2020).

The Covid-19 pandemic has increased the incidence of patients entering the ICU and using ventilators. The results of the study by Modes et al., (2022) reported that of 339 patients treated in California, America in the period 21 December 202 = 27 January 2022, 9-13% of Covid-19 patients entered the ICU and used mechanical ventilation. Patients treated with mechanical ventilation in the first 48 hours may develop Ventilator Associated pneumonia (Cooper, 2021). Methods that can be used to prevent VAP are oral health care, such as brushing teeth, using mouthwash, swabs, and also suctioning mucus (Albabtain, Ibrahim, Bhangra, Rosengren, & Gustafsson, 2018; Azaripour et al., 2017).

Nurses as caregivers have an important role in providing oral care interventions to maintain oral health and prevent infection (Anggraeni et al., 2020). On the other hand, the level of knowledge of nurses and doctors regarding oral care to prevent bacterial colonization in the oral cavity and oropharynx is still low. The research of Sadli, Tavianto, & Redjeki, (2017) describes that only 38.6% of nurses and 13.9% of doctors know that oral care is carried out if needed. On the other hand, oral care serves to reduce the risk of VAP. It is necessary to increase knowledge of the importance of oral care and simple tools that can be applied properly in oral care.

Setianingsih, Riandhyanita, & Asyrofi, (2017) report that's on nurses at a hospital in Central Java reported that 60% of respondents performed oral hygiene in the poor category, and 40% in the good category. The lack of good oral hygiene for patients is influenced by the high workload of nurses compared to the number of patients, facilities in the implementation of oral hygiene are still inadequate, and nurses do not understand how to implement oral hygiene in accordance with standard operating procedures (Setianingsih et al., 2017).

The actions taken at this time to clean the patient's mouth are suction and Chlorhexidine (CHX). The report Zhao et al., (2020) stated that patients who brush their teeth have a lower risk of developing VAP, than those who do not brush their teeth. The report Albrecht et al., (2013) also shows that brushing teeth < 2 times a day causes Decayed, Missing, and Filled Teeth (DMFT)) and periodontal disease, and reduces a person's quality of life.

Oral hygiene care does not guarantee a person's oral health improves. The results of the research by Anggraeni et al., (2020) showed that the oral health status of intubated patients was getting worse, despite routine oral care interventions using chlorhexidine gluconate. Researchers recommend additional topical agents to keep mucous membranes moist, so that the oral health status of intubated patients will be better. The results of a literature study (Hua et al., 2016) stated that chlorhexidine mouthwash or gel reduced the risk of developing ventilator-associated pneumonia in critically ill patients from 25% to approximately 19%. There is no evidence that using an antiseptic or povidone-iodine mouthwash is more effective than saline or placebo. Saline rinses are more effective than saline swabs in reducing VAP (Hua et al., 2016).

Good oral care involves one comprehensive treatment including oral hydration, lip balm, and careful brushing of teeth to mechanically remove plaque. Eliminate interventions that cause harm and focus on interventions that improve oral health that are evidence-based (Cuthbertson & Dale, 2021). Toothpaste ingredients are vital and

keep teeth clean. Replacement of toothpaste with a siwak stick (Salvadora perisca) in some parts of the world is becoming popular. Siwak is one of the oldest oral hygiene tools in the world. The low price and easy availability are the reasons for replacing toothpaste with siwak (Albabtain et al., 2018; Ayoub et al., 2021). Siwak has strong antibacterial ability against gram-negative bacteria, and can prevent mild-to-moderate periodontitis (Albabtain et al., 2018).

In addition to toothpaste, the type of toothbrush is an important factor in the implementation of oral care. The results of the study show that using an electric toothbrush can speed up the teeth cleaning process compared to a manual toothbrush, although there is no difference in dental hygiene achieved (Petker-Jung, Weik, Margraf-Stiksrud, & Deinzer, 2022). Different study results were reported by Hua et al., (2016) who stated that there was insufficient evidence to determine whether powered toothbrushes were more effective in reducing VAP.

Many studies and actions have been carried out to find the most effective way to perform oral care, but none of the most effective ways have been found. Researchers combined salvadora perisca with an electric toothbrush and foam stick in performing oral care on manikins. The purpose of this study was to determine the effect of electrical toothache salvadora perisca on oral health quality.

MATERIALS AND METHOD

A pre experimental study, with oral care treatment using manikins. The research was conducted in March-December 2021, with 1 lecturer and 6 final year students as respondents who were selected by purposive sampling. The research was conducted at the Poltekkes laboratory of the Ministry of Health Surakarta.

Manikins were given KY Jelly as a substitute for 2 cm of dirt on the mouth and teeth and in the same position on the lips, gingival and oral mucosa, tongue, teeth, and saliva. KY Jelly is spread in the area of the teeth and the oral mucosa inside and outside. Evaluation of dental and oral hygiene was based on the cleanliness of KY Jelly on the teeth and mouth of the manikin. The treatment given was manikins by brushing with an electrical toothache salvadora perisca toothbrush (Figure 1), for 1 minute. This toothbrush is a modification of an electric toothbrush where researchers replace the toothbrush bristles with Siwak (Salvadora Perisca). The step is to put the toothbrush into the water in a glass, to soften the bristles of the toothbrush. Then the teeth are brushed all over the teeth. The toothbrush moves up and down when it is turned on.

Figure 1. Electrical Toothache Salvadora Perisca

After brushing the teeth, the researcher then cleaned the mouth and teeth using a foam stick (Figure 2). Foam sticks are made of foam glued to a flat wooden stick. Foam sticks consist of 2 shapes, the first is a rectangle and the second is a half oval. Retangel foam sticks are used for wide and easy-to-reach areas of the mouth, while half oval

foam sticks are used inside and narrowly. Each mouth cleaning session uses 1 foam stick each. Foam sticks are not reused, but only used once.

Figure 2. Foam sticks

Respondents totaling 6 people performed oral care 2 times each using the same procedure. The mouth of the manikin was given Ky Jelly with the same amount and location, then oral hygiene was measured by modifying the Beck Oral Assessment Scale (BOAS) instrument.

Table 1. Instrument Beck Oral Assessment Scale (BOAS) modified

Area	Score			
	1	2	3	4
Lips	Very clean	Clean	Fairly clean	Dirty
Gingival and oral mucosa	Very clean	Clean	Fairly clean	Dirty
Tongue	Very clean	Clean	Fairly clean	Dirty
Teeth	Very clean	Clean	Fairly clean	Dirty
Saliva	Very clean	Clean	Fairly clean	Dirty

The score is divided into 4 levels, namely very clean (1), clean (2), fairly clean (3), and dirty (4). Then the scores are summed and interpreted as follows:
- BOAS I (0-5) : Very good
- BOAS II (6-10) : Good
- BOAS III (11-15) : Enough Good
- BOAS IV (16-20) : Not Good

Researchers looked at the cleanliness of the areas of the lips, gingival and oral mucosa, tongue, teeth, and saliva (Gupta, Gupta, Singh, & Saxsena, 2016) before and after oral care using electrical toothache salvadora perisca. Analysis of the data to compare the 12 actions taken is the Wilcoxon test. The Ethical Approval was obtained from Health Research Ethics Committee of Poltekkes Kemenkes Surakarta, numbered LB.02.02/1.1/2424.4A/2021 dated on January 31st, 2021.

RESULTS

The results showed that the Beck Oral Assessment Scale (BOAS) after oral treatment was:

Table 2. Beck Oral Assessment Scale (BOAS) Score by Area

| Area | Beck Oral Assessment Scale (BOAS) Score | | | | |
| | Before Oral Care | After Oral Care | | | |
	Dirty	Very clean	Clean	Fairly clean	Dirty
Lips	12 (100%)	10 (83%)	2 (17%)	0	0
Gingival and oral mucosa	12 (100%)	9 (75%)	3 (25%)	0	0
Tongue	12 (100%)	9 (75%)	3 (25%)	0	0
Teeth	12 (100%)	10 (83%)	2 (17%)	0	0
Saliva	12 (100%)	8 (67%)	5 (33%)	0	0

The state of oral health in pantom was made dirty with a value of 4 in all areas. After 12 treatments with 6 different people, the overall results of pantom oral health were clean and very clean. Lip area 83% at very clean level, and 17% at clean level. Gingival and oral mucosa as much as 75% at very clean level, and 25% at clean level. Tongue is 75% at very clean level, and 25% at clean level. Teeth lips 83% at a very clean level, and 17% at a clean level. Saliva lips 67% at very clean level, and 33% at clean level.

Table 3. Beck Oral Assessment Scale (BOAS) Score

BOAS Score	Before Oral Care	After Oral Care
Eksperiment 1	20	6
Eksperiment 2	20	6
Eksperiment 3	20	5
Eksperiment 4	20	6
Eksperiment 5	20	5
Eksperiment 6	20	5
Eksperiment 7	20	7
Eksperiment 8	20	8
Eksperiment 9	20	7
Eksperiment 10	20	7
Eksperiment 11	20	7
Eksperiment 12	20	6
Means (X)	**20**	**6.25**

The average Beck Oral Assessment Scale (BOAS) Score before treatment was 20, while after treatment was 6.25. The fact also shows that all trials resulted in lower BOAS scores than before the experiment. It can be concluded that oral care using electrical toothache salvadora perisca can reduce the BOAS score.

Table 4. Interpretation of the Beck Oral Assessment Scale (BOAS) Score

Var	BOAS Score			
	BOAS I	**BOAS II**	**BOAS III**	**BOAS IV**
Before Oral Care	0	0	0	12 (100%)
After Oral Care	3 (25%)	9 (75%)	0	0
P 0.002				

The BOAS score before treatment was 100% at level 4, while after treatment, the BOAS score was at 25% BOAS I and 75% BOAS II. The results of the Wilcoxon test showed a value of 0.002, which means that there was a difference in the BOAS score between before and after treatment.

DISCUSSION

Oral health is not only the area of the teeth, but includes the gingiva, lips, lips, saliva and chewing ability (Wood, 2017). The oral mucosa is the first place for microbes, antigens, allergens and food to enter the digestive tract (Moutsopoulos & Konkel, 2018). For this reason, oral hygiene can affect the patient's general health.

The results show that the lips area is 83% at the very clean level, and 17% at the clean level. Gingival and oral mucosa as much as 75% at very clean level, and 25% at clean level. Tongue is 75% at very clean level, and 25% at clean level. Teeth lips 83% at a very clean level, and 17% at a clean level. Saliva lips 67% at very clean level, and 33% at clean level.

This result is in line with the report Estaji, Alinejad, Hassan Rakhshani, & Rad, (2015) reported that the use of a toothbrush had a significant impact on the reduction of oral lesions in the patient's mouth. Electric toothbrushes are more effective at reducing dental plaque, gingivitis, and bleeding compared to manual toothbrushes (Wang et al., 2020). Although it was reported that only 41% of nurses used a toothbrush to treat the patient's mouth, the benefits of a toothbrush in eliminating microorganisms in the mouth were proven to be effective (Estaji et al., 2015; Wang et al., 2020).

Oral care needs to take into account the patient's risk, and the patient's ability to maintain oral health (Labeau, Conoscenti, & Blot, 2021). Although systematic oral care did not significantly reduce the incidence of ventilator-associated pneumonia in critically ill patients, it did significantly improve oral health and mucosal plaque index (Haghighi, Shafipour, Bagheri-Nesami, Gholipour Baradari, & Yazdani Charati, 2017). Integrated and collaborative actions in performing oral care need to be mobilized, maintained, and strengthened to address advanced diseases resulting from poor oral health (Wood, 2017). Report from Kitamoto et al., (2020) stated that periodontal inflammation exacerbates intestinal inflammation. Periodontitis causes the development of klebsiella and Enterobacter in the oral cavity, which is then ingested and transferred to the intestine. Pathogens that migrate to the intestines cause intestinal inflammation.

Oral care has been using chlorhexidine, and applying the material into the mouth of critically ill patients means solving the patient's problems. The investigators recommend the potential toxic effects of oral chlorhexidine mouthwash on mucosal lesions, acute pulmonary syndrome, and increased mortality (Kitamoto et al., 2020). One way to replace chlorhexidine is to use miswak. In addition to improving oral health in critically ill patients, miswak can reduce the risk of VAP.

Low cost, and fewer side effects than chlorhexidine make it recommended for use in critically ill patients (Irani, Sargazi, Dahmardeh, & Pishkar Mofrad, 2020). The

content of lavonoids, glycosides, sterols, terpenes, carbohydrates and alkaloids in miswak can act as antimicrobial, antioxidant, analgesic, anthelmintic, anti-inflammatory, antiulcer, sedative, anticonvulsant, antiosteoporosis, antidiabetic, and hypolipidemic (Farag, Abdel-Mageed, El Gamal, & Basudan, 2021).

CONCLUSION

The results showed that there was a difference in BOAS scores between before and after oral health treatment using electrical toothache salvadora perisca. Electric toothbrushes clean teeth better, and foam sticks are able to clean the inside and soft of the patient's mouth. Further experiments are needed to see the risk of thrush in pantoms, seeing that salvadora perisca has a rough structure.

We suggest doing some comparisons of the effectiveness between the use of chlorhexidine, toothpaste, cleaning without mouthwash, and other oral health products, so that it can be seen the most effective way to improve oral health on the patient.

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Original Research

Differences In Level Of Spiritual Well-Being Of Patients With Type 2 Diabetes Mellitus In Urban And Rural Areas

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ABSTRACT
Background: *Patients with Type 2 Diabetes Mellitus (T2DM) require a prolonged treatment time so that their condition can get worse. This incident is related chiefly to spiritual well-being disorders such as boredom and hopelessness, which results in decreased Diabetes management. The study aims to analyze differences in the spiritual well-being level of T2DM patients in urban and rural areas.*

Methods: *Quasi-experimental method with a two-group pre-post-test design without control was employed in this study. The population in the rural area were T2DM patients in Matesih Subdistrict, and the population in the urban area were members of the Persadia Ngringo unit whose. Samples were taken using purposive sampling, obtaining 120 people. Data were collected using the SWBS questionnaire made by Ellison and modified with a validity of 0.803 and reliability of 0.911. After the pretest was carried out, the respondents were given a pocketbook and lectures on how to maintain spiritual well-being. Then, a posttest was conducted, obtaining normality of 0.93, causing the data to be analyzed using a t-test.*

Results: *The spiritual well-being of people with T2DM in villages was 40% higher than those living in cities. The results of the t-test obtained a significant value of 0.04.*

Conclusion: *There are differences in the spiritual well-being of T2DM patients in urban and rural areas. Attention and support to the spiritual well-being of T2DM patients should be given to carry out diabetes management properly.*

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INTRODUCTION

T2DM is a disease with various complications requiring long-term care and regular monitoring, which often causes physical and psychological fatigue. These conditions in most patients cause changes in spiritual well-being, expectations, and adherence to the care and treatment being carried out (Javanmardifard.S., Heidari.S., Sanjari.M., Yazdanmehr.M., 2020). Specifically, it occurs in T2DM patients with leg injuries. Patients will get an impact in addition to physical and psychological health disorders, called spiritual well-being disorders (McIntosh. C., Ivory. J.D., Gethin.G., 2019).

It is known that there is a positive relationship between religious factors or so-called spiritual well-being with diabetes management, thus indicating that the development of the role of spiritual well-being in diabetes management (Darvyri, P., Christodoulakis, S., Galanakis, M., Avgoustidis. A.G., Thanopoulou, A., Chrousosi, 2018). An increasing number of research on spirituality in health in the last decade (Romeiro, J., Martin, H., Pinto, S., & Caldeira, 2018).

Spiritual well-being needs to be supported to make sufferers feel happy and valuable in their lives even when they are sick. If this is ignored, it might lead to poor quality of life as research on the poor quality of life of T2DM patients is caused by psychological and spiritual factors (Puspasari.S., 2021). The lack of a source of spiritual strength based on studies is a predisposing factor that contributes to the development of distress in T2DM patients (Skinner. T.C., 2021).

Another study explains that more than a third of T2DM patients experience stress and depression or anxiety. This study proves a relationship between spiritual well-being and anxiety and depression. Therefore, screening patients with T2DM to identify mental and psychological problems is recommended. They can then be given spiritual health interventions to reduce the appearance of these problems (Soudagar.S., 2018).

Various therapies have been developed focusing on behaviour and have been successful in showing clinically significant improvements, such as an improvement in depression in T2DM adults. These community-based interventions complement care interventions and expand access for those in rural and urban areas (Groot, M., G., Pillay, P., Mater, K.J., Fitzpatrick, K.,...Saha, 2019). Therefore, this study aims to add alternative actions that can be carried out based on the community.

The action in question was to maintain the spiritual well-being of T2DM patients for those in villages and cities where the trend of increasing prevalence was known. However, until now, it is unknown whether there is a difference in the level of spiritual well-being between DMT2 patients living in villages and cities so that the approach used in diabetes management can be effective and efficient.

Type 2 Diabetes Mellitus (T2DM) is a chronic disease affecting many people worldwide. The IDF (International Diabetes Federation) reports that the prevalence rate in 2021 of 10.5% might be 12.2% in 2045. It was also reported that the prevalence of T2DM in the urban area was 12.1% higher than in the rural area at 8.3% (Sun, H., Saeedi, P., Karuranga, S., Pinkepank, M., Ogurtsova, K., Duncan, B.N., ...Magliano, 2021).

Likewise, the results of a study in Columbia predict that the risk of getting T2DM in cities is higher than in rural areas (Molina, R.T., Garcia, A.L.R., Vergora, T.A., Garcia, V.A.F., Guiterrez, V.R., Lozano, K.F., & Barengo, 2022). Whereas in Nigeria, in general, metabolic syndrome diseases such as T2DM, according to the IDF report, the difference in cities is more significant than in rural areas by 21.7% (Adejumo. E.N., Ogundahunsi. O.A., Adejumo. O.A., Sotunsa.J., 2017).

This happened in Karang Anyar Regency based on reports that the prevalence of T2DM had increased. The prevalence of D.M. patients in 2014 was reported as 64 people (0.2%) and in 2021 to 1.2%, which means 421 people with T2DM were found (Karanganyar Regency Health Office, 2021).

Based on the description of spiritual well-being as an essential aspect of diabetes management and the prevalence of T2DM patients living in rural areas and urban areas, researchers wanted to find out whether there are differences in the level of spiritual well-being between T2DM patients living in rural areas and in urban areas of Karang

Anyar Regency which until now not yet known. This is done as input for health services in implementing a Diabetes management approach to be effective and efficient.

MATERIALS AND METHOD

This study employed a quasi-experimental which is the type of research used with a two-group pretest-posttest design without control. The population of this study were all T2DM patients treated at the Matesih Health Center as a group of respondents living in the village and all members of Persia (Indonesian Diabetes Association) Ngringo Karang Anyar unit as a group of respondents living in the city. The sample was selected using a purposive sampling technique with the criteria of being willing to follow the rules of the study, and being able to see, speak, hear, read and write.

Respondents who resigned during the study did not fill out the questionnaire until the end and worked as health workers were not taken as research respondents. The samples that met the criteria were 60 people who live in villages and 60 people who live in cities. Thus, the total sample size was 120 people. In both groups, a pretest was conducted to measure the level of spiritual well-being. Then, the respondents were given the same treatment: a pocketbook on maintaining spiritual well-being and spiritual guidance from clergy in the form of live lectures. They were also given as video recordings distributed via WhatsApp Group.

Research respondents were allowed to read and ask researchers or clergy who had given lectures via the telephone number attached in the pocketbook on how to maintain spiritual well-being. Respondents were monitored to ensure that they read or studied their pocketbooks or study. They were monitored by asking them three times via chat on the WhatsApp Group. After a week, a posttest was conducted on both research groups to re-measure their level of spiritual well-being.

This study was carried out from Match to September 2021. A research variable of this study was an improvement in the spiritual well-being of T2DM patients who live in urban and rural areas. The respondents' age, educational background, and gender were also noted. Primary data were collected directly from respondents using a Spiritual Well Being Scale (SWBS) questionnaire, which had been tested for construct validity with a value of 0.365-0.803 and a reliability test of 0.911.

The research materials used were a pocketbook on maintaining spiritual well-being compiled by researchers and lectures delivered by clergy. The data were then processed and analyzed with the Shapiro Wilk normality test. The results show a value of 0.93, meaning the data distribution was normal. Then, a bivariate analysis was carried out using the t-test to determine whether there was a difference in the spiritual well-being of people with T2DM between those living in rural and urban areas after being given pocketbooks and lectures.

This study was declared eligible and received a Statement of Eligibility from the Ethics Commission of Dr Moewardi Hospital Surakarta on April 28, 2021, number 464/IV/HREC/2021.

RESULTS

Table 1 presents that the most of respondents were female. Most of those who lived in the city were < 60 years, while most of those who lived in the village were > 60 years old. The educational background of the respondents who lived in the village was mostly elementary school graduates, and most respondents who lived in the city were college graduates. Furthermore, the level of the spiritual well-being of respondents

living in the village has increased after being given the treatment. Likewise, the spiritual well-being of respondents living in the city has also increased.

Table 1. Frequency Distribution of Respondents' Characteristics and Level of Spiritual Well-being

Variable	Rural		Urban		Total
	F	%	F	%	
Gender					
Male	20	34	21	36	41
Female	40	66	39	64	79
Age					
<60	20	34	40	66	60
>60	40	66	20	34	60
Educational Background					
Elementary School	24	40	12	20	36
Junior High School	17	28	18	30	35
Senior High School	12	20	20	34	32
Higher Education	7	12	10	16	17
Level of Spiritual Well Being					
Before					
High	33	55	48	80	81
Medium	17	28	6	10	23
Low	10	17	6	10	16
After					
High	53	88	54	90	107
Medium	6	10	5	8	11
Low	1	2	1	2	2

Table 2 shows a significant difference in the increase in the spiritual well-being of respondents who live in an urban area before and after the treatment (p-value of 0.000). There was also a significant difference in the increase in the spiritual well-being of respondents living in the rural area before and after the treatment (p-value of 0.000).

Table 2. Differences in Respondents' Spiritual Well-being Level

Variable	Rural	Urban
Differences in Spiritual Well-being Levels Before and After Treatment		
Before		
Min-max	74,00 – 120	73.00 – 120
Mean (S.D.)	89.1667 (±10.11153)	95.5667 (±10.75201)
After		
Min-max	80.00 – 120	79.00 – 120
Mean (S.D.)	98.1000(±10.91368)	105.8000 (±8.80062)
p-Value	0.000	0.000
Differences in Respondents' Spiritual Well-being Levels in the Urban and Rural Areas		
n	60	60
f	4.261	
Difference in Mean	1.46667	1.46667
p-Value	0.041	

Furthermore, after being given the treatment, it was proven that there was a significant difference in increasing spiritual well-being (p-value of 0.041) between respondents who lived in an urban area and those who lived in a rural area. Thus, the hypothesis that there is a difference in spiritual well-being between respondents who live in urban and rural areas is accepted.

DISCUSSION

This study was conducted during the Covid-19 pandemic, causing several issues for people with T2DM. T2DM is one of the most common comorbidities found in Covid-19 patients. One-third of patients with Covid-19 admitted to the ICU have T2DM as an underlying health condition (Shenoy, A., Ismaily, M., Bajaj, 2020). The existence of Covid-19 disease makes the problems of T2DM patients more complicated.

A study found a correlation between the level of hopelessness and spiritual well-being of T2DM patients as an effect of Covid-19 during the outbreak. As the patient's level of spiritual well-being increases, their level of loneliness and hopelessness decreases. That study found that a holistic approach is suggested to improve the spiritual well-being of diabetic patients (Dumus, M., Ciftci, N., Gercek, A., Dumju, 2022). For example, various psychological interventions have been carried out during the pandemic to maintain mental or spiritual health (APrzybylko, G., Morton, D.F., & Renfrew, 2021).

This condition causes researchers to increasingly recognize that spirituality can be a powerful coping strategy for people with weakened health conditions such as diabetes. Spirituality can bring a positive attitude towards life and enhance life with motivation and energy (Onyishi, C.N., IIechukwu, L.C., Aigbodion, V.V, Eseadi, 2021). Sociodemographic factors in this study were presented in Table 1, which shows that half of the respondents were aged < 60 years, and most were women. Most of those with the lowest education lived in rural areas, and those with the highest level of education lived in urban areas. Meanwhile, the spiritual well-being of respondents who lived in rural and urban areas before and after the treatment had increased even though there were still two respondents with low levels of spiritual well-being.

The results of this study support and further elaborate the research on T2DM patients who experience DFU (Diabetes Foot Ulcer). It was stated that the average patient with DFU had a low level of spirituality found in patients aged < 60 years. It was also reported that significantly lower levels of spirituality were found among the women who were respondents (Salomé, G. M., de Almeida, S. A., Mendes, B., de Carvalho, M. R., Bueno, J. C., Massahud, M. R. Jr., & Ferreira, 2017). The condition of the spiritual well-being of people with T2DM was varied. Patients referred to the diabetes polyclinic show that most participants had moderate spiritual well-being (Javanmardifard.S., Heidari.S., Sanjari.M., Yazdanmehr.M., 2020).

T2DM patients who lived in the urban and rural areas both experience an increase in their spiritual well-being, as presented in Table 2. This increase indicates a significant difference between before and after the treatment. This problem has been studied, and it has been found that the difference in the level of spiritual well-being between people with T2DM who live in urban and rural areas is a widespread problem in health and care in Africa. Spiritual variations, values, and behaviours are the root causes that underlie the differences in the level of spiritual well-being (Oloyede, 2017).

Another previous study found that spirituality is a strong predictor that positively impacts patients' spiritual care. Nurses are advised to consider the spiritual aspect of the

patient as a human being as the most critical aspect besides other health care provided (Akbari, S., Pazokian.M., Farahani, A.S.A., Nasiri, M., Rajab, 2020). In this study, it was found that respondents who had a positive correlation between the spiritual condition of T2DM patients and diabetes management improved well. It is recommended that spiritual role be increased in T2DM management activities (Darvyri, P., Christodoulakis, S., Galanakis, M., Avgoustidis. A.G., Thanopoulou, A., Chrousosi, 2018).

Referring this study which has proven differences in the spiritual well-being of people with T2DM before and after the treatment, it is supported by other research evidence on how spirituality plays a role in influencing people with T2DM to manage their daily self-care activities. The themes that emerged from the findings of this study included a relationship with God or spirituality as a coping method, religious practice, and social support (Permana, 2018). Accordingly, it can be understood that the level of well-being dramatically affects the lives of T2DM patients.

The level of well-being of respondents after being given treatments in the form of reading pocketbooks and listening to lectures on how to maintain spiritual well-being, which contains advice to remain grateful, patient, sincere, and pray a lot to Allah because they get a test in the form of T2DM has increased significantly different from before. This was also experienced in a study that used a well-being pocket book for children (Robinson.D., Moore.N., 2019) and a study using a booklet on people with T2DM which aimed to increase the daily activities of patients with neuropathy (Silva, E.O., Suda, E.Y., Santos, D.P., Verissimo, J.L., Ferreira. J.S.S., Junior, R.H.C., ...Sacco, 2020).

The results of this study also support a study on religious or spiritual practices related to the activities of Iranian T2DM patients. There was a positive and significant correlation between religious practices and self-care activities in T2DM patients. This indicates that religious practice improves spiritual well-being (Heidari, S., Rezaei, M., Sajadi, M., Ajorpaz, N.M., Koenig, 2017).

Furthermore, religious or spiritual practices must be supported based on each patient's culture. As Ghanaians who are migrants living in Europe and living in Africa realize that biomedical intervention co-exists with psychosocial and supernatural theories of diabetes, which is essentially called spiritual well-being (Aikins, G., Dodoo, F., Awuah, R.B., Dabo, E.O., Addo, J., Nicolaou, M.,...Agyemang, 2019). Given that the lifestyle of T2DM patients on aspects of spiritual well-being and psychological health is lower than that of non-DM patients as found in Iran, special attention should be paid to T2DM patients as well as possible (Valizadeh, M.M., Nasiri, T., & Shams, 2021).

Moreover, people who live in cities should be given more attention because they are prone to suffering from T2DM. This is supported by the results of research on predicting diabetes risk in people living in urban and rural areas in Columbia. The study found that people who live in urban areas are 1.9 times more at risk of suffering from diabetes than people who live in rural areas (Molina, R.T., Garcia, A.L.R., Vergora, T.A., Garcia, V.A.F., Guiterrez, V.R., Lozano, K.F., & Barengo, 2022).

CONCLUSION

There are differences in the spiritual well-being of T2DM patients who live in urban areas before and after the treatment. There are also differences in the spiritual well-being of T2DM patients living in rural areas before and after the treatment. The

difference in the level of well-being of people with T2DM between urban and rural areas after being given the treatment was proven to be significant. There was no control over the respondent's length of suffering from T2DM, which is a limitation of this study.

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Original Research

Peer Supports Was Related To Improving The Nurse's Self-Efficacy In Caring For Covid-19 Patients In Hospitals

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ABSTRACT

Background: Nurses who fought against Covid-19 are generally under pressure, so they are prone to anxiety and stress. This problem certainly affects the nurses' self-efficacy in caring for Covid-19 patients. Therefore, it is necessary to have support from nurse managers and colleagues to overcome this problem. This study aims to identify the correlation between nurse managers and peer support with nurses' self-efficacy in caring for Covid-19 patients in hospitals.

Methods: This study uses a quantitative descriptive method with a cross-sectional approach. The number of samples was 167 nurses from the Covid-19 referral hospital in Cirebon with the accidental sampling technique. Data were analyzed using the Chi-square test and multiple logistic regression tests.

Results: The results showed that there was a correlation between peer support and nurses' self-efficacy (p <0.001), and there was not a correlation between nurse manager support and nurses' efficacy in caring for Covid-19 patients in hospitals (p = 0.229). The most influential factors on nurses' self-efficacy were peer support (OR: 3.207) and gender (OR: 2.229).

Conclusion: Peer support was related to increasing the nurse's efficacy in caring for Covid-19 in the hospital. The recommendation is the hospitals need to increase support for nurses by providing motivation, information, and counselling for individuals who need it. Therefore the emotional burden of nurses can be reduced, and self-efficacy becomes better in doing the job.

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INTRODUCTION

Covid-19 is a disease that can be transmitted and has become a current pandemic in many countries worldwide. Covid-19 is a new challenge in the health system, such as the roles of nurses. Nurses have essential functions in the management of Covid-19 patients.

They not only provide nursing care but also coordinate and communicate with the other health care worker and family members to discuss the goals of Covid-19 patients

(Sharma, Pohekar, & Ankar, 2020). This disease's emergence also increases the chances of infection in health care workers, including nurses (Gallopeni et al., 2020). Therefore, the situation caused psychological pressure on nurses.

Nurses battling Covid-19 are generally under pressure, making them vulnerable to mental health problems (Gallopeni et al., 2020; Mo et al., 2020). Nurses have low sleep quality and high-stress levels during the pandemic process (Bilgiç, Çelikkalp, & Mısırlı, 2021). 2.2% to 14.5% of nurses have severe stress and anxiety (Bohlken, Schömig, Lemke, Pumberger, & Riedel-Heller, 2020).

The research on Covid-19 disaster volunteers in Indonesia found that most experienced mild stress, depression, and anxiety (Agustin, Nurlaila, Yuda, & Yulia, 2020). 61.9% of nurses have moderate stress levels, and 38.1% are low-stress in caring for Covid-19 patients (Sihombing & Septimar, 2020). Anxiety, stress, and depression scores significantly increased during the first wave of the Covid-19 pandemic compared with before the Covid-19 outbreak (Zakeri, Rahiminezhad, Salehi, Ganjeh, & Dehghan, 2021).

The increasing anxiety in nursing occurs because Covid-19 is a new disease. It changed the nurse's work routine, and they were not confident in caring for Covid-19 patients (Aydogdu, 2020; Rangachari & L Woods, 2020). It also affected self-Job performance was positively correlated with self-efficacy and not significantly associated with burnout.

However, self-efficacy was negatively correlated with burnout in psychiatric nursing (Lim, Song, Nam, Lee, & Kim, 2022). Rangachari & L Woods, 2020 mention that nurses need support to reduce anxiety and increase nurses efficacy during the Covid-19 pandemic, especially from nurse managers and peer support. Thoughtful and strong managers are needed during the Covid-19 pandemic. Nurse managers play a role in ensuring motivation, courage, and morale.

All nurses need (Turkmen, Aydogdu, Göktepe, & Baykal, 2020). The lack of support for nurses during the Covid-19 pandemic can reduce nurses' trust and psychological safety in communicating patient safety issues with nurse managers (Rangachari & L Woods, 2020). It is necessary to have support from various parties to reduce nurse anxiety and increase nurses' self-efficacy, especially from nurse managers and peer support.

Self-efficacy affects how a person thinks, feels, motivates, and acts. It is needed to provide hospital nursing care (Widyawati, Supriyadi, & Komarudin, 2022). Self-efficacy was correlated with mental health, resilience, and job fatigue experienced by nurses (Hsieh, Wang, & Ma, 2019). During the covid-19 pandemic, self-efficacy is essential in predicting the nurse's willingness and readiness to care for patients with infectious diseases (Lee & Kang, 2020).

Based on the description of the condition of psychological pressure for nursing during the Covid-19 pandemic, researchers are interested in examining the nurse manager and peers' support and nurses' self-efficacy in caring for Covid-19 patients in the hospital. This study aimed to identify the relationship between nurse managers and peer support with nurses' self-efficacy in caring for Covid-19 patients in hospitals.

MATERIALS AND METHOD

The design of this study used descriptive quantitative with a cross-sectional approach. The population of this study were all nurses in an isolation room for Covid-19 in referral hospital Covid-19 at Cirebon areas. The sample was taken using the

accidental sampling technique with a minimal selection was 158 respondents on duty in the Covid-19 room at RSD Gunung Jati Cirebon, RSUD Arjawinangun, and RS Paru Provinsi Jawa Barat with the criteria of being willing to be a respondent, and follow the rules of study.

Two hundred seventeen respondents followed this research, but only 167 nurses filled the questionnaire with full. Data was taken in May 2021 for one month using a questionnaire. The questionnaire was distributed with a google form via the WhatsApp application. But, there was a problem filling in the questionnaire with a google form, so it spread directly to hospitals.

The questionnaire used is a modification of several instruments. The nurse manager support questionnaire is a modified instrument from the Supervisor Support Scale (SSS) (McGilton, 2010). The peer support questionnaire was modified from Peer Caring Measurement (PCM) (Kuo, Turton, Lee-Hsieh, Tseng, & Hsu, 2007). The self-efficacy questionnaire is a modified instrument from the Self-Efficacy in Patient Centeredness Questionnaire (SEPCQ-27) (Zachariae et al., 2015).

All the questionnaires had obtained permission for modification from previous researchers by email. Chronbach's Alpha value obtained in the validity test of the nurse manager support questionnaire was 0.856, the peer support questionnaire received a value of 0.907, and for the nurse self-efficacy questionnaire, the value obtained was 0.884. Data were analyzed using the Chi-Square test and logistic regression test using SPSS.

This research was conducted after passing the ethical test at the Faculty of Nursing, the University of Indonesia with the number: SK-63/UN2.F12 D1.2.1/ETIK 2021 on March 11th, 2021, and passing the ethics test at Rumah Sakit Gunung Jati, Kota Cirebon number: No.086/LAIKETIK/KEPKRSGJ/V/2021 on May 6th, 2021. In addition, researchers also pay attention to the ethical aspects of research, including goodwill, respect for human dignity, justice, privacy, anonymity, and informed consent.

RESULTS

This study was conducted on 167 nurses who served in the Covid-19 room at the Cirebon area hospital, most of whom were male (50.9%), had vocational education (63.5%), aged more than 35 years (53, 9%), nurses have worked for more than six years (61.7%). They have an available position 1 (42.5%).

Table 1 describes nurse manager support, peer support, and nurses' self-efficacy in the hospital. Description of nurse manager support for nurses who treat Covid-19 patients is in the excellent category, as much as 60.5%. The overview of peer support to nurses caring for patients with Covid-19 includes both categories, amounting to 53.3%.

Meanwhile, the description of the self-efficacy of nurses caring for Covid-19 patients shows that nurses' self-efficacy is still relatively low, 50.3%.

Table 1. Description of Nurse Manager and Peer Support and Nurses' Self-Efficacy in Cirebon Regional Hospital, May 2021 (n=167)

Variable	n	Percentage (%)
Nurse Manager Support		
Good	101	60.5
Deficient	66	39.5
Peer Support		
Good	89	53.3

Variable	n	Percentage (%)
Deficient	78	46.7
Self-Efficacy		
Low	84	50.3
High	83	49.7

Table 2 shows the relationship between the characteristics of respondents and nurses' self-efficacy. It was found that there was a relationship between gender and nurses' self-efficacy (p-value of 0.011). There was also a significant relationship between age and nurses' self-efficacy in caring for Covid-19 patients in the hospital (p-value 0.024). It also found a meaningful connection between the working period of nurses and nurses' self-efficacy in caring for Covid-19 patients in hospitals (p-value 0.013).

Table 2. The Relationship of Respondents' Characteristics to Nurse's Self-Efficacy at Cirebon Regional Hospital, May 2021 (n=167)

Variable	Self-Efficacy				95% CI		P-value
	Low		High		OR	Min-Max	
	n	%	N	%			
Gender							
Male	51	60	34	40	2.227	1.19 – 4.13	0.011*
Female	33	40.2	49	59.8			
Education Level							
Vocational	54	50.9	52	49.1	0.932	0.50 – 1.75	0.826
Profession	30	49.2	31	50.8			
Functional Position							
PK 1	37	52.1	34	47.9			
PK 2	28	58.3	20	41.7	-	-	0.171
PK 3	19	39.3	29	60.4			
Age							
<35.10	55	57.9	40	42.1	2.039	1.09 – 3.80	0.024*
>35.10	29	40.3	43	59.7			
Working period							
< 6 years	40	62.5	24	37.5	2.235	1.18 – 4.23	0.013*
> 6 years	44	42.7	59	57.3			

Table 3 shows that statistically, there is no relationship between nurse manager support and nurses' self-efficacy in caring for Covid-19 patients (p = 0.229). However, there was also a significant relationship between peer support and nurses' self-efficacy in caring for Covid-19 patients in the hospital (p < 0.000). Nurses who received good peer support had higher self-efficacy than nurses who received deficient peer support (62.9%).

Table 3. The Relationship between Nurse Manager and Peer Support for Self-Efficacy in Cirebon Regional Hospital, May 2021 (N=167)

| Variable | Self-Efficacy | | | | 95% CI | | P-value |
| | Low | | High | | OR | Min-Max | |
	n	%	n	%			
Nurse Manager Support							
Deficient	37	56.1	29	43.9	1.446	0.78 – 2.73	0.229
Good	47	46.5	54	53.5			
Peer Support							
Deficient	51	65.4	27	34.6	3.205	1.69 – 6.04	0.000*
Good	33	37.1	56	62.9			

Table 4 shows that the influential factor on nurses' self-efficacy is gender and peer support. Peer support was the most significant variable of nurses' self-efficacy in caring for Covid-19 patients. Nurses who received good peer support had a self-efficacy of 3,207 times higher than nurses who received deficient support after being controlled by gender (95% CI).

Table 4. Final Modeling of the Most Influential Variables on Nurse Self-Efficacy in Cirebon Regional Hospital, May 2021 (N=167)

Step	Variable	B	S.E	Wald	df	P-value	OR	95% CI (Min-Max)
5	Peer Support	1.165	0.330	12.451	1	0.000	3.207	1.679 – 6.127
	Gender	0.802	0.329	5.927	1	0.015	2.229	1.169 – 4.250
	Constant	-1.030	0.297	12.025	1	0.001	0.357	-

DISCUSSION

This research was conducted during the Covid-19 pandemic, and many nurses had a lot of psychological pressure because the case of Covid-19 increased. They felt stress, anxiety, and not confidence in caring for Covid-19 patients (Rangachari & L Woods, 2020; Zakeri et al., 2021). This study found that self-efficacy during the Covid-19 pandemic is low.

It can happen because the Covid-19 pandemic was a new situation for nurses, who are inexperienced in caring for Covid-19 patients. The previous study also found low nurses' self-efficacy. Nurses cause it to lack the experience and confidence to cope with it. Nurses not confident in dealing with Covid-19 may feel more anxiety (Rangachari & L Woods, 2020; Xiong, Yi, & Lin, 2020). So nurses' self-efficacy was negatively correlated with anxiety (Xiong et al., 2020).

This study found a relationship between genders and nurses' self-efficacy in caring for Covid-19 patients in hospitals. Female nurses have higher self-efficacy than male nurses. This is because females have many roles in their lives, so females are more experienced in dealing with various situations. Women who work and become homemakers will have higher self-efficacy than men who only work (Manuntung, 2018).

This result was different from the previous study, which showed that the self-efficacy of males was higher than that of females. It caused the male to have a more mature readiness to solve the problem and find solutions (Handiyani et al., 2019). The results of statistical analysis showed that age-related to nurses' self-efficacy. The

possible explanation is that older nurses are more mature, influencing their thinking and perception of their abilities to do something; it will affect their self-efficacy.

This result was conducted by the research of (Wang, Qu, and Xu, 2015), which states that the level of efficacy is higher in the age group between 30-50 years, while the group under 30 and above 50 years has a lower level of self-efficacy. According to (Manuntung, 2018), 35 years is an adult age when a person begins to focus on their efficacy. Age will affect how to think and work. A more mature person will be better at thinking and working (Robbins & Judge, 2017).

The results showed a relationship between the working period and the nurse's self-efficacy. Respondents with more than six years of work have high self-efficacy. It can happen because the longer a person work, the more experience they have. The incident dramatically affects a person's self-efficacy in providing care to patients (Mukti & Tentama, 2019).

That a good experience can increase nurses' self-efficacy, while a lack of knowledge and experience can result in low nurses' self-efficacy in clinical competence (Welsh, 2014). Another research also stated that nurses who had just worked in hospitals during the Covid-19 pandemic, incredibly fresh graduated, felt that they experienced emotional changes such as nervousness and uncertainty due to the nurses' ignorance in caring for Covid-19 patients (Gómez-Ibáñez, Watson, Leyva-Moral, Aguayo-González, & Granel, 2020).

In addition to being under pressure, they also feel responsible and highly committed to society, the profession, and themselves in dealing with Covid-19. Therefore, they will feel guilty if they only quiet during this pandemic. This of course raises the pressure on them (Gómez-Ibáñez et al., 2020). This research investigated the support of nurse managers and peers and nurses' self-efficacy in a public hospital caring for Covid-19 patients. We found that the support of nurse managers and peers was included in the excellent category.

The possible reason is nurse managers and peers it was the same situation. They were inexperienced with the Covid-19 pandemic. They are still confused, stressed, and anxious with a change in their work routine. So that they support each other to continue the best nursing care for Covid-19 patients. Peer support provides intervention for mental health (Godfrey & Scott, 2020).

In a pandemic situation, thoughtful and robust managers are indispensable for nurses. It causes managers to play a role in ensuring nurses' motivation, courage, morale, and needs during the Covid-19 pandemic (Turkmen et al., 2020). Statistically, there is no relationship between nurse manager supports on nurse self-efficacy.

This study's results differ from previous research, which states that there is a significant relationship between the role of the head of the room and the nurses' self-efficacy (Saputra, Yanti, & Suarningsih, 2019). This difference is due to the current nurse manager's stress and anxiety in the face of the Covid-19 pandemic. They strive to remain in the lead despite experiencing unprecedented challenges. Simultaneously, nurse managers have personal fears and demands to care for their families and colleagues. So this affects their attitude in their role (Gerardi & Lawson, 2021).

Nurse managers carry out interpersonal roles, such as providing nurses support, motivation, and information (Robbins & Judge, 2017). These are parts of social persuasion that can increase self-efficacy because of the self-confidence that arises from one's self-motivation (Aydogdu, 2020; Manuntung, 2018; Saputra et al., 2019). The results of this study are also not to research conducted (Zaghini et al., 2021), which

found that nurse manager support can reduce exposure to stress due to work and emotional exhaustion of nurses during work stress in a pandemic.

The study found a relationship between peer support and nurses' self-efficacy in treating Covid-19 patients. These results align with the research conducted by Wang et al., 2018, that the help of friends and co-workers has a direct positive effect on self-efficacy at the beginning of a nurse's career. A supportive work environment can improve nurses' self-efficacy and performance professionally (L. Wang et al., 2018; Welsh, 2014).

Peer support can provide proactive services during the Covid-19 pandemic by providing empathy and compassion for co-workers. It is proven to reduce difficulties, build nurse resilience after experiencing stress, build a sense of security, calm, and self-efficacy, and increase nurses' recovery expectations. During the Covid-19 pandemic, this peer support provided interventions for mental health and psychological first aid (Godfrey & Scott, 2020).

Nurses' self-efficacy will continue to increase if nurses have strong self-confidence. This self-confidence can be obtained by providing motivation, information, opportunities to express feelings, and increasing knowledge and skills to nurses as a form of support given to nurses in charge of caring for Covid-19 patients (Kackin, Ciydem, Aci, & Kutlu, 2021; Viswanathan, Myers, & Fanous, 2020). Thus, the burden nurses feel can be slightly reduced to increase self-efficacy, and it is hoped that nursing care can be carried out correctly.

CONCLUSION

There was a relationship between peer support and nurses' self-efficacy in caring for Covid-19 patients in hospitals. But there is no significant relationship between nurse manager support and nurses' self-efficacy in caring for Covid-19 patients in hospitals. Nurses who receive peer support have higher self-efficacy than nurses who do not receive peer support. The variables that influence nurses' self-efficacy most are peer support and gender. The better peer support will increase the nurse's self-efficacy three times compared to nurses who lack support from peers after being controlled by gender.

This study recommends the need for support from various parties to increase nurses' self-efficacy in treating Covid-19 patients in hospitals. One of them is monitoring the health and welfare of nurses regularly, providing guidance and counselling for nurses, providing the latest information, and being empathetic to nurses. In addition, there is a need for further research related to self-efficacy in Covid-19 volunteer nurses qualitatively to deepen the factors that affect self-efficacy in treating Covid-19 patients.

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Original Research

Fatigue Level Of Chronic Kidney Failure Patients After Undergoing Hemodialysis Therapy

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ABSTRACT

Background: *Chronic kidney failure is a terminal illness where the disease cannot be cured, so it requires hemodialysis therapy. Life changes in post-HD patients cause various complications that make patients feel uncomfortable, have insomnia, and feel dizzy and tired. Therefore, it is necessary to measure the level of fatigue using a post-dialysis fatigue scale to anticipate the exhaustion felt by the patient on the subsequent dialysis.*

Methods: *Quantitative research using PLS statistics, the population in this study consisted of 69 residents who had post HD and conducted on 59 samples with purposive sampling. Obtained the results of validity and reliability in the study, composite realiability= 0.902; rho_A= 0.895; discriminant validity=0.650. Collecting data using a questionnaire Post Dialysis Fatigue Scale (PDFS). The study was conducted in February 2022.*

Results: *The results showed that most respondents felt severe fatigue, as many as 44 people (74.6%) after undergoing hemodialysis therapy. The items that respondents felt most about fatigue levels included feeling dizzy, headache, no appetite, chest aches, and pains. In addition, the majority of respondents aged ≥50 years, 26 respondents (70.3%) felt severe fatigue. While the majority of respondents who underwent hemodialysis for ≥12 months, namely as many as 35 respondents (76.1%), felt extreme fatigue.*

Conclusion: *Most respondents were dominated by men with an average blood pressure of 140/88 mmHg and were in the category of severe fatigue.*

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INTRODUCTION

Chronic kidney failure (CKD) is a disease that causes the kidneys to decline to the point that they cannot function properly (Kundre, 2018). The prevalence of chronic renal failure in 2017 increased with the number of elderly. About 1/10 of the world's population suffers from CKD at a particular stage (Info DATIN, 2017).

Chronic renal failure cases, based on doctors' diagnoses in Central Java, ranked third with a total of 96,794 people in 2018 (Riskesdas,2018) (Health Research and Development Agency of Central Java Province, 2018). Patients with chronic renal failure need life-supporting treatment, namely kidney transplantation or treatment with hemodialysis (Ardhyanto et al., 2019). Hemodialysis is a very efficient treatment that can quickly eliminate uremic toxins and correct abnormalities in fluid status, electrolytes, and acid-base balance (Kooman et al., 2018).

In hemodialysis, kidney function is replaced by a device called a dialyzer, where dialyzer is a process that transfers blood-soluble substances into a dialysate or vice versa (Wiliyanarti & Muhith, 2019). The Indonesian population participating in HD therapy in 2017 consisted of 25,446 new and 52,835 old patients (Ministry of Health RI, 2018). The Indonesian Renal Registry (IRR) shows that in 2018, in Indonesia, there were 66,433 new hemodialysis patients, while active hemodialysis patients were recorded as many as 132,142 active patients (PERNEFRI, 2018).

Changes in the life of hemodialysis patients will cause various complications that make patients feel uncomfortable, experience anxiety, low situational self-esteem, impaired body image, and fatigue (Riski et al., 2019). Fatigue is a common symptom in kidney disease patients undergoing hemodialysis (Diana, 2020). The level of fatigue is relatively high in post-dialysis patients, with the results of Diana, (2020) showing that as many as three respondents (6.3%) felt mild fatigue, 13 respondents (27.1%) felt moderate fatigue, and 32 respondents (66.6%) felt severe fatigue after undergoing hemodialysis.

The results of a study by Maesyaroh et al., (2020) on 116 post-HD respondents experienced moderate fatigue (67%), followed by mild and severe fatigue (16.5%). Fatigue is linked to dialysis recovery time, with about a quarter of patients returning to the initial behavior within minutes after the dialysis is completed, a third recovering at home, and nearly a quarter recovering the following day (Diana, 2020). Fatigue after dialysis is influenced by several factors, including osmotic disequilibrium, blood membrane interactions, ultrafiltration, and diffusion (Kundre, 2018).

According to Kooman et al., (2018), osmotic equilibrium is a severe complication of post-hemodialysis. The signs and symptoms vary greatly, ranging from anxiety, fatigue, and headaches to coma and death. According to Shofaniah, (2018), ultrafiltration is a hemodialysis process to remove excess fluid from the blood, including non-profiling and profiling techniques; ultrafiltration affects the occurrence of hypotension in hemodialysis and fatigue in patients. Islamic hospitals in Indonesia have hemodialysis units, one of which is the Islamic Hospital (RSI) Sultan Agung Semarang.

The results of the preliminary study on November 22, 2021, at RSI Sultan Agung Semarang were obtained from the (RSISA Medical Record, 2021). In April-June 2021, there were 96 patients undergoing hemodialysis. Based on an interview with the head of the hemodialysis unit room Muchfid, (2021), it is known that currently, the patients who are recorded as regularly scheduled to perform hemodialysis in a month are 69 patients with an average per day hemodialysis unit of RSI Sultan Agung Semarang receiving around 20 patients who serve hemodialysis.

There are still differences in the results of research on the level of fatigue of chronic kidney failure patients after undergoing hemodialysis, and chronic kidney failure patients who undergo HD are increasing in Indonesia every year. According to the head of the HD

unit room Muchfid, (2021), it is known that there has been no previous research that uses the title of fatigue level after undergoing HD at RSI Sultan Agung Semarang. In earlier studies on the level of fatigue of post-HD patients using the Post-Dialysis Fatigue Scale instrument, there were no reliable test results on the Post-Dialysis Fatigue Scale instrument in Indonesian (Diana, 2020).

Therefore, an indicator of the success of HD patients in overcoming post-HD fatigue is to monitor fatigue levels and anticipate if post-HD patient fatigue occurs. From the above, it can be concluded that the nurse's role is indispensable in overcoming the fatigue of patients with chronic renal failure post-hemodialysis. Based on the background and results of previous studies, researchers are interested in researching "Fatigue Levels of Chronic Kidney Failure patients after undergoing Hemodialysis therapy at RSI Sultan Agung Semarang".

MATERIALS AND METHOD

The type of research used is descriptive analysis with a quantitative approach. The research site was carried out at RSI Sultan Agung Semarang. The population of patients undergoing hemodialysis was 69 residents. The sample to be used in this study was 59 respondents. The sampling technique is purposive sampling.

The inclusion criteria are as follows: chronic renal failure patients undergoing hemodialysis at RSI Sultan Agung Semarang, patients with compliments awareness, patients who are willing to become respondents by signing an informed consent sheet, and patients who can read and write. Exclusion criteria include patients undergoing incidental HD (not routine). The research instruments used in this study included observation sheets to record age, gender, last level of education, length of hemodialysis, dry weight, and blood pressure.

Post-dialysis fatigue Scale sheet to measure respondents' fatigue levels consisting of 13 negative statements using the Likert scale. On this Likert scale, strongly agree statements are rated (5), agree (4), disagree (3), disagree (2), and strongly disagree (1). In the study of Maesyaroh et al., (2020), it was stated that the level of fatigue experienced by hemodialysis patients was from mild to severe. So based on that the researcher made the following category of fatigue: mild fatigue = 13 – 30; Moderate Fatigue = 31 – 48; Severe Fatigue = 49 – 65.

The instrument of this study on validity and reliability tests using ten different respondents from the sample. Validity was measured using Pearson product-moment correlation, and reliability was measured using the alpha Cronbach technique Sugiyono, (2017). The PDFS instrument shows acceptable validity (r table = 0.632) and good validity results of this study (r result = 0.977) with high validity category. The reliability of PDFS with the consistency of acceptable intervals (r table = 0.60) and the reliability results of this study are good (r Cronbach's alpha = 0.970) with high-reliability categories. Obtained data on calculations using PLS statistics as follows, namely are (composite reliability = 0.902; rho A = 0.895; discriminant validity = 0.650).

The data collection method involves interviews, observations, and questionnaires. This research was conducted after obtaining ethical worthy from RSI Sultan Agung Semarang with ethics no. 21/KEPK-RSISA/II/2022. The flow of this study was that in the first period, demographic data was taken (including age, gender, the last level of education,

the duration of undergoing hemodialysis, dry weight, and blood pressure). Then, researchers helped respondents to complete a questionnaire from 13 statements that had been prepared.

Next, researchers re-examined the demographic questionnaire and the PDFS questionnaire if any were incompletely filled out. Finally, after the data was collected from all respondents, the researcher analyzed them. The analysis used in this study is the PLS statistic, which was presented in the form of frequency and percentage distributions of each variable. While the PDFS item is presented in the form of mean and standard deviation.

In PLS statistics obtained insignificant results between the PDFS questionnaire and the demographic data questionnaire with the results (f Square = 0.112; R Square = 0.101; Path coefficient = 0.317). The linear regression test found no significant difference between demographic data and PDFS questionnaires with results (sig. 0.506[b]), so this research used descriptive analysis.

RESULTS
Demographics of Respondents
Table 1 shows that most of the respondents' ages were ≥50 years, as many as 37 people (62.7%), with the average age of respondents being 51.81 years and a standard deviation of 9,52. In the gender category, most respondents were male, namely 38 people (64.4%). Meanwhile, there were 21 female respondents (35.6%). Finally, in the demographic data for the last level of education, respondents who had previous primary and high school education had the same number, namely 20 people (33.9%).

Based on the length of hemodialysis, most respondents underwent HD for ≥12 months, as many as 46 people (78%), with the average respondent undergoing HD for 31.10 months and a standard deviation of 24,32. In the dry weight category after hemodialysis, most of the respondents who achieved dry weight were 40 people (67.8%), with an average dry body weight of respondents of 65.97 kg and a standard deviation of 9.97.

Based on blood pressure, most respondents had a systolic between 131-160 mmHg, which was 28 people (47.5%) and most respondents had a diastolic between 70-80 mmHg, which was 25 people (42.4%). Therefore, the average systolic and diastolic respondents were obtained at 139.96/88.57 mmHg, with a standard deviation of 18.47 and a diastolic of 9.68.

Table 1. Distribution of frequency, percentage, average, and standard deviation of respondents' demographic data after undergoing hemodialysis in 2022 (n=59)

Demographics Data	f	%	Mean	SD
Age			51,81	9,52
17-27 years	2	3,4		
28-38 years old	4	6,8		
39-49 years old	16	27,1		
≥50 years	37	62,7		
Gender				
Man	38	64,4		
Woman	21	35,6		

Demographics Data	f	%	Mean	SD
Last Level of Education				
No school	3	5,1		
Primary School	20	33,9		
Junior High School	10	16,9		
Senior High School	20	33,9		
≥Bachelor	6	10,2		
Long time undergoing HD			31,10	24,32
<12 months	13	22		
≥12 months	46	78		
Dry weight			65,97	9,97
Reached	40	67,8		
Not achieved	19	32,2		
Blood pressure				
Systolic			139,96	18,47
100-130	25	42,4		
131-160	28	47,5		
161-190	6	10,2		
Diastolic			88,57	9,68
70-80	23	39		
81-90	15	25,4		
91-100	21	35,6		

Respondents' Fatigue Levels After Undergoing Hemodialysis

Table 2 shows that the respondent's fatigue level after undergoing hemodialysis was obtained on average with a score of 52.11, which means that the average respondent belongs to the category of severe fatigue and has a standard deviation of 6.92. Then as many as one respondents (1.7%) felt mild fatigue with an average score of 30. Furthermore, 14 respondents (23.7%) felt moderate fatigue with an average score of 43.42 and a standard deviation of 4,01. Meanwhile, 44 respondents (74.6%) felt severe fatigue with an average score of 55.38 and a standard deviation of 3.59.

Table 2. Average, standard deviation, frequency distribution, and percentage of respondents' fatigue scale after undergoing hemodialysis in 2022 (n=59)

Variable	f	%	Mean	SD
Respondents' fatigue levels			52.11	6,92
Mild Fatigue (13-30)	1	1,7	30	0
Moderate Fatigue (31-48)	14	23,7	43,42	4,01
Heavy Fatigue (49-65)	44	74,6	55,38	3,59
Total	59	100		

Table 3 shows that post-hemodialysis patients stated "Strongly Agree" feeling dizzy, averaging 4.91 (SD ± 0.89). Furthermore, it was found that post-hemodialysis patients said "Strongly agree" to feel headaches with an average of 4,83 (SD ± 0.94). Then on the no appetite item, respondents stated "Strongly Agree" with an average of 4,59 (SD ± 0.94).

Meanwhile, in the chest item, respondents said "Agree" with an average of 4.50 (SD ± 0.87). Finally, respondents stated "Agree" on the pain item with an average of 4.45 (SD ± 0.79).

Table 3. Average and standard deviation of post-dialysis fatigue Scale items in post-hemodialysis patients (n=59)

Item	Mean	SD	Information
Feeling exhausted	4,07	0,73	Agree
Body aches	4,08	0,83	Agree
Feeling tired and lethargic	4,20	0,88	Agree
Feeling dizzy	4,91	0,89	Strongly agree
I need to lie down and take a nap	4,28	0,74	Agree
It is difficult to move if you do not rest	4,34	0,82	Agree
No appetite	4,59	0,94	Strongly agree
Feeling a headache	4,83	0,94	Strongly agree
Chest pain	4,50	0,87	Agree
Feeling toothache	4,37	0,88	Agree
I don't want to move	4,15	0,88	Agree
Not motivated by anything	4,30	0,81	Agree
Feeling pain	4,45	0,79	Agree

Fatigue Levels Based on Demographic Data of Post Hemodialysis Patients

Based on table 4, it is known that 26 respondents aged ≥50 years old experienced severe fatigue (70.3%). In the gender category, male respondents who experienced extreme fatigue were 29 people (76.3%). Based on the last level of education, 15 respondents who graduated from elementary school experienced severe fatigue (75%). Meanwhile, when he graduated from high school, he experienced extreme fatigue as many as 17 people (85%). In the old category of undergoing hemodialysis, respondents who underwent hemodialysis ≥12 months experienced moderate fatigue as many as 11 people (23.9%) and severe fatigue as many as 35 people (76.1%).

Based on dry body weight, respondents with dry body weight achieved mild fatigue as many as one person (2.5%), moderate fatigue as many as ten people (25%), and severe fatigue as many as 29 people (72.5%). In the blood pressure category, respondents who had a systolic of 131-160 mmHg experienced mild fatigue in as many as one person (3.6%), moderate fatigue in as many as five people (17.9%), and severe fatigue in as many as 22 people (78.5%). Respondents with a diastolic of 81-90 mmHg experienced moderate fatigue in as many as four people (26.7%) and severe fatigue in as many as 11 people (73.3%).

Table 4. Distribution frequency and percentage of respondents' fatigue scale after undergoing hemodialysis based on respondents' demographic data in 2022 (n=59)

Respondents' Demographic Data	Respondents' Fatigue Levels Post HD					
	Mild		Moderate		Heavy	
	f	%	f	%	f	%
Age						
17-27 years	0	0	0	0	2	100

Respondents' Demographic Data	Respondents' Fatigue Levels Post HD					
	Mild		Moderate		Heavy	
	f	%	f	%	f	%
28-38 years old	0	0	0	0	4	100
39-49 years old	1	6,2	3	18,8	12	75
≥50 years	0	0	11	29,7	26	70,3
Gender						
Man	1	2,6	8	21,1	29	76,3
Woman	0	0	6	28,6	15	71,4
Last Level of Education						
No school	0	0	2	66,7	1	33,3
Primary School	0	0	5	25	15	75
Junior High School	0	0	4	40	6	60
Senior High School	1	5	2	10	17	85
≥ Bachelor	0	0	1	16,7	5	83,3
Long time undergoing HD						
<12 months	1	7,7	3	23,1	9	69,2
≥12 months	0	0	11	23,9	35	76,1
Dry weight						
Reached	1	2,5	10	25	29	72,5
Not achieved	0	0	4	21,1	15	78,9
Blood pressure						
Systolic						
100-130	0	0	7	28	18	72
131-160	1	3,6	5	17,9	22	78,5
161-190	0	0	2	33,3	4	66,7
Diastolic						
70-80	0	0	7	30,4	16	69,6
81-90	0	0	4	26,7	11	73,3
91-100	1	4,8	3	14,2	17	81

DISCUSSION

Based on the respondents' age, the majority were aged ≥50 years, namely 37 respondents (62.7%), with the average age of respondents being 51.81 years and a standard deviation of 9.52. This study's results align with the research Hartini, (2016) that the decline in kidney function on a small scale is average for every human being as he ages. This is supported by Endarti's, (2017) research, where age is a risk factor for chronic kidney failure. In chronic kidney failure disease, the risk increases with a person's age.

After the age of 50 years, kidney filtration will decrease. This decrease is predicted to be around 1% yearly (Centers for Disease Control and Prevention, 2019). The age above 50 years is an age that is very vulnerable to various diseases, including chronic kidney failure and complications that can worsen kidney function (Ismail, 2016). This study showed that the number of respondents was dominated by men, with 38 respondents (64.4%).

The results of this study align with Endarti, (2017), which states that most men also often experience systemic diseases (diabetes mellitus, hypertension, glomerulonephritis, polycystic kidney, and lupus) as well as a history of inherited family diseases. Man are more prone to suffer from chronic renal failure caused by lack of volume in the urine or excess compounds (natural compounds containing calcium consist of oxalate or phosphates and other compounds such as uric acid and amino acid cystine), the influence of hormones, physical state, and intensity of activity, narrower male urinary tracts make kidney stones become clogged more often (Hartini, 2016).

The lifestyle of men who have the habit of smoking and drinking alcohol can cause tension in the kidneys so that the kidneys work hard. Alcohol carcinogens filtered out of the body through the kidneys change DNA and damage kidney cells affecting kidney function (Ariani, 2016). Based on the latest level of education, this study's results showed similar results. Namely, 20 respondents (33.9%) were elementary and high school graduates who underwent hemodialysis.

The results of this study, supported by Barnet et al., (2007), showed that the level of education provides a difference in the ability to obtain information about chronic renal failure and inhibits patients from undergoing hemodialysis. This is corroborated by the research of Mollaoglu, (2009), patients with a high level of education have a good level of health examination awareness, while low-level patients are afraid of undergoing hemodialysis, so it is necessary to increase their knowledge about chronic renal failure.

In addition, the higher a person's education, the faster it will understand the disease suffered, and the lack of knowledge and awareness causes the patient to come with complaints that are already severe. At the follow-up time, the examination is already at the final stage (Hartini, 2016). The theory reinforces that chronic renal failure cases at stages 1 and 2 have not shown specific symptoms and complaints (Wibisono, 2014). Thus, patients with a low education level will tend to be at risk of suffering from chronic renal failure.

Based on the length of undergoing hemodialysis, the results of this study showed that the number of respondents who underwent hemodialysis was mostly for ≥ 12 months. Namely, 46 respondents (78%) with the average length of respondents undergoing HD was 31.10 months and a standard deviation of 24.32. Patients undergoing hemodialysis for more than two years are a normal category in undergoing HD. The longer the patient undergoes hemodialysis, the more likely to have a better condition than patients who have not undergone hemodialysis for a long time.

The long period of hemodialysis in chronic renal failure patients dramatically affects the patient's condition and condition both physically and psychically (Endarti, 2017). The longer the patient undergoes hemodialysis, the more obedient the patient is to undergo hemodialysis because usually, respondents have reached the stage of receiving plus they are also likely to get a lot of health education from nurses and doctors about the disease and the importance of carrying out hemodialysis regularly for them (Devi & Rahman, 2022). The results of this study are supported by Ardhyanto et al., (2019) that patients with chronic renal failure patients must be hemodialysis for life because chronic kidney disease (CKD) is a late-stage disease that requires life support treatment, namely hemodialysis (HD) or by performing a kidney transplant.

This study's results showed that respondents' average dry body weight was 65.97 kg and the standard deviation was 9.97 with dry body weight reached, which was 48 people

(67.8%). This study's results are expected because most respondents go the dry weight and have achieved BMI. The results of this study are supported by Daugirdar, (2015) research that as many as 28 respondents have gone dry body weight, but patients still feel lethargic after hemodialysis.

The results of this study are corroborated by the analysis of Bossola et al., (2018), who stated that dry weight is usually not accompanied by edema and dyspnea. However, hemodialysis therapy can potentially experience hypotension after dialysis due to high and fast ultrafiltration. Dedi, (2019) shows signs of dry weight reached, one of which is that blood pressure is within the normal range after undergoing hemodialysis or before the next hemodialysis session.

The results of this study showed that the average blood pressure of respondents was 139.96/88.57 mmHg with a standard deviation in systolic of 18,47 and diastolic of 9,68. The majority of respondents can be said to have high blood pressure, with an average blood pressure that exceeds the standard limit of 120/80 mmHg. The results of this study are corroborated by Tjekyan, (2012) states that, in general, kidney failure occurs due to progressive damage due to high pressure on the glomerular capillaries, blood will flow to the functional units of the kidneys, neurons will be disturbed, and can continue to be and die. With the destruction of the glomerular membrane, the protein will come out simultaneously with the urine, so the osmotic pressure of the colloidal plasma is reduced. This leads to edema that is often found in chronic hypertension.

Based on the theory from the research of Tjekyan, (2012), The kidneys control blood pressure by 1) If blood pressure increases, the kidneys will increase the production of salt and water, which will lead to a decrease in blood volume and return blood pressure to normal; 2) If the blood pressure decreases, the kidneys will reduce the removal of salts and water so that the blood volume increases and the blood pressure returns to normal; and 3) the kidneys can also increase blood pressure by producing an enzyme called renin, which triggers the formation of the hormone angiotensin, which will further trigger the release of the hormone aldosterone (Tjekyan, 2012).

Based on table 2, it was found that as many as 44 respondents (74.6%) felt severe fatigue, with an average score of respondents' fatigue level of 52.11 and a standard deviation of 6,92. The results of this study are in line with Diana, (2020) research conducted on 48 respondents, showing data that 32 respondents (66.7%) felt severe fatigue. Bossola et al. (2018) supported the results of this study, which showed that 164 out of 271 respondents experienced post-dialysis fatigue, of which 94 experienced severe fatigue.

This study is the same as the results of the research of Su Jeong Han, (2015) showed that patients undergoing hemodialysis had a high level of fatigue after hemodialysis. The percentage of patients who experienced fatigue after hemodialysis was 59.8%. Based on table 3, it is known that most post-HD patients feel a level of fatigue, including dizziness, headaches, not having an appetite, chest pain, and pain. Gifts of dizziness felt by hemodialysis patients are caused by blood flow that tries to compensate for the increased blood circulation along with the high and rapid ultrafiltration process (Nurhayati, 2018).

Complaints of headaches in post-hemodialysis patients are usually felt in the upper head area extending from the orbital to the back of the head (Senanayake, 2020). Chepalgia or headache is characterized by a charge such as being tied up, not throbbing, pain not centered at one point, occurring spontaneously, vertigo, and impaired concentration

(Kusuma, 2012). Chepalgia can cause disorders in post-hemodialysis patients, such as causing depression and anxiety until the patient's appetite decreases (Hidayati, 2016). The study results also have similarities with Siswani's (2018) study of 73 post-HD respondents. It was found that as many as 74% of the total respondents felt a loss of appetite accompanied by nausea, vomiting, and chest pain.

The majority of respondents aged ≥50 years, 26 respondents (70.3%) felt severe fatigue. The results of this study are in line with Diana, (2020) that most of the respondents aged >50 years, namely as many as 11 people (36.7%), experienced severe fatigue. In this study, it was corroborated by the research of Ardhyanto et al., (2019) stated that a person over the age of 50 years will experience a gradual decrease in the glomerular filtration rate until the elderly, the normal range is around 50% which results in the higher the age of the patient, the heavier the fatigue.

In this case, the results of the study have similarities with the research of Ismail, (2018). Age is related to the prognosis of the disease and life expectancy, so patients over 50 years old are prone to complications that worsen kidney function. Increased age causes a decrease in organ function, and the risk of fatigue increases. The results of this study showed that the number of respondents was dominated by men, reaching 38 respondents (64.4%).

This study is in line with the results of Maesaroh, (2019) that there is a relationship between sex and the onset of fatigue, meaning that when in conditions after hemodialysis, men are unable to manage their diet and rest compared to women and the majority of men still have jobs and become the backbone of the family, so that time to rest is reduced. Furthermore, based on the latest level of education, this study's results showed similar results, namely 20 respondents (33.9%) were elementary and high school graduates who underwent hemodialysis. Of the 20 respondents who graduated from elementary school, 15 (75%) felt severe fatigue. Meanwhile, of the 20 respondents who graduated from high school, 17 (85%) felt severely exhausted.

The results of this study are in line with the research of Sulistini et al., (2012) that there is no relationship between educational achievement and the onset of fatigue. Furthermore, this is in line with the results of Research by Sulistini et al., (2012), which states that there is a relationship between the length of hemodialysis and the level of fatigue, where patients experience an increase in fatigue by one month during the HD period. In this regard, the results of the study were also corroborated by the research of Bossola et al., (2018), showing the effects that as many as 104 fatigued patients had a longer recovery time and lower levels of ultrafiltration, as well as older age and a longer duration of hemodialysis.

Based on dry weight, more patients with dry body weight were achieved in this study. Of the 48 respondents (67.8%) with dry body weight reached, 29 people (72.5%) felt severe fatigue. Widiyanto, (2013) supports this study's results, where dry weight can be influenced by fluid input, thirst, self-efficacy, and fatigue. This is corroborated by Kamyar, (2009) study that patients with excessive fatigue will affect the body weight of post HD patients, characterized by loss of appetite in post-hemodialysis patients.

The results of this research are also supported by Daugirdar, (2015) study that fatigue in post-hemodialysis patients affects dry weight achieved or not, where dry body weight achieved will have heavier fatigue compared to dry body weight that is not gained. Based

on blood pressure, the results of this study were more post-hemodialysis patients with systolic (131-160) and diastolic (70-80) blood pressure, namely 28 people (47.5%) for systolic and as many as 23 people (39%) for diastolic. Of the 28 respondents with systolic blood pressure (131-160), 22 people (78.5%) felt severe fatigue.

Meanwhile, of the 23 respondents with diastolic blood pressure (70-80), 16 people (69.6%) felt extreme fatigue. This is corroborated by Potter, (2010) that several things can affect blood pressure in kidney failure patients, namely stress, anxiety, fear, pain, and fatigue, resulting in sympathetic stimulation that increases blood frequency, cardiac output, peripheral vascular resistance and the effect of sympathetic stimulation of increasing blood pressure.

CONCLUSION

The majority of fatigue experienced by respondents in this study included the category of severe fatigue in as many as 44 people (74.6%), and it was known that what the majority of post-HD patients felt at the level of fatigue included items of feeling dizzy, feeling headaches, no appetite, chest pain and feeling pain. Furthermore, at the age of patients ≥50 years, as many as 26 people (70.3%) felt severe fatigue, while the number of respondents who underwent hemodialysis was mostly for ≥12 months, namely as many as 35 respondents (76.1%) felt extreme fatigue.

Further research is expected to enhance this research by developing research on the Post Dialysis Fatigue Scale (PDF) by further multiplying variables such as (ureum levels, work, and hemoglobin levels) so that patients can use the results of the study to increase their knowledge in the story of fatigue that is deep in patients. And it is expected to be able to prepare and carry out continuous monitoring of fatigue levels in post-hemodialysis patients.

The results of this study are also likely to be used as a basis and reference in monitoring the status of fatigue experienced by post-hemodialysis patients. Nurses can involve patients in monitoring fatigue by creating solutions and scheduled action plans related to post-HD fatigue monitoring so that patients take an active role in monitoring their fatigue.

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Original Research

Nurses' Perspective On Postpartum Education Needs In A Referral Hospital

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ABSTRACT

Background: The study about nurses' perception of postpartum complication education is limited. The previous studies in Indonesia focus on providing education as a direct intervention to patients. This study aimed to determine the educational needs of postpartum mothers from the nurses' point of view.

Methods: This study was a qualitative study conducted from April to July 2021 in a referral hospital in Central Java, Indonesia. Data were collected through focus group discussions, in-depth interviews, and observations. The participant of this study were seven nurses in the postpartum ward. The collected data were analyzed using a tabulated theme conducted through the thematic analysis approach.

Results: All the participants were females. Three major themes were generated in this study: reasons for the need for continuous postpartum education, obstacles to implementing postpartum education, and expectations of future follow-up care. The subthemes for the first theme are patients readmitted to the hospital, excessive educational topics, short admission time, and high-risk postpartum mothers. While the subthemes for the second theme are time constraints, limited educational media, and environmental and cultural influences, and the subthemes for the third theme are continuous monitoring and accessibility of educational media.

Conclusion: The study has provided new insights regarding the continuity of postpartum education and the obstacles nurses face and has implications for developing a system of continuity of care for postpartum patients, especially for high-risk patients.

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INTRODUCTION

Nurses as educators play an essential role in the mortality of maternal. Unfortunately, Indonesia's Maternal Mortality Rate (MMR) is still high. MMR, (2017) Indonesia had 177 deaths per 100,000 live births, far from the Sustainable Development Goals (SDGs) target of fewer than 70 deaths per 100,000 live births (*Maternal Mortality*

in 2000-2017, 2019). In Central Java, although the MMR figure is lower than the national figure, the maternal mortality rate was still 76.9 in 2020.

The most common causes of maternal death in Central Java are hypertension during pregnancy (29.6%) and bleeding (24.5%). Most of these maternal deaths occurred during the postpartum or puerperium (64.18%). Meanwhile, in Banyumas Regency, although the MMR is far below the national and provincial figures and the SDG target (38 deaths per 100,000 live births), most deaths also occur during the puerperium period (Pemerintah Kabupaten Banyumas Dinas Kesehatan Banyumas, 2020).

Maternal deaths during postpartum may occur due to the lack of continuity of care. The continuity of maternal health services in Indonesia is still low (46%) as pregnant women tend to pay attention only to prenatal care, not postpartum care. According to the Directorate General of Public Health Direktorat Jenderal Kesehatan Masyarakat, (2019) the high mortality during the puerperium period indicates the quality of postpartum care for mothers and newborns in Indonesia is still low.

The continuity of care conducted by nurses or other health workers for patients treated in hospitals is essential. Research conducted in 2004 showed that patients who had home visits by a doctor who treated them at the hospital had better outcomes than patients visited by other doctors (van Walraven et al., 2004). Data of obstetric and gynecological outpatient visits at a referral hospital in Central Java reported 7 cases of pregnant women at high risk for complications during childbirth and puerperium.

Most of the cases were hypertension in pregnancy. However, about 5.7% of cases of preeclampsia or eclampsia may present de novo in the postpartum period (up to six weeks), even without hypertension in pregnancy (Powles & Gandhi, 2017). Patel et al., (2020) found that hypertension, wound complications, and endometritis accounted for the top three admission diagnoses. Meanwhile, other studies found that puerperal sepsis, preeclampsia, eclampsia, and hemorrhage were the major postpartum complications requiring admission to the hospital Shrestha et al., (2020), and these postpartum complications were not the primary focus of the education given to the patient in the hospital stay (Suplee et al., 2017).

Nurses as educators are essential to reducing the morbidity of postpartum mothers due to complications. The previous studies investigated nurses' and other health workers' education on postpartum complications. A correlation between postpartum education and mortality was reported by 95% of nurses, but only 72% agreed it was their responsibility to provide postpartum complications education (Suplee et al., 2016). About 93.45% of midwives decided that it is their responsibility to teach all patients about warning signs of complications, but they did not always teach patients about complications (Adams & Sladek, 2022).

Studies on nurses' perceptions of postpartum complications education in Indonesia are limited. Most research focuses on providing education as a direct intervention to patients Ekawati et al., (2019); Mayasari & Jayanti, (2019); Sugiarti et al., (2020), not on nurses' perceptions. Therefore, this study aimed to determine the educational needs of postpartum mothers from the nurses' point of view, especially for high-risk postpartum mothers.

MATERIALS AND METHOD

This qualitative study followed the guidelines stated in the Consolidated Criteria for Reporting Qualitative Research (COREQ) and was conducted with content analysis.

The study was conducted from April to July 2021 in a general referral hospital in Central Java, Indonesia.

A purposive method was applied for sample selection. The key informants in this study were nurses in a postpartum ward. The inclusion criteria of this study were nurses who are directly involved in taking care of patients, have been working as a nurse in the postpartum ward for more than three months, were not on leave, were not on duty during the retrieval of data, and have agreed to participate in this study.

The exclusion criteria of this study were nurses in structural positions. According to Paramita & Kristiana, (2013), the number of participants in focus group discussions is 7-10 (12 in maximum). Eleven nurses met the requirements, but at the time of data retrieval, four nurses were absent without notifications, so seven nurses participated in this study.

Data was collected through a focus group discussion (FGDs), in-depth interviews, observations, and field notes. The FGD was carried out by the principal researcher with the nurses, while research members conducted observations of the nurses and patients. Principal researcher and research members are experienced in conducting qualitative research for 3-10 years—a single offline focus group discussion with seven nurses in a hospital meeting room for 70 minutes.

To obtain richer data, in-depth interviews with two participants who previously participated in the FGD were conducted for an additional 30 minutes. The FGD session began with greetings, introductions, and filling in participant characteristics data. Then, the core discussion started by asking general questions according to the guidelines and specific questions according to the participants' answers.

The researchers recorded the conversation and noted the nurses' answers for unclear sections during the discussion. Data retrieval was stopped when no new information could be found. After completing the data collection section, a verbatim transcription was directly conducted, and the data was analyzed.

One week before data collection, prospective informants were given an invitation letter to attend an interview. The invitation letter contains information about researchers, objectives, benefits, and risks of the study, freedom to participate, procedures and duration, confidentiality, participation, time, and place of the interview. An informed consent form was attached, and an invitation letter was to be signed if they participated. The principal researcher made a semi-structured interview guide based on need-based postpartum education and discussed it with the team; corrections were made based on the discussion. The question was pilot tested on two nurses who were not included in the analysis.

Data analysis using a tabulated theme was conducted through the thematic analysis approach according to Kiger and Varpio (Kiger & Varpio, 2020). According to Kiger and Varpio, there are six steps framework for conducting thematic analysis: (1) familiarizing with the data, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, (6) producing the report/manuscript.

First, the principal researcher and two research members read the data transcript repeatedly to identify the overall contents of the transcript. Next, the researchers started to code manually, made notes about potential data items of interest, made questions, and related them to the data obtained and other initial ideas, to get the code. In the third step, the researcher analyzed, combined, and compared the significant codes found to be arranged into themes.

Next, the researcher reviewed the themes by placing the code into each theme to ensure the theme's suitability with the code. Finally, the researcher re-examined whether the supporting data in the code was adequate and coherent with the theme. Then reread the entire data to recheck the theme and re-coded any additional data created or modified at this stage. After the review process was complete, the next step was to define the identified themes. The last step was to write a manuscript.

The credibility, transferability, dependability, and confirmability criteria were used to guarantee trustworthiness in this study (Lincoln, Y. S., & Guba, 1985). To ensure credibility, the participants were heterogeneously selected and ranged in age, education level, length of work in the postpartum ward, and role in patient care. In addition, focus group discussion, interview, and observation methods were used to collect data (Lambert & Loiselle, 2008).

The research team always conducted meetings at every stage, verbatim, during the transcription and coding process, and when determining, reviewing, and defining themes to ensure confirmability. In addition, the researcher also returned the transcripts to the participants to be corrected and to prevent any errors due to misinterpretations and misunderstandings. All participants agreed to the transcript's contents, and no corrections were given.

The researchers developed a detailed research protocol to ensure dependability and carried out each study stage according to the created protocol. The researcher detailed the subjects, participants, methods, collection, and data analysis processes to ensure transferability.

Informed consent was given to the respondent before data collection. The form explains the purpose of the study, the rights and obligations of the respondent, the anonymity of the participants, the data required, and the respondents' approval. This research has received ethical approval from the Hospital Health Research Ethics Commission number 420/03868/IV/2021.

RESULTS

The participants involved in the study were all women aged between 27 and 52 years old. Most of the participants' highest level of education was a diploma/associate degree. Their length of work as a nurse was 7-25 years. The length of work in the postpartum ward was a minimum of half a year and a maximum of 18 years. Most of them were associate nurses.

The characteristics of the participants are listed in Table 1, and the resulting themes are listed in Table 2.

Table 1. Participants' characteristic

Var	Age (years)	Educational level	Length of work as a nurse (years)	Size of work in the postpartum ward (years)	Role
P1	27	Diploma	7	5	Associate nurse
P2	52	Diploma	25	4	Associate nurse
P3	32	Diploma	11	0.5	Associate nurse
P4	42	Bachelor's	25	18	Primary

Var	Age (years)	Educational level	Length of work as a nurse (years)	Size of work in the postpartum ward (years)	Role
		degree			nurse
P5	35	Diploma	13	13	Associate nurse
P6	33	Diploma	11	11	Associate nurse
P7	43	Bachelor's degree	25	6	Primary nurse

Table 2. Themes and subthemes

Theme	Sub-theme
Reasons for the need for postpartum education	Patients readmitted to the hospital
	Excessive educational topics
	Short admission time
	High-risk postpartum mothers
Obstacles to implementing postpartum education	Time constraints
	Limited educational media
	Environmental and cultural influences
Expectations of future follow-up care	Continuous monitoring
	Accessibility of educational media

Reasons for the need for continuous postpartum education
This theme consists of 4 subthemes: patients readmitted to the hospital, excessive educational topics, short admission time, and high-risk postpartum mothers.

Patients were readmitted to the hospital.
All participants stated that many postpartum mothers were readmitted, particularly patients with a history of preeclampsia. Two participants said their patient's condition did not improve because of severe preeclampsia, and their blood pressure remained high. Therefore, they were readmitted after three days. The observation during data retrieval showed that two patients were readmitted because of high blood pressure.

... (patient's) severe preeclampsia did not recover after giving birth. Her blood pressure is still high; these are symptoms of eclampsia, so the patient returned to be treated after being discharged from the hospital three days ago. (P2))

Various educational topics
Several participants stated that many health education topics were discussed with postpartum mothers, including maternal and infant care. One participant said that because nurses provide much information, there are patients who understand and some who do not. Another participant stated that the difficulty in postpartum care was due to the many educational topics.

And the information we provide may be easy to understand, but some (patients) may not be able to understand it. Much information is provided, so not all (patients) can easily understand (the provided information). (P5)
So it seems like, ma'am.. the difficulty in maternity (postpartum care) is because of the many educations. (P1)

Short admission time

Most participants said that 24 hours is not long enough for the postpartum maternal care process because it is considered very little time for nurses to provide the required education to postpartum mothers. One participant stated that it would take at least a week of care until the mother can independently take care of herself and her baby. According to the hospital's rules, the period of hospitalization for postpartum patients with vaginal delivery is 24 hours and three days for C-section.

Care should be given to postpartum mothers for at least a week until they can bathe their baby and breastfeed. (P3)

High-risk postpartum mothers

All participants said that most women were treated as high-risk postpartum mothers. The hospital is a referral hospital; thus, most patients are already in high-risk conditions. In addition, many patients give birth by cesarean birth. Therefore the information provided to postpartum mothers is considered less effective because the patient would still be focused on her condition. One participant said that more than 50% of patients treated are postpartum mothers with severe preeclampsia history.

Much information is given at once, but the patients are not fully conscious yet, which is less effective. Moreover, they would not have adjusted to the hospital environment because they still feel pain. (P1)

Obstacles to implementing postpartum education
This theme consists of 3 subthemes: time constraints, limited educational media, and environmental and cultural influences.

Time constraints

According to the respondents, they would only have a limited time to provide educational materials or advice. Therefore, the activity was conducted once as a group with all patients in one room. We also found nurses who provided information in a single room with five patients, and although the patients were experiencing different conditions, they were delivered the same educational health topics.

We also educated patients when they would go home while giving medicine, measuring their blood pressure, and explained their diet, what to do at home, and so on. So sometimes only 5% or 10% of
the information we provided was absorbed by the mother (P6).

Limited educational media

      Some participants mentioned not using any new media when educating the patients. Sometimes they would directly demonstrate the educational information in front of patients. One person said that they provide education through leaflets.

    There is still limited (educational) media; only leaflets are available (P5)

Environmental and cultural influences

      The participants stated that the education given to patients could sometimes be ineffective even if the patient understands the information. One participant noted that the patient's home environment could be negatively influenced. For example, the patient would understand the importance of rest. Still, because the people around the patient say that postpartum mothers should not take a nap, the patient is not resting. Another participant noted that although we live in the modern era, some people are still attached to the wrong cultural traditions or myths, such as not eating seafood postpartum.

    Then also, about eating nutritious food, sometimes there are still people who believe in the myth that you can't eat fishy food. Many patients return to the hospital with severe wounds because, at home, they only eat vegetables. Yes, at home, they still believe in the village leaders who said they couldn't take a nap. (P2)

Expectations of future follow-up care

This theme consists of 2 subthemes: continuous monitoring and accessibility of educational media.

Continuous monitoring

      Most participants expressed their hopes of monitoring the patient's condition after being discharged from the hospital. However, one participant stated that patients are only referred to healthcare workers near their residence. Thus, they do not know about the patient's condition after discharge.

    Monitoring after the patient goes home, so we know if the patient is healthy or not (is essential). Because so far, we don't know how to follow up at home. …. Yes, I don't understand how, but if they are readmitted again after seven days of being treated, it's not okay; usually, you would know their condition when the patient goes for check-ups or visits. (P4)

Accessibility of educational media

The participants have also expressed their desire for educational media to be accessible at any time by the patient. One participant also stated that the educational media should contain much information so patients can still access the media despite the nurse's time limitations.

    If this is the case, the patient can read casually at home, and information absorption can be maximized. (P1)

We also have a lot of work and limited educational media, such as leaflets, so it is hoped that the media could be more audiovisual and be played or viewed many times. (P5)
Due to time constraints, patients need media that can be accessed at any time…(P3)

DISCUSSION

This pilot study explores nurses' perspectives on meeting the educational needs of postpartum mothers. Three themes were identified in this study, namely, the need for continuous postpartum education, obstacles to implementing postpartum education, and expectations of future follow-up care. Based on our findings, there are three main reasons for the need for continuous postpartum education: patients being readmitted to the hospital, short admission times, and high-risk postpartum mothers.

Meanwhile, the main obstacles to implementing postpartum education are limited educational media and environmental and cultural influences. In this study, the participants stated that the readmitted patients have a history of preeclampsia. This supports the results of previous studies, which said that most readmitted postpartum patients were diagnosed with hypertension during antepartum, intrapartum, or postpartum (Clapp et al., 2018) (Yee et al., 2020).

In addition, the respondents described that these patients were readmitted due to high blood pressure and symptoms of preeclampsia, so they returned to the hospital three days after discharge. Moreover, a previous Yee et al., (2020) study stated that 1.7% of patients were readmitted within 14 days after birth. The health education provided is ineffective due to the excessive topics discussed in postpartum care. Health education topics should focus on the patient's current needs because need-based education will be more readily accepted and understood by patients.

Furthermore, due to the targeted topic selection, nurses could convey the information effectively and efficiently, and patients can benefit better from this than being given varied health education. A previous study has also shown that need-based health education has helped to improve self-efficacy and patient health status (Ndosi et al., 2016). In addition, need-based patient education is more effective in reducing anxiety and increasing patient satisfaction and is more efficient than traditional patient education (Wongkietkachorn et al., 2018).

Our study also found that the admission time is too short and insufficient for healthcare workers to provide comprehensive health education to patients. Short admission time results in shorter nurse-patient contact time, whereas increasing contact time and patient health education can lead to more effective treatment goals (Mshelia et al., 2007). With longer admission times, nurses could also use alternative methods to educate patients through different media such as video and internet-based health education (Lewkowitz & Cahill, 2021) (Agustina et al., 2021) (McNab & Skapetis, 2019).

One of the obstacles in providing education to patients was the nurses' limited time due to their workload. One study reported that 65% of nurses rated task load as the most critical component of their workload. Work performance often depends on workload, cognitive demands, time pressure, effort, and physical demands (Lebet et al., 2021).

Furthermore, the limited availability of educational media was also an obstacle in providing health education to patients. Educative media is an essential element in the success of health education. Many studies have reported that media use in health

education effectively improves patients' health conditions, such as posters, audiovisual media, comics, and mobile phone applications (Setiawati et al., 2017) (Ulya & Iskandar, 2017)(Nurdianti et al., 2020).

Another obstacle in providing health education for postpartum mothers by nurses is the influence of the environment and culture. In Indonesia, especially in rural areas, strong cultural traditions and myths related to pregnancy, childbirth, and postpartum. Cultural influences are still strong and can affect postpartum maternal health, including abstinence from seafood.

One study reported that 38.2% of postpartum mothers abstain from foods such as seawater fish, crabs, shrimp, and squid (Mole et al., 2019). In this study, the respondents mentioned that the environmental influence on postpartum mothers was their family's ban on naps. In line with previous research, a family prohibition of naps is a culture still inherent in Indonesian society, especially within Javanese society (Tristanti & Khoirunnisa, 2019). Thus, education for postpartum mothers during follow-up care must also involve the family.

DISCUSSION

The results of this study have important implications for the methods and approaches to health education for postpartum mothers, especially for nurses and hospitals. For example, nurses must manage time when providing health education to patients and involve the family when educating the patient so that the family also understands the needs of postpartum mothers. In addition, hospitals can also provide educational media facilities that can be easily accessible by patients, such as by playing educational videos in the patient's room that contain the topic of postpartum care using a cultural approach that does not conflict with the patient's health.

In terms of limitations, this study was only conducted in one hospital, and the sample was too small. Therefore, it did not describe the perspective of all nurses in all hospitals. However, the research site is the highest level of referral hospitals in the southern part of Central Java, so the results of this study specifically describe the perspective of postpartum nurses where most patients are high-risk patients.

Although there are limitations in this study, this study is the first to explore the health education perspective of postpartum mothers from the nurse's point of view. Therefore, the results of this study can be used as a reference for developing better methods of implementing postpartum education, not only for patients but also for nurses and hospitals. Further research is needed to find an effective form of postpartum education for patients, nurses, and hospitals.

CONCLUSION

This study is the first to explore nurses' perspectives on meeting the educational needs of postpartum mothers. Three themes were identified in this study: reasons for the need for continuous postpartum education, obstacles to implementing postpartum education, and expectations of future follow-up care. The need for continued postpartum education was patients being readmitted to the hospital, short admission times, excessive educational topics, and high-risk postpartum mothers.

The obstacles to implementing postpartum education are time constraints, limited educational media, and environmental and cultural influences. Finally, the subthemes of future follow-up care expectations are continuous monitoring and accessibility of educational media. Our study has provided new insights regarding the continuity of

postpartum education and the obstacles nurses face and has implications for developing a system of continuity of care for postpartum patients, especially for high-risk patients.

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Original Research

Study of Diabetes Mellitus Management Policies Using a Systems Approach in Surge Capacity

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ABSTRACT

Background: *The prevalence of Diabetes Mellitus (DM) in Indonesia continues to increase, even though DM control policies and programs have been implemented. According to existing policies, the family has not been involved in diabetes control. This study evaluates diabetes mellitus management policies by designing family-based community empowerment model interventions with a systems approach to surge capacity.*

Methods: *The design of this study used a cross-sectional operational analysis conducted in Cirebon City with 26 participants. Data collection was carried out using Focus Group Discussion (FGD) and in-depth interviews using interview guidelines from the surge capacity component. Inclusion criteria were Non-Communicable Diseases program holders at the Cirebon City Health Office and Community Health Centers with the highest and lowest prevalence, and DM sufferers and their families representing each age and gender category. Data analysis was performed using open code.*

Results: *The non-communicable disease program has not been integrated between the health office and the hospital; funds for the DM prevention program have not met the needs; there are limited human resources with multiple tasks and an excessive workload, so it is not optimal for DM health services; and there is a lack of family involvement in diabetes control, so the incidence of DM is still not usually controlled.*

Conclusion: *Policy studies using a system approach in surge capacity have been able to dig up various information on DM control efforts in terms of policy, organizational structure, DM surveillance, information systems, integrated services, case screening, budgeting, and community empowerment.*

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INTRODUCTION

Diabetes Mellitus (DM) is a Non-Communicable Disease that is an issue of the 2030 Sustainable Development Goals and is a priority in every country (Direktorat Jenderal Pencegahan dan Pengendalian Penyakit, 2019). The International Diabetes Federation estimates that the prevalence of DM worldwide is 9.3%. Indonesia is the only country in Southeast Asia that is included in the ten countries with the highest DM sufferers in the world (Kementerian Kesehatan RI, 2020).

Diabetes Mellitus can cause heart disease, kidney failure, blindness, and even death, especially during the COVID-19 pandemic, which is still happening today. Diabetes Mellitus is the second-largest comorbid disease that increases the risk of death in Indonesia (Kemenkes, RI, 2020). The prevalence of DM in Indonesia based on a doctor's diagnosis at the age of >= 15 years has increased from 1.5% in 2013 to 2% in 2018, as well as the prevalence based on blood sugar examination results from 6.9% in 2013 to 8.5% in 2018 (Badan Penelitian dan Pengembangan Kesehatan Kemenkes RI, 2019a).

This prevalence is still very far from the global target of the P2PTM program. Namely, there is no increase in DM or 0% (Direktorat Jenderal Pencegahan dan Pengendalian Penyakit, 2019). The difference in the prevalence of DM based on a doctor's diagnosis and blood sugar examination shows that only 25% of sufferers know they have DM (Kementerian Kesehatan RI, 2020). West Java Province has a high DM prevalence of 1.7% (Badan Penelitian dan Pengembangan Kesehatan Kemenkes RI, 2019a). Cirebon City is a city in West Java Province with the highest DM prevalence of 3.58%, which exceeds the national prevalence (Badan Penelitian dan Pengembangan Kesehatan Kemenkes RI, 2019b).

The government has issued a policy through Permenkes, or Regulation of the Minister of Health number 71 of 2015, concerning the management of Non-Communicable Diseases (NCDs) (Kemenkes, 2015). Permenkes explains that the central government, local government, and the community are responsible for managing NCDs and the consequences they cause through community health efforts and individual health efforts. Prevention of NCDs through Public Health Efforts is carried out with prevention and control efforts focused on controlling modifiable risk factors through health promotion activities, early detection of risk factors, and special protection. Control is carried out through early-case findings and early management activities. Handling individual health efforts is carried out by handling cases.

Health promotion aims to realize clean and healthy behavior by practicing CERDIK behavior, namely periodic health checks, getting rid of cigarette smoke, diligent physical activity, a healthy diet, balanced nutrition, adequate rest, and managing stress, carried out by health workers who are competent in the field and empower health cadres (Kemenkes, 2015). Even though there has been a policy on DM prevention until now, it has not shown any significant success, as evidenced by the increasing prevalence and low CERDIK behavior for diabetes prevention. In Cirebon City, the proportion of people eating sweets > once a day was 56.99%, and the habit of drinking sweets was 70.36%. The habit of consuming fatty foods once per day was 58.77%, and physical activity that was less active was 43.89%. All these figures exceed national figures.

In existing policies, the family has not been involved in diabetes control. The results of previous research concluded that the Sundanese culture-sensitive family empowerment model was effective in increasing family behavior and greatly

contributing to DM control (Badriah & Junaiti Sahar, 2017; Badriah et al., 2019; Badriah et al., 2021). The purpose of this study is to examine diabetes mellitus management policies using a systems approach to surge capacity.

MATERIALS AND METHOD

The study conducted is a cross-sectional operational analysis and policy research. This study explores the implementation of current regulations and what potential can support them so they can be implemented properly following existing regulations. The participants of this study were the head of nursing at Gunung Jati Hospital, Cirebon City; non-communicable disease officers, doctors, and nurses from Puskesmas Perumnas Utara and Puskesmas Kalitanjung, Cirebon City; Head of the Cirebon City Health Office; Head of Disease Prevention and Control; and Coordinator of Non-Communicable Diseases. The number of participants was calculated by a purposive sampling technique, with as many as 12 participants.

Data were collected from November 12 to November 15, 2022, through in-depth interviews and focus group discussions, using digital sound recordings and field notes, with each participant in their home in approximately 60 to 90 min/sessions, for a total of 4 interview sessions for one participant from the head of the nursing field at Gunung Jati Hospital. Focus Group Discussion data collection techniques have been carried out with health workers from the Puskesmas Perumnas Utara Puskesmas Kalitanjung and the Cirebon Health Office regarding efforts to control DM using the system approach in the surge capacity. The FGD activities were carried out on September 13, 2022. Data analysis in this study used qualitative analysis, namely content analysis, a scientific research technique aimed at describing the characteristics of the content and drawing inferences from the content. Content analysis was carried out using open-source software.

This research has passed the ethics test from the Gunung Jati Hospital, Cirebon ethics committee, with the number 044/LAYAKETIK/KEPPK RSGJ/IX/2022. In carrying out this research, it has fulfilled ethical principles such as explaining the research objectives, maintaining the confidentiality of respondents, and providing sufficient time for data collection. In addition, this study provides direct benefits, namely optimizing the implementation of Regulation of the Minister of Health number 71 of 2015 concerning the management of Non-Communicable Diseases (NCDs), specifically in the prevention and control of DM.

RESULTS

Characteristics of participants
There were twelve participants (two male and ten female), with an age range of 32 to 55 years. Their educational level varies; one participant passed the master of health, and eleven passed the bachelor's in nursing and public health. The length of work varies from 5 years to 10 years.

Management of DM in a Cirebon City-based system in the Surge Capacity System
The system in DM management includes policies and regulations, organization, structure, DM disease surveillance, information system, budget, case screening, integrated health services delivery, and community empowerment, as clearly described as follows.

Policies/Regulation

System analysis (integrated policy and management) in managing DM in the city of Cirebon. Based on the results of interviews with research informants, information was obtained regarding policies and management in DM in the city of Cirebon that the regulations and policies are divided into, namely, regulations that apply to the national level, such as Minister of Health Regulation No. 71 of 2015 concerning NCDs, PMK No. 5 of 2017 concerning the 2015-2019 National Action Plan for the Management of NCDs, and Minister of Health Regulation No. 4 of 2019 concerning the Minimum Service Standards and NCDs management manual. The Regulation at the City District Level, which is the guideline, consists of Regional Regulations on the Prevention and Management of NCDs, the Mayor's Circular on Prevention and Control of NCDs, the Mayor Decree, and standard operating procedures related to Minimum Service Standards No. 43 of 2016. The implementation of policies that apply in hospitals using Minister of Health regulations clinical guidelines no. HK 107, as stated by the informant, "..that the policies in force in cities and provinces are following national policies, achievement of the Minimum Service Standard target must be 100%, and the policy is made not specifically for the treatment of DM but for NCDs."

Organizational Structure

According to the information of the participants at the city or health office level, "the organizational structure of DM control shows that the structure of the service is integrated into NCDs. The structure looks "big" because many disease programs are integrated over there. The participant from the hospital stated that "the structure of DM treatment does not stand alone but is part of internal medicine." The Community Health Center (Puskesmas) received information from the participant: "The structure is integrated with NCDs; Posbindu and cadres are not included in the structure."

DM Disease Surveillance

The participants' answers to DM surveillance were divided into two categories, namely: a) regarding the objectives and implementers of the surveillance that surveillance aims to find or screen new sufferers; for old sufferers, it is more about treatment management. b) the timing of the surveillance as described below: "..surveillance of DM is not carried out separately but together in an NCDs program, by circulars and guidelines. Surveillance is carried out once a year, both outside the building and inside the building. Cadres assist in implementation at Posbindu and Posyandu with the target population aged 15 years and over. If suspected DM is found, they will be referred to the puskesmas, and a repeat test will be carried out at the puskesmas."

Information System

The participants answered that the information system in management DM was divided into two categories, namely types of information systems and constraints on the implementation of the information system.

The type of information stated by the participant is as follows: The Health Service and Puskesmas already have "SI PTM, or Information System NCDs," but this year a new IS, namely "ASIK," has appeared. Another participant mentioned that System NCDs" are used offline and online. At Posbindu and puskesmas, data is recorded on form or paper first, then entered into the application (excel) offline, and then the Excel file is sent to the Health Office for entry by health service officers into the action system

NCDs. " To complete the data for "information system NCDs," the puskesmas sometimes retrieve data from the "e-pusk" application; there is no special application for the hospital. However, it is included in the Hospital Information System (HIS). This year, there is a new application called ASIK for all programs, including PTM and DM. The ASIK application is fully online, but it is still quite difficult to use (because it is still new and the training is very new), and you also have to re-train the cadres."

The constraints on the implementation of information systems experienced by participants are described below: "... there still likes to have double data when entered (reported twice), puskesmas often send wrong NCDs reports, reports were sent late to the health office because the puskesmas staff was busy, health center staff who hold NCDs programs often change, the existing programs at the puskesmas are solid, but the number of officers is limited, and for ASIK because it is online, cadres must provide internet data/quota access."

Budget
Information obtained from participants regarding the DM management budget at the health office and at Puskesmas was divided into two categories: budget type and budget constraints.

Budget Type
The type of budget received was revealed from the participant's statement that '...the available annual budget is combined with the PTM program. There are various sources of the budget at the health service center and at the puskesmas: APBN, or State Revenue Expenditure Budget; APBD, or Regional Revenue Expenditure Budget; BOK, or Health Operational Assistance; and for puskesmas, other than the source of the budget, this is taken from the BLU Public Service Agency. The budget from the public service agency at the puskesmas is managed by the puskesmas itself. To carry out the screening of the puskesmas in coordination with the ward for the provision of consumables from the ward budget (before COVID)... Budget in the laboratory for the purchase of reagents... In the health department, the budget is more for outreach, and in the hospital, there is no special budget."

Budget Constraints
Information from some of the participants about budget constraints is that "the budget from the central government is very dependent on the size and allocation of the central government, often not by local or regional needs; the budget is not optimal during the COVID pandemic; the budget is too limited; the budget is not sustainable every year."

Case Screening
The participants' answers were divided into two categories: screening types and screening targets. As stated by the participant, "the available annual budget is combined in the PTM program; screening with blood sugar examination; screening for DM in hospitals is carried out according to standard clinical guidelines." Meanwhile, the target screening cases obtained information that "screening was carried out on residents aged 15–59 years; some were screened in junior high school; screening, especially in the building, is not only for residents in the working area of the puskesmas; the results of the screening will determine if the DM suspect is treated according to the work area because it will be difficult if it is managed at the puskesmas if it is outside the area."

Integrated Health Services Delivery

The participant's answers were divided into three categories: a) service characteristics; b) service flow; and c) constraints. The characteristics of health services are integrated, involving many professions such as doctors, nurses, nutritionists, laboratories, health promotion, and pharmacy. The service flow Services at the hospital are carried out according to patient service standards; if patients have positive DM, then services are given according to the diagnosis of DM for those served at the Internal Medicine Clinic with a laboratory examination package (BPJS), including serving patients referred to suspected DM, and the results of the service are recorded in the patient's medical record; if it's routine, it's recommended to the prolanis group." The constraints in service were mentioned by the participant as follows: There are obstacles in referral services from hospitals to puskesmas depending on the hospital; there are patients whose blood sugar is checked more than once a month; while follow-up efforts for patients served include those referred to the hospital; there are obstacles in the referral service from the hospital to the puskesmas depending on the hospital; there are patients whose blood sugar is examined more than once a month; while efforts to do follow-up for patients served include those referred to the hospital."

Community Empowerment

The participant's answers were divided into two categories: the content of the empowerment and the community empowerment goals. The content and type of empowerment are conveyed through the following statement: "Inviting the community to carry out the Healthy Community Movement, or Germas, to provide education about DM disease, education is carried out while identifying cases in the field. Education continues at every meeting. Empowerment during home visits... contains material about being smart and obedient; material on how to take medicine; education for prolongs and health promotion are separate and uncooperative patient education."

The Community Empowerment Goals are expressed as follows: "People with home visits will collaborate within health promotion officers,... to the patient's family for patients whom the family drives to the puskesmas; in hospitals, a community of DM sufferers was formed to facilitate socialization, etc., empowerment of cadres; the puskesmas conducts training to cadres at least once a year; and in educational hospitals, it is carried out when examining patients in clinics."

DISCUSSION

Based on the answers from the participants and cross-checked with existing documents, the regulations and policies used in the implementation of DM prevention are quite complete, starting with policies that are national, namely Minister of Health Regulation No. 71 of 2015 concerning DM management, which is followed up with policies at the national level. Until a circular letter from the mayor of Cirebon, at the technical level, such as at the health office and health center, SOPs have been made. Even so, the existing regulations and policies do not specifically address the prevention of DM but, in general, the prevention of Non-Communicable Diseases (NCDs).

According to the researchers, even though the implementation of DM prevention is integrated with the prevention of other non-communicable diseases, it is better for things that are more technical to make specific policies or regulations regarding DM prevention. Regarding the content of the policy, apart from being generally concerned with non-communicable diseases, the policy technically has not yet integrated all

services, both at the basic level, such as health centers, clinics, and specialist practice, up to the hospital when referred. There are no rules governing DM handling that are integrated from technical services and DM counseling to DM case reporting.

As a result of the absence of these regulations and policies, the researchers found that related DM management programs in hospitals were less integrated with programs in the health office. The new hospital serves DM patients according to clinical service guidelines only. There is no link between programs at the health office, puskesmas, or doctor's practice. This is following research in Thailand. This strategy document provides clear guidance to address the increasing burden of diabetes and NCDs, and creativity is needed.

In this changing disease burden, linking this approach to decentralization, national and local governments need to adapt guidance from the central level to effectively address a health concern that affects all levels of society and, therefore, clearly define their role in the struggle to prevent and deal with the increasing burden of diabetes and other NCDs (Beran & Higuchi, 2013). By applicable policies, DM surveillance activities are carried out together in non-communicable disease prevention activities. The implementation is carried out passively in the building and acts directly on the community, with the target population aged more than 15 years, by health cadres through posbindu. This surveillance aims to capture new DM sufferers who were previously undetected.

In practice, if a person is found whose blood sugar test results are higher than normal levels, then the health cadre will refer the person to the puskesmas for further examination. If it turns out that the results lead to DM disease, then the patient will be recorded as a DM sufferer and will be handled according to the Standard Operating Procedure for DM sufferers. For better results, as has been done in Pakistan, the four main strategies to tackle the rising incidence of diabetes in Pakistan are: 1) creating a multidisciplinary team through capacity building of the health care professionals, including doctors, dieticians, diabetes educators, diabetes foot assistants, and program managers, in standardized, evidence-based protocols, enhancing their knowledge and skill in managing diabetes and their related comorbidities; and 2) promoting primary prevention and awareness all over Pakistan using screening methods such as risk assessment of Pakistan individuals for diabetes. 3) defining strategies for management and prevention of diabetes and complications through a forum such as the Pakistan Diabetes Leadership Forum (PFLF); and 4) implementing a nationwide diabetes care program including registrations, treatment, and referral protocols (Basit et al., 2019).

The information system (SI PTM) has been created and implemented. Filled out by officers at the puskesmas, then recapitulated by officers at the district health office to be reported to the province and the ministry of health. Nevertheless, unfortunately, this system is not integrated with services in the hospital. This has the potential for undocumented patient care at the hospital. This also shows that the data has not been integrated into one system because the hospital records and reports it in another format to the health service department at the health office.

The latest information has been made and introduced; a new information system called ASIK has been used as a substitute for SI PTM. Following applicable regulations, this information system is not specific to DM but to non-communicable diseases. It is very important to integrate DM patient data in an information system, such as the results of research conducted in Turkey that primary care services for CVD-DM require urgent attention, focusing particularly on the training of staff in public facilities, the integration

of patient data, referrals, and follow-up across all levels of the health system (Kilic, B., Kalaca, S., Unal, 2015).

The results showed that empowering health workers had made promotional and preventive efforts through education about DM during hospitalization and home visits, as well as identifying cases in the field, but more often during visits to clinics or hospitals and even if a family was accompanying them. This is consistent with the results of other studies, which state that educational interventions have increased the knowledge of diabetic patients about the disease, self-care, and long-term disease control. Patient education is thus an important component in the management of diabetes mellitus. In addition, education with a cultural approach has been proven to increase knowledge, attitudes, and skills in controlling blood sugar levels in West Java, Indonesia. The same condition shows that a cultural approach is very important in the Saudi Arabian environment for improving DM treatment behavior (Alharbi et al., 2016; Badriah et al., 2021).

The study found that DM services have been carried out in an integrated manner between professions in the form of interprofessional collaboration and a referral system that has been running optimally. This is under the results of a study in Iran that reported that doctors should use guidelines regarding glycemic control to treat diabetes patients. Apart from that, to increase the program's effectiveness and strengthen the referral system, the government must also provide adequate health facilities for the prevention and control of diabetes in the country. In addition, given the important role of the community and patients in the success of the diabetes program and its patient-oriented nature, they must pay more attention to their health through proper nutrition, sufficient physical activity, and awareness of physical health. Carried out collaboratively in the form of interprofessional collaboration (Faraji et al., 2015).

The results show that the budget for controlling non-communicable diseases, especially DM, is not optimal at the health office and health center levels. This factor can become an obstacle to implementing DM control programs, as reported in a study. The government should allocate more funds and interest to education programs. Furthermore, NGOs and the private sector should contribute to formulating and implementing diabetes prevention and control programs in the future (Faraji et al., 2015).

CONCLUSION

Policy studies using a system approach in surge capacity have been able to dig up various information on DM control efforts in terms of policy, organizational structure, DM surveillance, information systems, integrated services, case screening, budgeting, and community empowerment. However, there are several obstacles to optimizing DM control, including family involvement that is not optimal and budgets that do not meet needs. Therefore, for future researchers, further studies are needed regarding family involvement to create effective interventions in optimizing DM control, as well as further studies regarding budget reviews as needed so that they will support efforts to prevent an increase in the prevalence of DM.

Head of the Cirebon City Health Office, Head of Disease Prevention and Control, and Coordinator of Non-Communicable Diseases.

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Original Research

Impact Of Nutsi-Smartphone Application On Nutritional Knowledge Among Breastfeeding Mothers: A Quasy-Experimental Study

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ABSTRACT

Background: Nutrition knowledge among breastfeeding mothers is a key factor in good nutrition status. Some breastfeeding mothers in Indonesia suffer from inadequate nutrition status, which may affect exclusive breastfeeding practice. However, few breastfeeding women have adequate nutritional knowledge. Health education about adequate nutrition during lactation is highly needed.

Methods: This was a quasi-experimental study with a control group, pretest, and post-test design. It was conducted at the work area of the Panyingkiran Public Health Center, Majalengka Regency, West Java Province, Indonesia. This study used a consecutive sampling method and involved 78 respondents, divided into 39 respondents in the intervention group and 39 respondents in the control group. Data was collected using a set of questionnaires to collect demographic and nutritional data. Then, the data were analyzed using the Wilcoxon test and Chi-square test.

Results: This study found that there was a significant difference between pre-test and post-test scores in the intervention group (t=0,000 p<0,05). There was no significant difference between pre-test and post-test scores in the control group (t=1, p >0,05). Furthermore, there was a significant difference in post-test scores between the intervention and control groups (t=0,000 p<0,05).

Conclusion: The developed smartphone application-Nutsi-was effective in increasing nutritional knowledge among lactation mothers. Health care providers may use Nutsi as a health promotion media in order to improve nutrition knowledge among pregnant women.

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INTRODUCTION

The Infant Mortality Rate (IMR) is the number of infant deaths per 1000 live births. IMR is an indicator to assess people's welfare in the health sector. South East Asia is one of the regions that has the highest infant mortality rate (WHO, 2022). IMR in Indonesia is around 19.548 per 1000 live births in 2020 (UNICEF, 2022). IMR may be prevented by practicing exclusive breastfeeding, especially among children in developing countries (Mbonye, 2022).

Providing exclusive breastfeeding may save an infant's life in developing countries (Pretorius et al., 2021). Exclusive breastfeeding was influenced significantly by maternal nutritional status (Glanny Anindya, Salimo, Lanti, & Dewi, 2020). Maternal nutrition affects breastmilk composition. Poor maternal nutrition status is significantly associated with low breastmilk quantity and quality.

Breastmilk DHA levels is associated significantly with maternal fish diet (Adhikari, Kudla, Nyakayiru, & Brouwer-Brolsma, 2021). Food consumption during lactation affects breastmilk micronutrients among lactating women (Bzikowska-Jura et al., 2018). Adequate nutrition for lactating mothers is important for both maternal and child health. Sufficient nutrients during breastfeeding are needed in order to produce high quality breastmilk and prevent breastfeeding mothers from malnutrition (Marshall et al., 2022).

Unbalanced maternal nutrition during breastfeeding affects the breastfeeding mother, such as fatigue, which also may cause low breastmilk supply. Insufficient nutrient intake may cause a breastfeeding mother to take the deficient nutrient from the body's stores (UNICEF, 2022b). The impacts of nutritional deficiencies in breastfeeding mothers are anemia, iodine deficiency disorders, vitamin D deficiency, lack of protein energy, and decreased breastmilk supply (Winarsih, 2018).

Maternal eating behavior and dietary intake significantly affect exclusive breastfeeding duration (Specht, Rohde, Olsen, & Heitmann, 2018). A breastfeeding mother should pay attention to nutritional intake such as fluid volume, supplements, food intake in order to produce a high quality of breastmilk (Widyastutik, Chartasim, Trisnawati, & Selviana, 2021). Breastfeeding mothers' nutritional needs are higher than non-breastfeeding mothers' (UNICEF, 2022b). Breastmilk supply is influenced by the frequency of nipple sucking and the volume of breastmilk is influenced by maternal hydration status (Kominiarek & Rajan, 2016).

Maternal nutritional knowledge affects nutritional status among breastfeeding mothers. Nutrition knowledge is a key factor which may influence eating behavior among breastfeeding mother (Tritya, 2017). Breastfeeding mothers who had high nutrition knowledge tended to practice an adequate diet (Tessema, Girma, Mekonnen, & Mebratu, 2020). A previous study found that the majority (57.8%) of breastfeeding mothers in developing countries had low nutritional knowledge (Desisa Hundera, 2015). In addition, nutritional information related to sufficient nutrition among breastfeeding mothers may affect breastmilk production (Widyastutik et al., 2021).

Breastfeeding mothers need appropriate information about nutrition during breastfeeding in order to achieve better knowledge about nutrition in breastfeeding mothers so that they can apply awareness of breastfeeding mothers in order to realize their nutritional needs during the lactation period. Previous studies revealed that more than one third (35.7%) of breastfeeding mothers in Indonesia suffered from poor nutrition Triatmaja, I, & Hidayat, (2018) and the majority of the breastfeeding mothers (65.5%) had a lack of knowledge about nutrition during breastfeeding in Indonesia. Good nutrition practice affects the exclusive breastfeeding duration Rohman, Ichsan, Lestari, & Agustina, (2021) and breastmilk production (Prialita, 2021). Therefore, increasing knowledge about appropriate nutrition among Indonesian breastfeeding mothers is highly needed.

Nurses play an important role in providing health education related to adequate nutrition during breastfeeding. The development of information and communication technology in the current era shows the use of the internet and social media (APJII,

2018). There are so many innovations and changes in communication media that are increasingly attracting public interest. Various methods and media have been used for health education, such as a smartphone application (Ependi, Anggraeni, & Kartikasari, 2022).

A smartphone application was effective to increase the husband's knowledge and support for exclusive breastfeeding practice Budianto & Handayani, (2017) and pre-marital sex knowledge among teenagers (Turah, Anggraeni, & Setiawati, 2019). There is no previous study aimed at developing a smartphone application for nutritional knowledge among breastfeeding women. This study aimed to develop and determine the effect of *Nutsi* on nutritional knowledge among breastfeeding women.

MATERIALS AND METHOD

The research design used in this study was a quasi-experimental with a control group pretest and posttest design. It was conducted at Majalengka Regency, West Java Province, in July-August 2020. The population in this study were breastfeeding women who had children aged 0–24 months old. The inclusion criteria in this study were women who were breastfeeding, had a child aged 0–24 months old, had an Android-based smartphone, could read, and were willing to participate in this study.

The exclusion criteria in this study were respondents who had visual impairments and respondents who withdrew from the study. They were enrolled using a convenience sampling method. The total sample was 78 respondents, which was divided into 39 respondents in the intervention group and 39 respondents in the control group.

Subjects that met all the inclusion criteria were informed about this study's purpose, benefits, procedure, and potential risks. They were also assured of their anonymity and provided information on how to install the Nutsi application and answer the questionnaire. All of the subjects signed consent to show their agreement to participate in this research. This study had Institutional Review Board and Ethics approval from the Committee of the Faculty of Health Sciences, Jenderal Sudirman University (Number. 116/EC/KEPK/VI/2020).

This study used the Demographic Characteristics Questionnaire, which was developed by the researchers, and the Balanced Nutrition Knowledge of Breastfeeding Mothers Questionnaire, developed by (Ma'munah, 2015). The researchers modified the questionnaire and tested it for content validity. In this study, the researcher conducted a content validity test to add and change more appropriate sentences on several question items, which were assessed by two maternity specialist nurses working as nurse practitioners.

The results of the content validity test of the Balanced Nutrition Knowledge of Breastfeeding Mothers Questionnaire were obtained with a mean value of 4.2, while the mean value of the results of sentence grammar was obtained at 4.55. The intervention in this research is health education through a smartphone application named Nutsi (Lactation Nutrition), which can be downloaded from the Playstore for free. The researcher did a literature review to create the content of the application, including the definition and benefits of breastfeeding.

The nutritional needs of breastfeeding mothers, the importance of nutrition for breastfeeding mothers, daily meal arrangements, and examples of healthy diet menus for breastfeeding mothers. Then, the researchers asked three experts in the breastfeeding area to provide content validity approval for the application contents. Respondents in both intervention and control groups were asked to fill out a Demographic Data

Questionnaire and a pretest using the Balanced Nutrition Knowledge of Breastfeeding Mothers Questionnaire.

After that, respondents in the intervention group were asked to download Nutsi on their smartphones and read the content of Nutsi. Respondents in both the intervention and control groups were asked to do a posttest using the Balanced Nutrition Knowledge of Breastfeeding Mothers Questionnaire one day after the pretest. Then, researchers provided information to respondents in the control group about Nutsi and let them download it on their smartphones.

Data was analyzed using a univariate and bivariate analysis method. The univariate analysis results presented in the frequency distribution a percentage of age, mother's education, occupation, and income. The bivariate analysis in this study was carried out with the Wilcoxon test and Kolmogorov-Smirnov test (Dahlan, 2019).

RESULTS

The characteristics of the respondents are shown in table 1. The majority of respondents in both groups were aged 20-35 years old, graduated Senior High School, housewives, low income ($< IDR 1.750.000$). The homogeneity values in both groups were $p > 0.05$, which means that the demographic data in both groups were homogeneous.

Table 1. Demographic Characteristics of Respondents

Characteristics	Intervention group		Control group		Total	%	p
	n	(%)	n	(%)			
Age							
<20 years	2	5.1	2	5.1	4	5.1	0.788
20-35 years old	29	74.4	27	69.2	56	71.8	
>35 years old	8	20.5	10	25.6	18	23.1	
Level of Education							
Primary School	4	10.3	10	25.6	14	17.9	
Junior High School	10	25.6	9	23.1	19	24.4	0.169
Senior High School	13	33.3	13	33.3	26	33.3	
University	12	30.8	7	17.9	19	24.4	
Working status							
Housewives	30	76.9	36	92.3	66	84.6	0.117
Working	9	23.1	3	7.7	12	15.4	
Income							
< IDR 1.750.000	24	61.5	25	64.1	49	62.8	1
>IDR 1,750,001	15	38.5	14	35.9	29	37.2	

The difference in pretest scores for breastfeeding knowledge between the intervention and control groups was shown in Table 2 ($p > 0.05$). The results of the analysis of the Chi-Square test conditions are not met, so an alternative that can be done is the Kolmogorov-Smirnov test (Dahlan, 2019).

Table 2. Differences of pretest score between the intervention and control group

Group	Knowledge level						Total		p
	Good		Moderate		Low				
Pretest	n	%	n	%	n	%	n	%	
Intervention	8	20.5	27	69.2	4	10.3	39	100	0.986
Control	12	30.8	22	56.4	5	12.8	39	100	

The difference in posttest scores for breastfeeding knowledge between the intervention and control groups was shown in Table 3. There was a difference in the post-test scores in the level of breastfeeding knowledge between the intervention and control groups (p<0.05).

Table 3. Differences of pretest score between the intervention and control group

Group	Knowledge level						Total		p
	Good		Moderate		Low				
Posttest	n	%	n	%	n	%	n	%	
Intervention	38	97.4	1	2.5	0	0	39	100	0.000
Control	11	28.2	23	59.0	5	12.8	39	100	

Table 4 showed that there was a difference between the pretest and posttest scores in the intervention group (p<0.05) and there was no significant difference between the pretest and posttest scores in the control group (p>0.05).

Table 4. The Difference of Pretest and Posttest Scores within the Intervention and Control Groups

Group	Knowledge Level						Total		p
	High		Medium		Low				
	n	%	n	%	n	%	n	%	
Intervention									
Pretest	8	21	27	69	4	10	39	100	0.000
Posttest	38	97	1	3	0		39	100	
Control									
Pretest	12	31	22	56	5	13	39	100	1
Posttest	11	28	23	59	5	13	39	100	

DISCUSSION

In this study, the majority of respondents in both groups were in the age range of 20–35 years old. Mothers with an age range of 20 to 35 years have a safe age for pregnancy, childbirth, and breastfeeding, so that it can be said that this age is very supportive for breastfeeding (Cato, Sylvén, Henriksson, & Rubertsson, 2020). Most of the respondents' education level was senior high school.

Education is one of the factors that influence knowledge (Notoatmodjo, 2014). Education is also an important factor in getting and digesting information more easily (Minato et al., 2019). Most of the respondents have graduated from senior high school. Higher education causes a better understanding of health knowledge (Zajacova & Lawrence, 2018).

The majority of respondents' occupations in this study were housewives. According to the Indonesian Ministry of Health (2002), mothers who do not work tend

to pay more attention to their daily diet and have the opportunity to prepare healthy food menus for themselves and their families. Meanwhile, mothers who work with prominent working conditions, excessive activity, and lack of rest at work are at risk of nutritional deficiency if it occurs for a long time (Beluska-Turkan et al., 2019).

The majority of respondents in this study had a low income. According to Scaglioni et al., (2018), relevant factors involved in eating behaviors are socioeconomic aspects and education. In this study, 19 respondents graduated with bachelor's degrees; however, their jobs were as honorary teachers, whose minimum wages were still far below the minimum wages in Majalengka District. Someone with a high wage level can meet the necessary needs, including their nutritional needs (Hapsari, 2013).

According to Quin (2006), economic factors can influence the need for information and education. However, family income does not directly affect knowledge but is related to the availability of facilities that can support the need for broad insight and information (Notoatmodjo, 2010). In this study, the majority of respondents had a significant increase in nutritional knowledge but a lack of information about nutritional practice after getting the Nutsi application.

The results of this study found that there was no difference in pretest between the intervention and control groups. It might be because the characteristics of respondents based on age, education level, and family income are homogeneous, so that the characteristics of respondents do not affect the level of knowledge about nutrition among breastfeeding mothers. This result supports previous studies which revealed that there was no significant difference in pretest scores between the intervention and control groups before respondents got the "Nutri Quiz Story" application Fahrizki, (2017) and the "Gapin" application (Turah, Anggraeni & Setiawati, 2019).

Health education is provided by several types of media in order to increase human knowledge (Turah, Anggraeni & Setiawati, 2019). The results of this study support previous study results which found that the android application media may increase posttest score in the intervention group. Previous studies revealed that the "Breastfeeding Father" application was an effective way to increase posttest scores of exclusive breastfeeding knowledge among respondents in an intervention group (Budianto & Handayani, 2017). In addition, there are a variety of internet-based e-technologies that professionals can use to promote, educate, and support breastfeeding women (Almohanna, Win, & Meedya, 2020).

The source of information is a main factor influencing knowledge. The media is a key to making health education successful. The Nutsi application is an effective way to increase nutritional knowledge among breastfeeding mothers. The medium used in this study is a smartphone application, which in this day and age has been widely used as a learning medium in the world of education and health (Divya & Kumar, 2016).

This smartphone application media has advantages, including learning materials that can be presented in various methods, can be given to broad targets, and can be accessed anywhere and anytime (Kusumadewi, 2009). Internet-based health education is an interesting means to increase knowledge and attitudes among young people in Indonesia nowadays (Anggraeni, Aji, Setyani, Rahmawati & Kartikasari, 2018). Besides that, breastfeeding interventions through mobile apps are encouraging because of their relative simplicity and continuous availability (Almohanna et al., 2020).

CONCLUSION

This study developed a smartphone application "Nutsi" as an effective educational medium to increase knowledge of breastfeeding mothers' nutrition. Mothers who received health education about nutrition during breastfeeding through the Nutsi smartphone application experienced increased knowledge compared to those who did not use the Nutsi smartphone application. The Nutsi smartphone application can be used to increase knowledge and also prepare women for lactation.

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