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Effect of Garlic Powder (Allium Sativum Linn) on Reducing the Sign and Symptoms of Pulmonary Tuberculosis (Retno Twistiandayani, Akhmat Imam Lajuward, Istiroha) Universitas Gresik. Jl. Arif Rahman Hakim Gresik No.2B, Kramatandap, Gapurosukolilo, Kec. Gresik, Kabupaten Gresik, Jawa Timur 61111 218-224

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Characteristics of Chronic Kidney Disease Patients Undergoing Hemodialysis at RSPAL Dr. Ramelan Surabaya from January to June 2022 (Anita Carolina, Prajogo Wibowo, Renata Prameswar*)* Universitas Hang Tuah Surabaya. Jl. Arief Rahman Hakim No.150, Keputih, Kec. Sukolilo, Surabaya, Jawa Timur 60111. 225-237

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Effect of Garlic Powder (Allium Sativum Linn) on Reducing the Sign and Symptoms of Pulmonary Tuberculosis

Retno Twistiandayani[1], Akhmat Imam Lajuward[2], Istiroha[3]

[1,2,3] *Fakultas Ilmu Kesehatan,Universitas Gresik, Indonesia*

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CORRESPONDENCE

E-mail: twistiandayani@unigres.ac.id

A B S T R A C T

Garlic contains substances that function as broad-spectrum antimicrobials that can inhibit the bacteria that cause Tuberculosis (TB). This study aimed to explain the effect of garlic powder (Allium Sativum Linn) on reducing the signs and symptoms of pulmonary TB. This study was a quasi-experimental study using a control group pre-posttest design approach. The population of this study was all patients with pulmonary TB at Metatu Health Center, Beijing, Gresik. The purposive sampling technique was used to recruit respondents, and 22 respondents were divided into treatment and control groups. The treatment group received 5gr of garlic powder 3x/day. The instruments used were standard operational procedures and observation sheets for signs and symptoms of pulmonary TB. Data analysis using Paired T-Test test with $\alpha < 0.05$. The statistical test results obtained p value = 0.000, which means there was a significant difference in the decrease in signs and symptoms of pulmonary TB before and after the administration of garlic powder. The results of statistical tests in the control group obtained p value = 0.341, meaning there was no significant difference in reducing signs and symptoms of pulmonary TB in the control group. The allicin compound in garlic can inhibit the bacteria that cause tuberculosis. The health center is expected to make Standard Operational Procedures related to complementary nursing by giving garlic powder to patients with pulmonary TB.

INTRODUCTION

Tuberculosis (TB) is a disease caused by an acid-resistant bacterial infection that can survive in the human body for years. The use of pulmonary TB drugs for a long period is often a contributing factor to the incomplete consumption of drugs, so many patients experience resistance (Veronica *et al.*, 2021). The situation at the Metatu Health Center, Gresik, East Java, has increased the number of patients with pulmonary TB in the last three months in 2023. Many patients are not obedient to treatment; sometimes, patients forget and feel bored taking medicine because of long-term treatment. The use of many TB drugs over a long period is also often a contributing factor to the incomplete consumption of drugs so that M. tuberculosis becomes resistant. Currently, about 45% of pulmonary TB cases in the world have experienced the MDR (Multi Drug Resistance) era. Taking TB drugs can also cause side effects such as nausea, vomiting, lack of appetite, blurred vision, weakness, fatigue or even fever (Seniantara, Ivana and Adang, 2018). So, some patients prefer herbal medicines. It is known that garlic has long been believed to have good antibacterial activity (Hanif and Carolia, 2019).

Indonesia is a country with a tropical climate and high humidity levels, so pulmonary TB disease is a major public health problem in Indonesia, with the 3rd most significant number of sufferers in the world after India and China. The number of new pulmonary TB patients in Indonesia was 543,874, and East Java

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is one of the provinces with the most cases of pulmonary TB in Indonesia besides Central Java and West Java, with a prevalence of 45% of the total number of pulmonary TB in Indonesia (Sutriyawan, Nofianti and Halim, 2022). Based on data from the East Java Provincial Health Office, Gresik District is ranked 6th with the most TB cases in East Java, with 2,505 cases (Wu *et al.*, 2022). The incidence of pulmonary TB at the research site has also increased. In 2019 there were 13 cases; in 2020, there were 41 cases; in 2021, there were 38 cases; in 2022, there were 58 cases. In 2023, there were 20 cases from January to March, and from April to June, there were 24 cases.

TB transmission usually occurs in dark rooms with minimal ventilation. Prolonged contact with a TB-infected person increases the risk of transmission. In individuals with a standard immune system, 90% will not progress to TB disease, and only 10% of cases will become active TB. Symptoms of TB disease depend on the location of the lesion so that it can show symptoms such as cough ≥ 2 weeks, cough with phlegm, cough with phlegm, mixed with blood, and may be accompanied by chest pain and shortness of breath. Other symptoms may include malaise, weight loss, decreased appetite, chills, fever, and night sweats (Organization, 2022).

The management of pulmonary TB generally uses pharmacological therapy of primary and additional drugs. However, people do not know that in addition to pharmacological therapy, several complementary herbal therapies can reduce the symptoms of pulmonary TB. One plant that has long been believed to have quite good antibacterial activity against various kinds of bacteria is garlic (Allium sativum) (Hanif and Carolia, 2019). Garlic has been shown to inhibit the growth of gram-negative and gram-positive bacteria, including Escherichia coli, Salmonella, Staphylococcus, Streptococcus, Klebsiella, Proteus, Bacillus, Clostridium, P. aeruginosa, K. pneumoniae, and Bifidobacterium lactis. Acid-resistant bacteria such as Mycobacterium tuberculosis are also garlic-sensitive (Barbole *et al.*, 2024).

The allicin contained in garlic (Allium sativum linn) functions as a broad-spectrum antimicrobial that can inhibit the bacteria that cause TB. Allicin is formed from the main organosulfur compounds in garlic, namely gamma-glutamyl-s-allylcysteine and Sallyl-L-cysteins sulfoxides (alliin) through enzymatic reactions with the help of the enzyme alinase. As an antibacterial, allicin changes the composition of proteins, lipids, and polysaccharides in bacterial cell membranes (Barbole *et al.*, 2024). This study aimed to explain the effect of giving garlic powder (Allium sativum linn) on reducing signs and symptoms of pulmonary TB.

METHOD

This research method was a quasy experiment with a control group pre-posttest design. This study used a population of all TB patients at the Metatu Health Center, Benjeng, Gresik, East Java, in the period April-June 2023. Samples were taken using a purposive sampling technique with inclusion criteria: 1) patients

newly diagnosed with pulmonary TB; 2) patients who were currently receiving TB treatment for three months; 3) patients who had mild to severe TB signs and symptoms. Pulmonary TB patients with comorbidities such as Diabetes Mellitus and HIV/AIDS were excluded from the study.

The data collection method in this study began with a pretest by observing signs and symptoms of pulmonary TB on the first day before the intervention. Then, the researcher gave an intervention by giving 5gr of garlic powder 3x/day for seven days. Garlic powder was provided from 1-2 garlic cloves or 3-6gr of fresh garlic, which was thinly cut and dried in the sun for two days/oven at 500 C for 1-2 hours, then powdered with a dry mill blender for 15 minutes or pounded after which the powder was sieved several times. This powder can be stored in an airtight box for up to 2 weeks. The method of administration of this intervention is done by dissolving garlic powder with 250ml of warm water taken 3x/day at 6:00 am, 2:00 pm, and 10:00 pm.

On the 8^{th} day, the researcher did a posttest by observing the signs and symptoms of Pulmonary TB in patients. The instrument used in this study was the Standard Operating Procedure for administering garlic powder prepared by the researcher. The TB signs and symptoms instrument used an observation sheet for TB signs and symptoms with parameters of cough with phlegm, cough mixed with blood, chest pain, shortness of breath, malaise, weight loss, decreased appetite, fever, and night sweats. A score of 0 = no symptoms appeared, a score of 1-3 = symptoms appeared, a score of 4-6 = mild symptoms, a score of 7-9 = severe symptoms, and a score of 10 = very severe symptoms. The data collected were coded, edited, processed, cleaned, tabulated, and then statistically tested using the paired t-test with a limit of $\alpha \leq 0.05$. This research has obtained ethical approval from Health Research Ethics Comittee, Sekolah Tinggi Ilmu Kesehatan Husada Jombang with number 248-KEPKSHJ.

RESULT

The data showed that most of the respondents in the treatment and control groups were aged 46-55 years, 63.6% and 54.5% respectively. The gender of respondents in both the treatment and control groups was mostly male (54.5%). Based on education, most respondents in the treatment and control groups had elementary school education (54.5% and 63.6%). Respondents in the treatment and control groups also mostly worked as farmers (54.5% and 63.6%). Respondents' house lighting in both groups was mostly in the cool category (63.6% and 54.5%). The ventilation of respondents' homes in the treatment and control groups was mostly ventilated (81.8% and 54.5%). Based on smoking habits in the treatment and control groups, most respondents had smoking habits as many as six respondents (54.5%).

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Table 1. General characteristics of respondents

Characteristic	Intervention group		Control group	
	n	%	n	%
Age				
17 – 25 years	0	0%	0	0%
26 – 35 years	0	0%	0	0%
36 – 45 years	3	27,3%	5	45,5%
46 – 55 years	7	63,6%	6	54,5%
56 – 60 years	1	9,1%	0	0%
> 60 years	0	0%	0	0%
Sex				
Male	6	54,5%	6	54,5%
Female	5	45,5%	5	45,5%
Educational status				
Primary school	6	54,5%	7	63,6%
Secondary school	5	45,5%	4	36,4%
High school	0	0%	0	0%
University	0	0%	0	0%
Occupation				
Civil servants/Army/Police	0	0%	0	0%
Farmer	6	54,5%	7	63,6%
Private/self-employed	5	45,5%	4	36,4%
Housewife	0	0%	0	0%
House lightening				
Light	0	0%	0	0%
Dark	0	0%	0	0%
Cool	7	63,6%	6	54,5%
Moist	4	36,4%	5	45,5%
House Ventilation				
Yes	9	81,8%	6	54,5%
No	2	18,2%	5	45,5%
Smoking habit				
Yes	6	54,5%	6	54,5%
No	5	45,5%	5	45,5%

Most respondents in the treatment group before getting garlic powder had mild symptoms, as many as six respondents (54.5%), and none of the respondents were in a condition of no symptoms or very severe symptoms. After getting garlic powder, most respondents in the condition of symptoms appeared to be as many as seven (63.6%), and none of the respondents had severe or very severe symptoms. The results of the paired sample t-test obtained a value of p = 0.000, meaning that there is a significant difference in reducing the signs of pulmonary TB symptoms before and after giving garlic powder. The pretest results in the control group showed that most respondents had mild symptoms, as many as nine people (81.8%), and the posttest results showed that most respondents had mild and severe symptoms, as many as five people (45.5%). The results of the paired sample t-test in the control group obtained a value of p = 0.341, meaning there was no significant difference in reducing signs of pulmonary TB symptoms before and after giving garlic powder.

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Table 2. Signs of pulmonary TB symptoms before and after the intervention in the treatment and control groups

Category	Group							
	Intervention				Control			
	Pretest		Posttest		Pretest		Posttest	
	n	%	n	%	n	%	N	%
None	0	0%	1	9,1 %	0	0%	0	0%
Symptom appeared	3	27,3%	7	63,6%	0	0%	1	9,1%
Mild symptoms	6	54,5%	3	27,3%	9	81,8%	5	45,5%
Severe symptoms	2	18,2%	0	0%	2	18,2%	5	45,5%
Very severe symptoms	0	0%	0	0%	0	0%	0	0%
Total	11	100%	11	100%	11	100%	11	100%
Paired t test			p = 0,000				p = 0.341	

Symptoms of Pulmonary TB in most treatment group respondents before getting garlic powder were included in mild symptoms in as many as six respondents (54.5%). The pretest results in the control group showed that most respondents had mild symptoms, as many as nine people (81.8%). Tuberculosis is a disease caused by infection with acid-resistant bacteria or M. Tuberculosis that can survive in the human body for years. The disease is transmitted by droplets containing bacilli that depend on how many tubercles are inhaled and the body's defenses of a person infected with Tuberculosis (Barbole *et al.*, 2024). Symptoms of TB disease depend on the location of the lesion so that it can show the following clinical manifestations: cough ≥ 2 weeks, cough with phlegm, cough with phlegm may be mixed with blood, and may be accompanied by chest pain and shortness of breath. Other symptoms include malaise, weight loss, decreased appetite, chills, fever, and night sweats.

DISCUSSION

One of the factors that can lead to infection with TB bacteria is the unhealthy physical environment of the house. The results of this study showed that the lighting conditions of respondents' homes in the two groups had cool (59.05%) and humid (40.95%) categories. Most respondents' houses in the treatment and control groups had ventilation (68.15%), but some respondents did not (32%). This can be a contributing factor to the occurrence of pulmonary TB infection. The quality of the physical environment of an unhealthy home is important for the transmission and proliferation of Mycobacterium tuberculosis. Lack of sunlight entering the house and poor ventilation creates a humid and dark atmosphere; this condition causes germs to survive for days to months in the house (Sahadewa S, 2018).

In addition, another factor that causes infection with TB bacteria is smoking. In this study, most respondents in both groups had a smoking habit (54.5%). Smoking damages the structure and function of the airway and reduces the activity of the immune system. TB is associated with changes in the immune response and several defects in immune cells such as macrophages, monocytes, and CD-4 lymphocytes. Other mechanisms, such as mechanical impairment of cilia function and hormonal effects, may also be

secondary to smoking. In addition, the phagocytic ability of alveolar macrophages in smokers is lower, so they are more at risk of active pathogenic germs (de Vargas *et al.*, 2021). A study by Qiu et al. in 2017 said that smokers stimulate macrophages to produce more IL-8, which causes excessive inflammation.

The post-test results showed that after receiving garlic powder, most treatment group respondents had condition symptoms (63.6%). The paired sample t-test results showed a significant difference in the decrease in signs and symptoms of pulmonary TB before and after the administration of garlic powder. Garlic is proven to be active against M. tuberculosis. The allicin compound contained in garlic is a broad-spectrum antimicrobial that can inhibit the bacteria that cause TB. Allicin is formed from the main organosulfur compounds in garlic, namely gamma-glutamyl-s-allylcysteine and Sallyl-L-cysteins sulfoxides (alliin) through enzymatic reactions with the help of the enzyme alinase. As an antibacterial, allicin changes the composition of proteins, lipids, and polysaccharides in bacterial cell membranes (Barbole *et al.*, 2024). Reuter et al. (1996) found that garlic has various properties or biological effects, such as antimicrobial, anti-cancer, antioxidant, immunomodulatory, anti-inflammatory, hypoglycemic, and anti-cardiovascular effects. Even the research results show that garlic can inhibit the growth of M. tuberculosis, even MDR isolates (Jiwintarum *et al*., 2022).

The results of this study are per the research of Fazeli-Nasab *et al.*, (2021) on the identification of genes resistant to antibiotics and the effect of ethanolic extracts of garlic on Mycobacterium tuberculosis isolated from patients in Zabol, Iran, showing that ethanolic extracts of garlic are very effective on Mycobacterium tuberculosis and the most influential genes in mycobacteria are ropB and rrs. Jiwintarum *et al.*, (2022) also showed that mint and garlic leaf extracts and the combination of the two can inhibit the growth of M. tuberculosis isolates from new TB and MDR TB patients with the smallest concentration of 3mg/mL.

CONCLUSION

Garlic powder administration influences reducing signs and symptoms of Pulmonary Tuberculosis. Garlic powder complementary herbal therapy can be used as a companion to pharmacological therapy to reduce the symptoms of pulmonary tuberculosis patients, so public health centers are expected to make standard operating procedures for complementary nursing by giving garlic powder to patients with pulmonary tuberculosis.

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Characteristics of Chronic Kidney Disease Patients Undergoing Hemodialysis at RSPAL Dr. Ramelan Surabaya from January to June 2022

Anita Carolina[1], *Prajogo Wibowo*[2], *Renata Prameswari*[3]

[1] *Faculty of Medicine, Universitas Hang Tuah, Surabaya, Indonesia*
[2] *Department of Farmacology, Faculty of Medicine, Universitas Hang Tuah, Surabaya, Indonesia*
[3] *Department of Dermatovenerology, Faculty of Medicine, Universitas Hang Tuah, Surabaya, Indonesia*

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CORRESPONDENCE

E-mail: anitacarolina20190410062@gmail.com

A B S T R A C T

Chronic Kidney Disease (CKD) is a persistent abnormality in kidney function or structure, with or without a decline in glomerular filtration rate (GFR) below 60 mL/min/1.73 m², lasting for more than three months. CKD diagnosis relies on markers of kidney damage and/or a reduction in GFR. Patients with advanced CKD, characterized by a GFR below 15 mL/min/1.73 m², typically require dialysis. In 2018, 60,852 individuals in Indonesia were reported to have CKD requiring lifelong dialysis. This study aims to assess the characteristics of CKD patients undergoing hemodialysis. This research employs descriptive design. The sample consists of all CKD patients undergoing hemodialysis, as recorded in the medical records of RSPAL dr. Ramelan Surabaya between January and June 2022. The findings reveal that more than half of the patients (52.7%) had been on hemodialysis for more than 12 months. Many of the patients (66.2%) were between 40 and 60 years old, with males accounting for 54.1% of the sample. Hypertension and diabetes mellitus were identified as the most common comorbid conditions (31.1%), while pain medication consumption was the least reported cause (2.7%). All patients had hemoglobin levels below the normal range (<13 g/dL for males and <12 g/dL for females) and relied on BPJS (Indonesia's national health insurance) to cover the cost of hemodialysis. Furthermore, most patients exhibited creatinine levels exceeding 1.5 mg/dL, blood urea nitrogen (BUN) levels above 24 mg/dL, serum iron (SI) levels between 45 and 158 µg/dL, and total iron-binding capacity (TIBC) levels below 250 µg/dL.

INTRODUCTION

Chronic Kidney Disease (CKD) is an abnormality in the function or structure of the kidneys, with or without a reduction in the glomerular filtration rate (GFR) to below 60 mL/min/1.73 m², persisting for more than three months. Kidney damage can manifest as albuminuria, abnormalities in urine sediment, electrolyte imbalances, structural or histological changes in the kidneys, or a history of kidney transplantation (KDIGO, 2013).

According to the 2018 Basic Health Research (Riset Kesehatan Dasar), the prevalence of Chronic Kidney Disease (CKD) in Indonesia among individuals aged over 15 years is 0.38%. The prevalence is higher in males (0.42%) than in females (0.35%). In terms of age and employment status, the highest prevalence is observed in the 65–74-year age group (0.82%), followed by the unemployed population (0.48%) (Aisara, Azmi and Yanni, 2018; Riset Kesehatan Dasar, 2018).

Kidney damage in Chronic Kidney Disease (CKD) is irreversible and can result from various factors (Aisara, Azmi, & Yanni, 2018). Among patients with stage 5 CKD, the most common cause is hypertensive kidney disease (36%), followed by diabetic nephropathy (28%). Other causes include

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primary glomerulopathy (10%), obstructive nephropathy (3%), chronic pyelonephritis (3%), lupus nephropathy/systemic lupus erythematosus (SLE) (1%), gout nephropathy (1%), polycystic kidney disease (1%), unknown causes (12%), and other causes (5%) (PERNEFRI, 2018).

The diagnosis of CKD relies on markers of kidney damage and/or decreased GFR (Eckardt et al., 2009). Early stages of CKD are usually asymptomatic and symptoms do not manifest until stages G4 and G5 or when GFR falls to less than 30 mL/min/1.73 m^2 (Charles and Ferris, 2020).

CKD patients whose kidney function decreases and is characterized by a GFR of less than 15 mL/minute/1.73 m^2, begin to require dialysis. In this situation, the patient experiences uremia where there is an accumulation of toxins in the patient's body because his kidney function has experienced an extreme decline so that Renal Replacement Therapy (RRT) is needed to replace the function of the kidneys in eliminating toxins in the body so as not to cause increasingly severe symptoms (PERNEFRI, 2003).

Hemodialysis is a common form of dialysis therapy for End-Stage Renal Disease (ESRD) (Zazzeroni et al., 2017). Hemodialysis is expected to reduce albumin expenditure in CKD patients and reduce symptoms of uremia. This is because the toxic substances contained in the blood can be removed through hemodialysis so that it can improve the patient's clinical symptoms (PERNEFRI, 2003; Aisara, Azmi and Yanni, 2018).

Data regarding the characteristics of CKD patients undergoing hemodialysis in Indonesia, especially in Surabaya, is still available in small quantities, so this makes researchers interested in conducting research on the characteristics of CKD patients undergoing hemodialysis at RSPAL dr. Ramelan Surabaya Period January-June 2022.

METHOD

This study employed a descriptive design with quantitative methods conducted between August and December 2022. The sample consisted of all CKD patients undergoing hemodialysis based on data from the medical records of RSPAL dr. Ramelan Surabaya for the period January–June 2022, selected using the total sampling technique. Data collection involved reviewing all medical records that met the inclusion and exclusion criteria established prior to the study. The collected data were analyzed descriptively.

The inclusion criteria for this study were: (1) complete medical records of CKD patients undergoing hemodialysis at RSPAL dr. Ramelan Surabaya during the specified period, (2) patients undergoing hemodialysis on a regular basis, and (3) patients who were alert and conscious. The exclusion criterion was any patient with an incomplete medical record data.

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RESULT

This study was conducted on CKD patients undergoing hemodialysis at RSPAL dr. Ramelan Surabaya during the period January–June 2022. The data were obtained from patient medical records within this timeframe, and random sampling was used, resulting in a total of 152 CKD patients undergoing hemodialysis. After applying the inclusion and exclusion criteria, 74 patients had medical records that met the requirements for inclusion in the study.

Table 1. Frequency Distribution of Patient Age

Age	Frequency	Percentage
<40 years old	5	6,8
40-60 years old	49	66,2
>60 years old	20	27
Total	74	100

Based on Table 1, many CKD patients undergoing hemodialysis fall within the 40–60-year age group, accounting for 49 cases (66.2%). This is followed by the >60-year age group with 20 cases (27%), while the lowest proportion is found in the <40-year age group, with 5 cases (6.8%).

Table 2. Frequency Distribution of Patient Gender

Gender	Frequency	Percentage
Male	40	54,1
Female	34	45,9
Total	74	100

Based on Table 2, many CKD patients undergoing hemodialysis were male, accounting for 40 cases (54.1%), while female patients comprised 34 cases (45.9%).

Table 3. Frequency Distribution of Patient Risk Factors

Risk Factors	Frequency	Percentage
Hypertension	22	29,7
Diabetes Mellitus	4	5,4
Hypertension & Diabetes Mellitus	23	31,1
Gout	3	4,1
Kidney Stones	4	5,4
Pain Medication (Analgesic)	2	2,7
Others	16	21,6
Total	74	100

Based on Table 3, the three most common risk factors among CKD patients were hypertension and diabetes mellitus, with 23 cases (31.1%), followed by hypertension alone, with 22 cases (29.7%). Additionally, diabetes mellitus and kidney stones were observed in 4 cases (5.4%) each. The least common risk factor was pain medication use, reported in 2 cases (2.7%).

Table 4. Frequency Distribution of Patient Hemodialysis Time

Duration of Hemodialysis	Frequency	Percentage
<6 months	19	25,7
6-12 months	16	21,6
>12 months	39	52,7
Total	74	100

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Based on Table 4, many patients had undergone hemodialysis for over 12 months, with 39 patients (52.7%) in this category. In contrast, 19 patients (25.7%) had been on hemodialysis for less than 6 months, while 16 patients (21.6%) had undergone hemodialysis for 6 to 12 months.

Table 5. Frequency Distribution of Patient Creatinine Levels

Creatinine Levels	Frequency	Percentage
0,6-1,5 mg/dl	2	2,7
>1,5 mg/dl	72	97,3
Total	74	100

Based on Table 5, it can be deduced that many patients, 72 (97.3%), had creatinine levels greater than 1.5 mg/dL, while only 2 patients (2.7%) exhibited normal creatinine levels, which range from 0.6 to 1.5 mg/dL.

Table 6. Frequency Distribution of Patient BUN Levels

BUN Levels	Frequency	Percentage
10-24 mg/dl	25	33,8
>24 mg/dl	49	66,2
Total	74	100

Table 6 indicates that 49 patients (66.2%) had BUN levels greater than 24 mg/dL, while the remaining 25 patients (33.8%) had normal BUN levels within the range of 10–24 mg/dL.

Table 7. Frequency Distribution of Patient Hemoglobin Levels

Hemoglobin Levels	Frequency	Percentage
Male		
a. <13 g/dl	40	54,1
b. 13-17 g/dl	0	0
Female		
a. <12 g/dl	34	45,9
b. 12-15 g/dl	0	0
Total	74	100

Based on table 7, it can be stated that all male and female patients suffering from CKD and undergoing hemodialysis have hemoglobin levels below normal levels, namely <13 g/dl for male patients in 40 cases (54.1%) and <12 g/dl for female patients as many as 34 cases (45.9%).

Table 8. Frequency Distribution of Patient Serum Iron Levels

Serum Iron Levels	Frequency	Percentage
<45 µg /dl	18	24,3
45-158 µg /dl	56	75,7
Total	74	100

Table 8 indicates that 56 patients (75.7%) had normal SI levels ranging between 45-158 µg/dl and 18 patients (24.3%) had SI levels <45 µg/dl.

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Table 9. Frequency Distribution of Patient TIBC Levels

TIBC Levels	Frequency	Percentage
<250 µg /dl	69	93,2
250-460 µg /dl	5	6,8
Total	74	100

Based on table 9, it can be stated that as many as 69 patients (93.1%) had TIBC levels of <250 µg/dl and only 5 patients (6.8%) had normal TIBC levels ranging between 250-460 µg/dl.

Table 10. Frequency Distribution of Sources of Hemodialysis Costs for Patients

Sources of Hemodialysis Costs	Frequency	Percentage
BPJS	100	100
General	0	0
Others	0	0
Total	74	100

Based on Table 10, it can be presumed that the source of hemodialysis costs for all patients (100%) was covered by BPJS (Indonesia's national health insurance).

DISCUSSION

1) Age

This study found that more than half of the cases (66.2%) were in the 40–60-year age group. These findings align with research conducted in 2020, which reported that 72% of chronic kidney disease patients undergoing hemodialysis fell within the 40–60 year age group (Afriansya, Sofyanita and Suwarsi, 2020). The 11th Report of the Indonesian Renal Registry indicated that, in 2018, the majority of hemodialysis (HD) patients were in the 45–54 year age group (30.82%), followed closely by the 55–64 year age group (29.31%) (PERNEFRI, 2018).

Increasing age is associated with a decline in kidney function, a reduction in the glomerular filtration rate (GFR), and impaired tubular function (Pranandari & Supadmi, 2015). Kidney function begins to deteriorate after the age of 40 years, as the number of nephrons decreases by approximately 20%, leading to a decline in kidney performance. This reduction results in a decrease of 10 mL/min/1.73 m² in GFR with each passing decade (Badariah, Kusuma and Dewi, 2017; Prasetyo, Pranowo and Handayani, 2018).

2) Gender

In this study, there were 40 male patients (54.1%) and 34 female patients (45.9%). Similarly, a study conducted at Rumkital Dr. Ramelan Surabaya in 2018 also found a higher proportion of male patients (56.6%) compared to female patients (43.4%) (Kurniawati and Asikin, 2018). The 11th Report of the Indonesian Renal Registry also shows the gender distribution of HD patients in 2018 consisting of 57% men and 43% women (PERNEFRI, 2018).

Most men pay less attention to their health and/or maintain a healthy lifestyle than women, so their chances of developing CKD are greater (Pranandari and Supadmi, 2015). Besides that, the lifestyle and

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eating patterns of male respondents who drink coffee and smoke more often also play a role in increasing the possibility of suffering from CKD (Utomo, 2018). There is a theory that states that men have a higher chance of experiencing systemic diseases (glomerulonephritis, lupus, diabetes mellitus, polycystic kidneys, and hypertension), and the possibility that a family history of inherited diseases can also increase the risk of experiencing CKD (Prasetyo, Pranowo and Handayani, 2018).

3) Risk Factors

Revelations from this study indicate that the three most common risk factors among patients were hypertension and diabetes mellitus, reported in 23 cases (31.1%), followed by hypertension alone in 22 cases (29.7%). Additionally, diabetes mellitus was identified in 4 cases (5.4%), the same frequency as cases associated with kidney stones. These findings align with research conducted at RSUD Dr. Soetomo, which reported that the most common comorbidities among end-stage renal disease (ESRD) patients undergoing hemodialysis were hypertension (61.3%), hypertension and diabetes mellitus (28.7%), and diabetes mellitus (5%) (Violita and Mardiana, 2022). In 2018, CKD that occurred in Indonesia was mainly caused by hypertension and diabetes mellitus with each disease accounting for 36% and 28% (PERNEFRI, 2018).

Patients with hypertension have a 3.2 higher chance of developing CKD than patients without hypertension, while patients with diabetes mellitus have a 4.1 higher chance of developing CKD than patients who do not have diabetes mellitus (Pranandari and Supadmi, 2015). This shows that hypertension and diabetes mellitus have a significant correlation with the occurrence of CKD (Purwati, 2018). Hypertension and diabetes mellitus are factors initiating CKD which can directly cause kidney damage and can turn into a progression factor if kidney damage becomes faster and worse due to uncontrolled (Eka Yuliandi, Mutiara Hikmah and Maulana Yusup, 2021). Hypertension can worsen damage to kidney structure and function because intraglomerular pressure increases, causing constriction of the afferent arteries (Purwati, 2018; Violita and Mardiana, 2022). Diabetes mellitus can cause the kidneys to become leaky because the kidneys have to work harder during the filtration process and later all the existing waste will no longer be able to be filtered by the kidneys (Kalengkongan, Makahaghi and Tinungki, 2018; Eka Yuliandi, Mutiara Hikmah and Maulana Yusup, 2021). As many as 50% of CKD patients on hemodialysis have hypertension as a comorbid history, 20% of patients have hypertension & diabetes mellitus, 6.67% of patients have diabetes mellitus, and 23.33% of patients do not have a history of both diseases (Eka Yuliandi, Mutiara Hikmah and Maulana Yusup, 2021).

4) Duration of Hemodialysis

This study showed that more than half of the patients had undergone hemodialysis for >12 months (52.7%). In line with the results of previous research which concluded that the majority of patients had been on hemodialysis for >12 months (Lolowang, Lumi and Rattoe, 2020).

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The length of time a patient undergoes hemodialysis indirectly influences their quality of life. Respondents interviewed by Wua et al (2019) stated that after undergoing hemodialysis their bodies felt much better and they were still able to carry out their usual activities (Fima L.F.G. Langi., 2019). This is supported by research which states that hemodialysis can prolong a patient's life which has an impact on the patient's perception of their quality of life (Lolowang, Lumi and Rattoe, 2020). Patients who regularly undergo hemodialysis and during the process have positive thoughts can have a better quality of life (Prasetyo, Pranowo and Handayani, 2018; Lolowang, Lumi and Rattoe, 2020).

5) Creatinine Levels

From this study, it was found that 97.3% of all patients had creatinine levels of >1.5 mg/dl. This is almost similar to research that has been conducted previously and stated that all of their research respondents had high creatinine levels (Afriansya, Sofyanita and Suwarsi, 2020; Misnawati et al., 2022).

Creatinine is mostly produced in skeletal muscle and is an endogenous substance that is freely filtered, does not undergo reabsorption in the renal tubules, but a small amount of creatinine is secreted by renal tubular cells so that creatinine clearance is a good parameter for assessing renal function because its plasma levels are relatively constant (Salazar, 2014; Alfonso, Mongan and Memah, 2016; Rahmawati, 2018). The patient's muscle mass influences plasma creatinine concentration due to the location of its production. Apart from that, the concentration is also influenced by the patient's body weight, age and gender. Daily creatinine excretion is influenced by dietary creatinine from meat (Salazar, 2014; Rahmawati, 2018). Normal serum creatinine levels in men are 0.7-1.3 mg/dl while in women it is 0.6-1.1 mg/dl (Alfonso, Mongan and Memah, 2016). Serum creatinine levels >1.5 mg/dl indicate impaired kidney function (Rahmawati, 2018).

As the function of the glomerulus in filtering creatinine decreases, creatinine levels in the blood will also increase, which indicates damage to the kidneys, so hemodialysis needs to be carried out to replace the main function of the kidneys, especially eliminating toxic metabolic substances such as creatinine (Afriansya, Sofyanita and Suwarsi, 2020; Ariami et al., 2022; Misnawati et al., 2022). A two-fold increase in serum creatinine levels indicates a 50% decrease in kidney function, and so on. Increased creatinine levels in the blood are also influenced by other factors, namely dehydration, excessive fatigue, consumption of nephrotoxic drugs, kidney dysfunction accompanied by infection, and uncontrolled hypertension (Alfonso, Mongan and Memah, 2016). Creatinine levels still cannot reach normal levels even though hemodialysis has been carried out and there is a decrease in creatinine levels shown (Eka Yuliandi, Mutiara Hikmah and Maulana Yusup, 2021). Serum creatinine levels that are still high after hemodialysis can be caused by the large molecular weight of creatinine, namely 113 daltons, so that this molecule is difficult to eliminate from the bloodstream during the hemodialysis process (Nuratmini, 2019).

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6) BUN Levels

This research showed that 66.2% of patients had BUN levels of >24 mg/dl. This data is slightly different from the results of research in 2020 and 2022 which stated that all patients had increased urea levels (Afriansya, Sofyanita and Suwarsi, 2020; Misnawati et al., 2022). However, as many as 91.3% of respondents with CKD stage 3-5 in Japan had BUN levels >23 mg/dl (Seki et al., 2019).

Ureum is the main metabolite derived from food protein and tissue protein turnover and is a small organic molecule (MW 60). Amino acids originating from protein breakdown are deaminated to produce ammonia which is then converted by liver enzymes into urea, so that urea is a non-protein nitrogen (NPN) waste product. Ureum is then freely filtered in the glomerulus but is not secreted, and is reabsorbed by the renal tubule. More urea is reabsorbed when there is a decrease in the rate of urine flow. Blood urea nitrogen (BUN) only measures the nitrogen component of serum urea (MW 28), so the urea value is approximately twice (60/28 = 2.14) the BUN value. Thus BUN 10 mg/dl is equivalent to urea 21.4 mg/dl. The reference value for BUN is 10-20 mg/dl and urea in serum or plasma is 20-30 mg/dl (Salazar, 2014; Higgins, 2016; Rahmawati, 2018; Seki et al., 2019).

BUN levels in the blood increase as glomerular filtration ability decreases. Kidney failure and uremia may be indicated if kidney function has decreased by <15%. Uremia syndrome can occur if the urea that accumulates in the body is not removed, therefore hemodialysis needs to be done (Afriansya, Sofyanita and Suwarsi, 2020; Misnawati et al., 2022). Increased BUN levels in the blood are also influenced by extrarenal factors, such as high protein intake, gastrointestinal bleeding, starvation, dehydration, increased protein catabolism, obstruction in the lower urinary tract, heart failure, and use of glucocorticoids. Decreased BUN levels in the blood can be caused by overhydration (hypervolemia), low protein intake, malnutrition, pregnancy, severe liver damage, consumption of phenothiazine drugs, and the addition of intravenous glucose fluids (Arjani, Suryawan and Sudarmanto, 2017; Rahmawati, 2018).

A decrease in BUN levels is indeed obtained after hemodialysis in CKD patients, but not all patients who have undergone hemodialysis can reach normal levels (Sari, 2020; Eka Yuliandi, Mutiara Hikmah and Maulana Yusup, 2021). BUN levels that return to normal after hemodialysis indicate that the hemodialysis carried out is effective. BUN levels that are still high after hemodialysis indicate a lack of hemodialysis adequacy, while BUN levels that decrease drastically can be caused by other factors affecting the patient's body, for example liver failure, excessive hydration, or negative nitrogen balance in malnutrition and malabsorption (Nuratmini, 2019).

7) Hemoglobin Levels

In this study, all hemodialysis patients (100%) both male and female had hemoglobin levels below normal levels. In accordance with previous research which stated that all hemodialysis patients at RSU "KH" Batu had hemoglobin levels below normal values (Agustina and Wardani, 2019).

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In CKD patients undergoing hemodialysis, a decrease in hemoglobin often occurs along with eGFR which also decreases so that the prevalence of anemia increases (McMurray et al., 2012; KDIGO, 2013). This is in accordance with research conducted in Japan which shows an increase in the prevalence of anemia in CKD patients as eGFR decreases, especially in hemodialysis patients (Akizawa et al., 2018). In fact, according to PERNEFRI, supporting therapy can be given to hemodialysis patients with hemoglobin levels <10 gr/dl (PERNEFRI, 2018). A decrease in hemoglobin concentration itself can be caused by a decrease in the effectiveness of erythropoiesis so that erythropoietin production is disrupted. Apart from that, it can also be due to a lack of iron intake, gastrointestinal bleeding, or blood loss during the hemodialysis procedure itself (Sumirah et al., 2022).

8) Serum Iron (SI) Levels

A total of 56 patients (75.7%) in this study had normal SI levels ranging from 45-158 µg/dl. This data is in line with the results of Djami and Tangkelangi's (2021) research which concluded that 60.8% of CKD sufferers who underwent hemodialysis had normal SI levels (Djami and Tangkelangi, 2021). Stage 5 CKD patients who routinely undergo hemodialysis have a mean SI level of 56.53 g/dl (Maulidya et al., 2022).

Serum Iron (SI) is the amount of iron concentration that can bind to transferrin and circulate in the blood. Patients who undergo hemodialysis can lose 10-20 times more iron than those who do not undergo it, because during this process iron can be lost as much as 3-5 grams per year. Apart from that, CKD patients also only have erythrocytes whose lifespan is approximately half that of normal erythrocytes (Maulidya et al., 2022). Therefore, one of the complications that can be encountered in hemodialysis patients is absolute iron deficiency anemia (Djami and Tangkelangi, 2021).

9) Total Iron-Binding Capacity (TIBC) Levels

In this study, 69 patients (93.1%) had TIBC levels below 250 µg/dL, while only 5 patients (6.8%) had normal TIBC levels within the range of 250–460 µg/dL. These findings differ from previous research, which reported that 67.4% of CKD patients undergoing hemodialysis had normal TIBC levels, and only 15.2% had reduced TIBC levels (Djami and Tangkelangi, 2021).

Total Iron Binding Capacity (TIBC) is the number of places that can bind iron to plasma transferrin (Gaweda, 2017). A decrease in total iron binding capacity can occur in anemia of chronic inflammatory diseases due to increased ferritin. Low TIBC levels indicate sufficient iron stores (ferritin), but not enough available in the blood circulation (serum iron), while TIBC levels that tend to increase indicate decreased iron stores (Maulidya et al., 2022).

10) Sources of Hemodialysis Costs

All patients (100%) in this study used BPJS as a source of funding for hemodialysis. In 2018, the payment method for all hemodialysis patients at RSUP Dr. Sadikin Bandung is through BPJS (Amalina, Ibrahim and Emaliyawati, 2018).

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Based on the 11th Report of the Indonesian Renal Registry by PERNEFRI, it is known that 91% of hemodialysis patients in Indonesia have received funding from BPJS through its JKN program (PERNEFRI, 2018). This shows an increase in hemodialysis patients using BPJS because in 2015 only 86% of patients received JKN funding (Kementerian Kesehatan RI, 2017). The increase in patients using BPJS is due to the decreased productivity of hemodialysis patients due to the long duration of each therapy so that their working hours are reduced and income disappears, while patients and their families have to bear quite high costs, such as direct non-medical costs (informal services, accommodation, transportation) and other costs not covered by BPJS (medicine and supplements) (Rahajeng, Sarnianto and Ramadaniati, 2020).

CONCLUSION

This study concludes that the majority of CKD patients undergoing hemodialysis are male (54.1%) and fall within the 40–60 year age group (66.2%). Hypertension and diabetes mellitus are the most prevalent risk factors. Most patients have been on hemodialysis for over 12 months, with laboratory results showing creatinine levels >1.5 mg/dL, BUN levels >24 mg/dL, serum iron (SI) levels between 45 and 158 µg/dL, and TIBC levels <250 µg/dL. All patients, regardless of sex, have hemoglobin levels below the normal range, and their treatment is covered by BPJS (national health insurance).

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The Relationship Between Confirmed COVID-19 Positive Characteristics of Laboring Mothers and the Incidence of Asphyxia in Infants at Hospital Dr. Hasan Sadikin Bandung

Dinna Triyani[1], Akhmad Yogi Pramatirta[2], Sefita Aryuti Nirmala[3], Ari Indra Susanti[4], Astuti Dyah Bestari[5]

[1] *Applied Undergraduate Study Program in Midwifery, Faculty of Medicine, Padjadjaran University*
[2] *Department of Obstetrics and Gynecology, Faculty of Medicine, Padjadjaran University*
[3,4,5] *Department of Public Health Sciences, Faculty of Medicine, Padjadjaran University*

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E-mail: dinna19001@mail.unpad.ac.id

A B S T R A C T

The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is the cause of Coronavirus Disease 2019 (COVID-19). In December 2021, the Omicron variation was first identified in Indonesia, and it has since been linked to nearly 72 million cases worldwide. When COVID-19 is present during pregnancy, unfavorable outcomes including stillbirth, preterm delivery, and maternal mortality may occur. The purpose of this research was to examine the association between the features of women who tested positive for COVID-19 and the incidence of asphyxia in their babies at Dr. Hasan Sadikin General Hospital in Bandung between July 2021 and July 2022. A quantitative descriptive technique was used, and 69 mothers and 70 babies were sampled overall. Medical records provided the data, which was then subjected to chi-square analysis. There was no discernible correlation between the incidence of hypoxia and the mother's age (p = 0.838), parity (p = 0.647), or delivery method (p = 0.313). Nonetheless, a noteworthy correlation was seen between the gestational age (p = 0.001) and the maternal difficulties (p = 0.013) associated with baby hypoxia. This research found that whereas age, parity, and delivery style were not substantially linked with newborn hypoxia, gestational age and COVID-19-related problems were.

INTRODUCTION

Coronavirus Disease2019 (COVID-19) is an infectious disease caused by a virus called Severe Acute Respiratory Syndrome Coronavirus 2 (SARSCoV2) (Ministry of Health, 2020). This virus is a new type of coronavirus that has never been identified in humans (Ministry of Health, 2020). Omicron is the latest variant of the coronavirus that causes COVID-19. This new variant spreads faster than other COVID-19 variants but with milder symptoms or tends to be asymptomatic. This new variant of the omicron coronavirus was first discovered in Africa and has now been detected in several countries, including Indonesia (Widiastuti, 2022).

COVID-19 cases are increasing again (PDPI et al., 2020). Omicron in Indonesia was first detected in early December due to the arrival of Indonesian citizens from foreign countries at the end of November.(First Case of Omicron in Indonesia Allegedly from Indonesian Citizen Coming from Nigeria – Sehat Negeriku, nd)As of December 16, 2021, the total number of identified COVID-19 cases globally was 72,209,009, with 1,630,932 deaths (CFR 2.3%) in 219 affected countries and 180 local transmission countries. In Indonesia, as of December 16, 2021, there were 636,154 confirmed COVID-19 cases and 19,248 deaths (CFR: 3.0%) (PHEOC Ministry of Health of the Republic of Indonesia, 2023).

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Among the many people infected with COVID-19, several categories are vulnerable to COVID-19 (Posumah et al., 2021). Vulnerable groups to COVID-19 include the elderly, people with hypertension and diabetes mellitus, pregnant women, immunocompromised patients, men, obesity, and active smokers. Based on data from the Indonesian Obstetrics and Gynecology Association (POGI), around 13.7% of pregnant women tend to be more susceptible to COVID-19 infection than non-pregnant women. This is because, during pregnancy, there are changes in the immune system and physiology of the pregnant woman's body. This makes pregnant women more susceptible to COVID-19 (Posumah et al., 2021). In April 2020-April 2021, 536 pregnant women were infected with COVID-19, of which 3% died. This data was taken before the spike in COVID-19 cases in Indonesia between June and July 2021 due to the delta variant attack (Refrizal, 2019).

The characteristics of the mother in labor can affect the outcome of labor. The characteristics that influence include maternal age, gestational age, parity, type of labor, and labor complications. A study conducted in America stated that the incidence of preeclampsia was higher in pregnant women who were hospitalized for COVID-19 (Wastnedge et al., 2021). Based on the risks that can occur in pregnant women with confirmed COVID-19, it is important to emphasize maternal age, parity, type of delivery, delivery complications, and especially gestational age (Arruda et al., 2021). Mothers who give birth at a gestational age of less than 37 weeks or more than 42 weeks are more likely to give birth to asphyxia babies. Because at a gestational age of less than 37 weeks, the surfactant in the baby is still not enough, so the possibility of the baby experiencing asphyxia is greater (Sulfianti & Purba, 2020).

Pregnant women are susceptible to COVID-19 because the physiological changes of pregnancy involve the cardiorespiratory and immune systems, which may result in altered responses to SARS-CoV-2 infection in pregnancy. Physiological changes during pregnancy significantly impact the immune system, respiratory system, cardiovascular function, and coagulation, which have positive or negative effects on the development of COVID-19 disease (Luluk, 2020). This is because pregnant women experience physiological and mechanical changes in the body, including increased oxygen consumption, edema of the respiratory tract mucosa, increased diaphragm, and changes in lung volume during pregnancy. These changes reduce the total lung capacity (TLC) and the body's ability to clear the respiratory tract (Nurdianto et al., 2020). Pneumoniae tends to predispose to pulmonary infections that worsen maternal and neonatal outcomes, just as COVID-19 can cause an acute respiratory syndrome in the mother and cause asphyxia in the baby (Arruda et al., 2021).

In addition to the vulnerability of pregnant women to COVID-19 infection, this infection can cause undesirable outcomes such as premature birth, maternal death, abortion, and stillbirth. According to research by Arruda V, Souza B et al. regarding the risk of premature pregnancy in mothers with COVID-

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19, it was stated that mortality and the prevalence rate of premature newborns occurred around 47% due to complications caused by COVID-19 (Arruda et al., 2021). However, another study by Nayak AH, Kapote DS, et al. showed that COVID-19 infection did not affect the outcomes of mothers and babies during pregnancy (Nayak et al., 2020). However, long-term newborn monitoring is necessary to confirm the possibility of delayed effects (Nayak et al., 2020). Previous studies also stated that data related to maternal and infant outcomes in COVID-19 cases still had limitations (Nayak et al., 2020).

Dr. Hasan Sadikin General Hospital Bandung is one of the referral hospitals in West Java and Nationally, has national standards from the Hospital Accreditation Commission (KARS), is accredited as an international standard hospital by the Joint Commission International (JCI), manages cases of patients with confirmed COVID-19. For almost 2 years of the pandemic, Hasan Sadikin Hospital (RSHS) Bandung has experience as the main referral hospital for COVID-19 patients (Minister of Health Hands Over JCI Certificate and Inaugurates Orchid Building of Dr. Hasan Sadikin General Hospital – Healthy My Country, nd). Therefore, the researcher was interested in Dr. Hasan Sadikin General Hospital as a place for research and referring to the previous explanation, the researcher raised the research title "The Relationship Between Characteristics of Mothers Who Have Confirmed COVID-19 and Infant Outcomes at Dr. Hasan Sadikin General Hospital, Bandung, July 2021-July 2022".

METHOD

This study employs an analytical research method using a descriptive quantitative approach. The subjects comprise mothers with confirmed COVID-19 who gave birth and their newborns at Dr. Hasan Sadikin Hospital, Bandung. The total sample includes 69 mothers and 70 newborns. This study was conducted from July 2021 to July 2022 at Dr. Hasan Sadikin Hospital, Bandung. The inclusion criteria for this study were mothers who gave birth with a positive diagnosis of COVID-19 and mothers who had complete medical record data (medical record number, age, gestational age, parity, type of delivery, complications of delivery, and APGAR Score). The exclusion criteria for this study were mothers who gave birth with comorbidities (concomitant diseases) such as asthma, heart disease, and diabetes. The sampling technique used total sampling. The research instrument used was the medical records of mothers who gave birth at Dr. Hasan Sadikin Hospital. Hasan Sadikin Bandung Hospital in the period July 2021-July 2022. The collected data were analyzed using the chi-square test, which aims to determine the relationship between the characteristics of mothers giving birth confirmed with COVID-19 and the incidence of asphyxia in babies at Dr. Hasan Sadikin Bandung Hospital in the period July 2021-July 2022

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RESULT

The results of the study on the relationship between the characteristics of mothers giving birth confirmed with COVID-19 and the incidence of asphyxia in infants can be seen from the distribution table.

Table 1 Frequency distribution of characteristics of mothers giving birth confirmed with COVID-19 at Dr. Hasan Sadikin General Hospital, Bandung, July 2021-July 2022

Characteristics of Mothers in Labor	Number (n)	Percentage (%)
Mother's age		
<20 years	5	7.2
20-35 years	49	71.0
>35 years	15	21.7
Parity		
Primipara	23	33.3
Multipara	43	62.3
Grand multipara	3	4.3
Gestational Age		
Premature	21	30.4
Aterm	48	69.6
Postterm	0	0
Types of Childbirth		
Spontaneous	39	56.5
SC	30	43.5
Complications of childbirth		
Yes	40	58.0
No	29	42.0

Based on Table 1, it was found that the age of the majority of mothers giving birth was 20-35 years old at 71.0%, multiparity parity at 62.3%, term gestational age at 69.6%, spontaneous delivery type at 56.5%, complications during pregnancy at 58%.

Table 2 Distribution of frequency of asphyxiated babies from mothers giving birth confirmed with COVID-19 at Dr. Hasan Sadikin General Hospital, Bandung, July 2021-July 2022

Baby Outcome	Number (n)	Percentage (%)
APGAR Score		
Asphyxia	22	31.4
No asphyxia	48	68.6
Amount	70	100

Based on Table 2, it was found that the majority of mothers giving birth gave birth to babies without asphyxia, amounting to 68.6%.

Table 3 Frequency distribution of gestational age in asphyxiated babies at Dr. Hasan Sadikin General Hospital, Bandung, July 2021-July 2022

Gestational Age	Asphyxia	
	Number (n)	Percentage (%)
Gestational Age		
Premature	13	59.1
Aterm	9	40.9
Postterm	0	0.0
Amount	22	100

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In Table 3 above, the majority of mothers giving birth gave birth with preterm gestational age, amounting to 59.1%.

Table 4 Relationship between characteristics of mothers giving birth confirmed with COVID-19 and the incidence of asphyxia in babies at Dr. Hasan Sadikin General Hospital, Bandung, July 2021-July 2022

Characteristics of Mothers in Labor	APGAR Score				TOTAL		*p-value**
	Asphyxia		No Asphyxia				
	N	%	N	%	N	%	
Mother's age							
<20 years	2	2.90	3	4.35	5	7.25	0.838
20-35 years	16	23.19	33	47.82	49	71.01	
>35 years	4	5.80	11	15.94	15	21.74	
Parity							
Primipara	9	13.04	14	20.29	23	33.33	0.647
Multipara	12	17.39	31	44.93	43	62.32	
Grand multipara	1	1.45	2	2.90	3	4.35	
Gestational Age							
Premature	13	18.84	8	11.60	21	30.44	0.001*
Aterm	9	13.04	39	56.52	48	69.56	
Postterm	0	0.0	0	0.0	0	0.0	
Types of Childbirth							
Spontaneous	10	14.49	29	42.03	39	56.52	0.313
SC	12	17.39	18	26.09	30	43.48	
Complications of childbirth							
Yes	18	26.09	22	31.88	40	57.97	0.013*
No	4	5.80	25	36.23	29	42.03	

Note: *chi-square

Based on the results in Table 4, it was found that there was no significant relationship between age, maternal parity, and type of delivery confirmed with COVID-19 and the incidence of asphyxia in infants (p-value>0.05). Meanwhile, the characteristics of gestational age and complications of childbirth experienced by mothers confirmed with COVID-19 had a significant relationship with the incidence of asphyxia in infants (p-value<0.05).

DISCUSSION

Mother's Age

The frequency distribution table is based on age characteristics: most mothers are 20-35. In terms of maternal health, mothers aged <20 years and >35 years are at 2-3 times greater risk compared to those aged 20-35 years (Utami & Wilis Sukmaningtyas, 2020). The age of pregnant women <20 years or >35 years is a risky age for pregnancy. At a younger age, namely <20 years, blood circulation to organs that play a role in pregnancy, such as the uterus and cervix, is not yet perfect, so the distribution of nutrients to the fetus can be disrupted, while at the age of >35 years, reproductive tissues and organs have changed,

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and the birth canal becomes inflexible. Other diseases, such as hypertension, tend to be found in the age group >35 years.

This study's results align with research conducted by Amorita and Syahriarti, which stated that the population of pregnant women confirmed with COVID-19 was mostly found in the age range of 20-35 years. When viewed only from the age variable, most pregnant women confirmed with COVID-19 have a relatively low risk.(Amorita & Syahriarti, 2021)Thus, it is not always the case that the age of the mother giving birth who is at risk (<20 years or >35 years) experiences asphyxia in the baby because there are various other factors, such as the absence of pregnancy and childbirth disorders, and the readiness of the female reproductive organs that are not the same. The age of the mother giving birth who is at risk of experiencing asphyxia in the baby can be caused by various factors such as maternal factors, placental factors, fetal factors, and childbirth factors (Syarif & Umar, 2019).

The results of the Chi-Square test showed that the p-value = 0.838>α = 0.05, so there is a significant relationship between the age of the mother confirmed with COVID-19 and the incidence of asphyxia in infants.

Parity

Parity is a term that indicates the number of pregnancies that result in the birth of a fetus that can survive outside the womb. Parity that is too high and pregnancy spacing that is too close affect the condition of the mother and fetus. Parity is divided into several parts or classifications, namely, primipara is a woman who has given birth once; multipara is a woman who has given birth less than five times, and grand multipara is a woman who has given birth more than five times. Low parity (parity one) indicates the mother's unpreparedness in dealing with complications that occur during pregnancy, childbirth and postpartum. Primiparous parity is risky because the mother is not ready medically or mentally (Isrofiana, 2017).

Mothers who are giving birth for the first time tend to experience difficulties compared to mothers who have given birth before. This is because mothers with primiparous parity will experience difficulties during labor due to muscles that are still stiff and not elastic, which will affect the length of labor, causing the baby to experience asphyxia. In contrast, mothers with multiparous parity experience weakness or lack of uterine muscle strength, which can prolong the labor process (Deastri Pratiwi, 2019).

A study conducted by Marsden KA et al. stated that there was no significant relationship between the number of parties and the prevalence or severity of COVID-19 in the population of mothers giving birth infected with COVID-19. In the study's results on the outcomes of babies with multiparous mothers, it was also found that the babies were in good condition where they were born alive, had normal birth

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weight, and were not asphyxiated. This is because the greater the number of parties, the worse the baby's outcomes can be (Marsden et al., 2021).

This condition does not always mean that parity is at risk of asphyxia. This is because mothers who are at risk but do not experience asphyxia can be caused by the different experiences of each woman and the absence of complications in pregnancy and childbirth. Parity that has a risk of asphyxia is influenced by several factors, such as not being medically or mentally ready, as well as the presence of complications in pregnancy and childbirth (Syarif & Umar, 2019).

The Chi-Square test results showed that the p-value = 0.647>α = 0.05, so there is no significant relationship between the parity of mothers confirmed with COVID-19 and the incidence of asphyxia in infants.

Gestational Age

Pregnant women who are infected with COVID-19 are at risk for depression, anxiety, fear, and confusion. Symptoms of anxiety and depression in pregnant women are often associated with an increased risk of premature birth. According to research conducted by the Centers for Disease Control (CDC), the risk of premature birth in pregnant women who are confirmed positive for COVID-19 is 3 times higher than in mothers who are not confirmed positive for COVID-19 (Chen et al., 2020).

One mechanism that may be associated with an increased risk of preterm birth in mothers infected with COVID-19 is an excessive inflammatory response in the body. COVID-19 can cause the immune system to overreact, resulting in a strong inflammatory reaction. Significant inflammation can have a negative impact on the placenta and interfere with fetal growth and development. This, in turn, can lead to an increased risk of preterm birth.

In addition, other factors such as high blood pressure, lung disease, and blood clotting disorders that can occur due to COVID-19 infection can also contribute to the risk of preterm birth. However, it is important to remember that each pregnancy and individual is unique, and factors other than COVID-19 can also affect the incidence of preterm birth.

Babies born to mothers with a term gestational age have live birth outcomes, no asphyxia, and normal birth weight. A study in Italy stated that healthy newborns were born to mothers with pneumonia caused by COVID-19, and all mothers gave birth at term. Babies born at term gestational age are less at risk of experiencing poor outcomes (Perrone et al., 2020).

According to WHO, gestational age is divided into 3, namely premature (<37 weeks), mature (37-42 weeks), and postmature (>42 weeks) (Rahma & Armah, 2014). Premature babies (< 37 weeks) have a higher risk of death from asphyxia. Respiratory failure in preterm babies occurs due to immaturity of surfactant in the baby's lungs (Mumpuni et al., 2021). Mothers with pregnancies of more than 42 weeks

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(post-term) also have a 3.571 times greater risk of giving birth to a baby with asphyxia (Deastri Pratiwi, 2019). This is because the placental function is no longer optimal due to aging, which causes reduced oxygen transport from the mother to the fetus. Placental function peaks at 38 weeks of gestation and then begins to decline, especially after 42 weeks, as evidenced by a decrease in estriol and placental lactogen (Saridewi, 2014).

The results of the Chi-Square test showed that the p-value = 0.001 <α = 0.05, so there is a significant relationship between the gestational age of mothers confirmed with COVID-19 and the incidence of asphyxia in infants.

Types of Childbirth

In a study conducted by Rahmah et al., it was stated that mothers who gave birth by CS had a 4.44 times greater risk of giving birth to babies with asphyxia compared to mothers who gave birth normally/spontaneously. In line with the study conducted by Yelis, it was found that the type of delivery with CS had a 5.47 times greater risk of experiencing baby asphyxia compared to mothers who gave birth normally (Tahir, 2008).

According to a systematic review study, the rate of CS in mothers who were infected with COVID-19 was higher than in pregnant women who were not infected. This was done to minimize poor maternal and infant outcomes after giving birth. According to information from the hospital, it was also reported that several mothers gave birth to CS due to COVID-19 infection. However, it will be returned to the SOP in force at the hospital.

Currently, there is still insufficient evidence that cesarean delivery can increase adverse effects on infants with COVID-19 and prevent vertical transmission from pregnant women with COVID-19 to newborns. COVID-19 infection should not be an indication for cesarean delivery. CS should be performed on pregnant women infected with COVID-19 after assessing the severity of the disease and also for other obstetric indications (Cai et al., 2021).

The results of the Chi-Square test showed that the p-value = 0.313>α = 0.05, so there is no significant relationship between the type of delivery of mothers confirmed with COVID-19 and the incidence of asphyxia in babies.

Complications

Preeclampsia is a higher risk of COVID-19 infection. Many deaths in patients with COVID-19 are due to acute respiratory distress syndrome. This endothelial protection is disrupted in acute respiratory disease, leading to excessive tissue swelling and inflammation. Risk factors for COVID-19, such as advancing age, obesity, diabetes, and cardiovascular disease, are all associated with endothelial cell dysfunction.

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Given the critical role of endothelial cells in the development and progression of COVID-19, these women may be at increased risk (PRADANA, 2022).

Research conducted by Youssef et al., in 2021 stated that COVID-19 infection can cause preeclampsia through increased coagulation cascade activity. Increased coagulation cascade activity can be observed through changes in PT (prothrombin time), BT (bleeding time), aPTT (activated Partial Thromboplastin Time), and CT (clotting time) parameters (Youssef et al., 2021).

In addition, research conducted by Baboolall et al. also stated that COVID-19 infection could increase the inflammatory response characterized by increased CRP (C-reactive protein), D-dimer, and NLR (neutrophil-lymphocyte ratio) values, which can ultimately also trigger preeclampsia (Baboolall et al., 2019). The risk of preeclampsia in pregnant women with COVID-19 increases with the severity of COVID-19 experienced. Pregnant women with COVID-19 who experience severe symptoms have a 5-fold higher risk of preeclampsia compared to pregnant women with COVID-19 without symptoms.

The existence of a bad condition of the baby that occurs in newborns can be caused by complications of childbirth. Complications that can cause bad conditions in newborns include preeclampsia, eclampsia, premature rupture of membranes, cephalopelvic disproportion (CPD), and others.

The results of the Chi-Square test showed that the p-value = 0.013 $<\alpha = 0.05$, so there is a significant relationship between maternal complications confirmed with COVID-19 and the incidence of asphyxia in infants.

CONCLUSION

The relationship between the characteristics of mothers confirmed with COVID-19 and the incidence of asphyxia in infants showed that there was no significant relationship between the age, parity of the mother, and type of delivery confirmed with COVID-19 with the incidence of asphyxia in infants (p-value>0.05). Meanwhile, the characteristics of gestational age and complications of childbirth experienced by mothers confirmed with COVID-19 had a significant relationship with the incidence of asphyxia in infants (p-value<0.05).

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Risk Factors for Dyspepsia Incidence in Community Aged 15-64 Years in Oesao Village, Oeaso Community Health Center Work Area

Elistho Adrianus Ndun[1], Sigit Purnawan[2], Deviarbi Sakke Tira[3]

[1,2,3]*Faculty of Public Health, UNDANA, Kupang, Indonesia*

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CORRESPONDENCE

E-mail: ithondun8@gmail.com

A B S T R A C T

Dyspepsia is a non-communicable disease affecting the digestive system, characterized by symptoms such as heartburn, abdominal discomfort, nausea, vomiting, bloating, and feeling of fullness. As of June 2022, more than 376 cases of dyspepsia were reported in the village of Oesao, with the condition being most prevalent among individuals aged 15-64 years. This study aimed to identify the risk factors for dyspepsia in individuals aged 15-64 in the village of Oesao and its surrounding areas, served by Puskesmas Oesao. An analytic observational study with a case-control design was conducted at Puskesmas Oesao from May to June 2023. A total of 213 respondents were recruited using random sampling with a 1:2 ratio. Data was collected through interviews. The relationship between various factors and dyspepsia incidence was analyzed using p-values with alpha <0.05 as the significance threshold. The results of the study showed that diet was significantly associated with dyspepsia ($p < 0.05$). Coffee consumption was significantly associated with dyspepsia ($p < 0.05$). Alcohol consumption was significantly associated with dyspepsia ($p < 0.05$). Sour and spicy foods were significantly associated with dyspepsia ($p < 0.05$). This study concludes that coffee, alcohol, sour, and spicy foods have a significant relationship with the incidence of dyspepsia.

INTRODUCTION

Dyspepsia is one of the most common health problems experienced by the community. Dyspepsia is a syndrome or collection of symptoms where in this condition, the patient experiences complaints in the form of pain, discomfort, or pain in the upper abdomen that can be persistent or episodic and accompanied by a feeling of fullness when eating, satiety, heartburn, bloating, belching, anorexia, to nausea and vomiting (Octaviana Elsi, Anam Khairul, 2018).

In 2021, Oesao Health Center was included in the top 5 health centers with the highest number of dyspepsia syndrome cases, ranking fifth in the Kupang Regency Health Service work area. According to data obtained from Oesao Health Center, dyspepsia syndrome ranked second in the top ten diseases in the Oesao Health Center work area for the past two years, with the number of cases in 2020 reaching 1,974 cases and in 2021 reaching 1,728, while according to data as of June 2022, dyspepsia cases reached 987 with the incidence of cases in men totaling 346 and in women totaling 641, and is still ranked second in the category of the top ten diseases in mid-2022 and most often occurs in people of productive age, namely 15-64 years.

Oesao Village is included in the working area of the Oesao Health Center, which is a village with the highest incidence of dyspepsia syndrome in the working area of the health center; based on data obtained

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from the Health Center over the past two years, it shows an increasing trend of dyspepsia cases in Oesao Village with the number of cases in 2020 amounting to 684 cases, in 2021 amounting to 831 cases, while in mid-2022 to June 2022, dyspepsia cases in Oesao Village reached 376 cases and were dominated by the 15-64 year age group.

Based on previous research by Fithriyana Rinda, 2018 in the Bangkinang City Health Center area, factors that can influence the incidence of dyspepsia syndrome are diet, habits of consuming drugs containing NSAIDs, and habits of consuming irritating foods and drinks that can stimulate HCL, such as coffee, alcohol, carbonated drinks, and sour and spicy foods. If the incidence of dyspepsia is not prevented properly, it will have an impact on the decline in the quality of life of the community in Oesao Village due to a decrease in the productivity of the community's daily activities such as trading, farming in the fields or in the fields, raising livestock, office activities and education in schools and universities, by knowing the risk factors that cause the incidence of dyspepsia syndrome in Oesao Village, it will help program makers to design forms of intervention that can prevent the occurrence of dyspepsia syndrome. Based on the description of the background above, researchers are interested in researching the Risk Factors for the Occurrence of Dyspepsia Syndrome in the Community Aged 15-64 Years in Oesao Village, Oesao Health Center Work Area.

METHOD

This study is an analytical observational study using a case-control study design. Case-control study. This study was conducted in Oesao Village, East Kupang District, Kupang Regency in 2023. The study was conducted in May-June 2023. The population in this study consisted of a case population and a control population. The case population in this study were all dyspepsia patients aged 15-64 years who visited and were registered in Oesao Village, East Kupang District, totaling 376 people. The control population in this study were those of aged 15-64 years who did not experience dyspepsia, totaling 1,874. The sample in this study was divided into two, namely the case group and the control group, with a ratio of 1: 2 calculated using the Lemeshow formula; the number of samples was 213. The case sample in the study was people aged 15-64 years who experienced dyspepsia in Oesao Village, East Kupang District, with a total of 71 people, while the control sample in this study was people aged 15-64 years who did not suffer from dyspepsia with a total of 142 people. Data collection techniques were carried out by interviewing and using a research instrument in the form of a questionnaire. Data analysis was carried out descriptively and analytically. Univariate analysis to determine the frequency distribution of each dependent and independent variable, which aims to describe the risk factors for dyspepsia, dietary patterns, coffee consumption, alcoholic beverage consumption, and spicy or sour food consumption, are displayed in the form of a frequency distribution table. Analytical analysis used bivariate analysis, namely, to test the

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relationship between dietary patterns, coffee consumption habits, alcohol consumption habits, and habits of consuming sour or spicy foods with the incidence of dyspepsia using the Chi-Square test.

RESULT

1. Univariate Analysis

Table 1 Frequency Distribution of Dyspepsia Incidents Based on Gender in Oesao Village, East Kupang District, Oesao Health Center Working Area

Gender	Dyspepsia events				Total	
	Case		Control			
	n	%	n	%	N	%
Man	30	42	60	42.3	90	42.3
Woman	41	57.7	82	57.7	123	57.7
Total	71	100	142	100	213	100

Based on table 1 shows that the highest gender is female, with a total of 123, with a percentage of 57.7% consisting of 41 cases and 82 controls, while the male gender is 90 people with a percentage of 42.3% consisting of 30 cases and 60 controls.

Table 2 Frequency Distribution of Dyspepsia Incidents Based on Age in Oesao Village, East Kupang District, Oesao Health Center Working Area

Age	Dyspepsia events				Total	
	Case		Control			
	n	%	n	%	N	%
15-30	47	64.8	94	64.8	141	66.1
31-45	17	23.9	34	23.9	51	23.9
46-60	6	9.9	12	9.9	18	8.4
61-64	1	1.4	2	1.4	3	1.4
Total	71	100	141	100	213	100

Based on Table 4.2, the highest age group is in the 15-30-year age group, with a total of 141 people (66.1%) consisting of 47 cases and 94 controls, while the lowest age was in the 61-64 age group with a total of 3 people (1.4%) consisting of 1 case and 2 controls.

Table 3 Frequency Distribution of Dyspepsia Incidents Based on Occupation in Oesao Village, East Kupang District, Oesao Health Center Working Area

Work	Dyspepsia events				Total	
	Case		Control			
	n	%	n	%	N	%
Students/Students	31	43.7	61	43.0	92	43.2
civil servant	14	19.7	8	5.6	22	10.3
Housewife	5	7.0	24	16.9	29	13.6
Private employees	13	18.3	15	10.6	28	13.1
Businessman	1	1.4	8	5.6	9	4.2
Honorary	0	0	4	2.8	4	1.9
Farmer	3	4.2	19	13.4	22	10.3
Doesn't work	4	5.6	3	2.1	7	3.3
Total	71	100	142	100	213	100

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Based on table 3, the respondents, according to the type of work, the largest number is the Student/Pupil group with a total of 92 people with a percentage of 43%, while the group of respondents according to the least number of jobs is honorary with a total of 4 people in the control group.

2. Bivariate Analysis

Table 4 Relationship between Diet Patterns and the Incidence of Dyspepsia in the Community Aged 15-64 Years in Oesao Village, Oesao Health Center Working Area

Dietary habit	Dyspepsia events						OR 95% Cl	*p-value*
	Case		Control		Total			
	n	%	n	%	N	%		
Not good	53	74.6	28	19.1	81	37.7	12,432	0.00
Good	18	25.4	114	80.9	132	62.3	(6,301-24,530)	
Total	71	100	142	100	213	100		

Based on Table 4, 53 (74.6%) respondents who experienced dyspepsia had poor eating habits, which is in contrast to the control group, where 114 (80.9%) respondents who did not experience dyspepsia tended to have good eating habits. The results of the analysis of the relationship between eating habits and the incidence of dyspepsia using the chi-square test obtained a p-value of 0.00 (p-value <0.05), meaning that there is a significant relationship between eating habits and the incidence of dyspepsia in people aged 15-64 years in Oesao Village, Oesao Health Center working area. According to the analysis results, an Odds Ratio value of 12.432 (OR value> 1) was obtained, meaning that people with poor eating habits are 12.432 times more at risk of experiencing dyspepsia compared to people who have good eating habits.

Table 5 Relationship between Coffee Consumption and the Incidence of Dyspepsia in People Aged 15-64 Years in Oesao Village, Oesao Health Center Working Area

Coffee Consumption	Dyspepsia events						OR 95% Cl	*p-value*
	Case		Control		Total			
	n	%	n	%	N	%		
Yes	56	78.9	76	53.5	132	62.0	3,242	0.00
No	15	21.1	66	46.5	66	38.0	(1,678-6,263)	
Total	71	100	142	100	213	100		

Based on Table 5, 56 (78.9%) respondents who experienced dyspepsia had a habit of drinking coffee, in contrast to the control group, where 66 (46.5%) respondents who did not experience dyspepsia tended to have no habit of consuming coffee. The results of the analysis of the relationship between diet and the incidence of dyspepsia with the Chi Square test obtained a p-value of 0.00 (p-value <0.05), meaning that there is a significant relationship between coffee consumption habits and the incidence of dyspepsia in people aged 15-64 years in Oesao Village, Oesao Health Center work area. According to the results of the analysis, an Odds Ratio value of 3.242 was obtained (OR value> 1), which means that people with a habit

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of drinking coffee are 3.242 times more at risk of experiencing dyspepsia compared to people who do not have a habit of drinking coffee.

Table 6. Relationship between Alcohol Consumption and the Incidence of Dyspepsia in the Community Aged 15-64 Years in Oesao Village, Oesao Health Center Working Area

Alcohol Consumption	Dyspepsia events						OR 95% Cl	*p-value*
	Case		Control		Total			
	n	%	n	%	N	%		
Yes	35	49.3	22	15.5	57	26.8	5,303	0.00
No	36	50.7	120	84.5	156	73.2	(2,767-10,163)	
Total	71	100	142	100	213	100		

Based on table 6, 35 (49.3%) respondents who experienced dyspepsia had a habit of drinking alcohol; this contrasts with the control group, where 120 (84.5%) respondents who did not experience dyspepsia tended to have no habit of consuming alcohol. The results of the analysis of the relationship between diet and the incidence of dyspepsia with the Chi Square test obtained a p-value of 0.00 (p-value <0.05), meaning that there is a significant relationship between alcohol consumption habits and the incidence of dyspepsia in people aged 15-64 years in Oesao Village, Oesao Health Center work area. According to the results of the analysis, an Odds Ratio value of 5.303 was obtained (OR value> 1), which means that people with a habit of drinking alcohol are 5.303 times more at risk of experiencing dyspepsia compared to people who do not have a habit of drinking alcohol.

Table 7 Relationship between the Consumption of Sour or Spicy Foods and the Incidence of Dyspepsia in People Aged 15-64 Years in Oesao Subdistrict, Oesao Health Center Working Area

Consumption of Sour or Spicy Foods	Dyspepsia events						OR 95% Cl	*p-value*
	Case		Control		Total			
	n	%	n	%	N	%		
Yes	61	85.9	79	55.6	140	65.7	4,865	0.00
No	10	14.1	63	44.4	73	34.3	(2,307-10,259)	
Total	71	100	142	100	213	100		

Based on Table 4.7, 61 (85.9%) respondents who experienced dyspepsia had a habit of consuming sour or spicy foods. This is inversely proportional to the control group, where 63 (44.4%) respondents who did not experience dyspepsia tended not to have a habit of consuming sour or spicy foods. The results of the analysis of the relationship between the consumption of sour and spicy foods and the incidence of dyspepsia with the chi square test obtained a p-value of 0.00 (p-value <0.05), meaning that there is a significant relationship between the habit of consuming sour or spicy foods and the incidence of dyspepsia in people aged 15-64 years in Oesao Village, Oesao Health Center work area. According to the results of the analysis, an Odds Ratio value of 4.865 (OR value> 1) was obtained, which means that people with a habit of consuming sour or spicy foods are 4.865 times more at risk of experiencing dyspepsia compared to people who do not have a habit of consuming sour or spicy foods.

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DISCUSSION

1. The Relationship Between Diet Patterns and the Incidence of Dyspepsia in the Community Aged 15-64 Years in Oesao Village, Oesao Health Center Working Area

Poor eating patterns, such as irregular and poorly controlled, can trigger dyspepsia. The meaning of irregular eating is the calculation of daily food consumption patterns measured based on the frequency of eating while the frequency of eating remains 3 times a day with snacks in between. The ideal eating schedule for a good eating pattern is 5 to 6 times a day, namely breakfast, snacks, lunch, afternoon snacks, dinner, and, if necessary, can be added with evening snacks (Annisa, 2009). The eating patterns that are the focus of this study are the regularity and frequency of eating which researchers measure by using a questionnaire and scoring each question where a score of 1-7 is in the irregular category while a score of 8-10 is in the regular category.

The results of the study conducted in Oesao Village showed a relationship between diet and the incidence of dyspepsia in people aged 15-64 years in Oesao Village, the working area of Oesao Health Center, where respondents with irregular diets were 12.432 times more at risk of experiencing dyspepsia. Based on findings in the field by researchers that as many as 18 people with regular diets also experienced dyspepsia, based on the results of interviews with respondents, it was found that this was because even though they had a fairly regular diet, the discipline of eating according to meal times was not routinely and consistently carried out by the respondents so that even though the diet was carried out 3 times a day, it was not by the proper meal times, which triggered gastric acid secretion which resulted in increased production of gastric acid which had an impact on the incidence of dyspepsia, in addition, the habit of delaying breakfast was also often done by respondents even though the body needed a lot of energy in the morning for activities, breakfast was needed to meet calories in the morning after the stomach was empty at night because it was used for rest or sleep. The consequences of not having breakfast can cause an imbalance in the central nervous system, followed by tremors, dizziness, and fatigue. This can also trigger dyspepsia because, during sleep, the body fasts all night and, in the morning, is in the first stage of feeling hungry, so the stomach, which is still in a state of hunger, can result in the production of stomach acid. This is also due to stomach activity, which tends to increase in the morning so that stomach acid production increases, which results in dyspepsia. In addition, it was also found that as many as 18 respondents from the case group who had a good diet but experienced dyspepsia were caused by other habits that can also increase the risk of dyspepsia, including coffee consumption, alcohol consumption habits and habits of consuming sour or spicy foods which are also variables studied in this study.

This is in line with research conducted by Juliha Fitri et al in 2020 on risk factors for dyspepsia at the Blangkejeren Health Center, Gayo Lues Regency, that there is a significant relationship between consumption patterns and the incidence of Dyspepsia at the Blangkejeren Health Center, Gayo Lues

Regency. Research conducted by Lestari Linda et al, on factors related to the incidence of dyspepsia in productive age (15-64) in the work area of the Lhoong Health Center, Lhoong District, Aceh Besar Regency in 2022 also showed the same results that there is a significant relationship between diet and the incidence of Dyspepsia in productive age (15-64) in the work area of the Lhoong Health Center, Lhoong District, Aceh Besar Regency. Research also conducted by Wibawani Evilia et al. on factors related to the incidence of dyspepsia in outpatients of the internal medicine polyclinic at the Koja Regional Hospital found that there is a significant relationship between diet and the incidence of dyspepsia that occurs in outpatients in the internal medicine polyclinic at the Koja Regional Hospital. This is supported by Djojodiningrat (2009), who states that diet plays a role in the occurrence of dyspepsia. Irregular eating, hasty eating habits, and irregular schedules can cause dyspepsia.

Based on the results obtained from the research conducted in the Oesao sub-district, researchers argue that, in fact, the community only knows that the ideal eating pattern is only about the frequency of eating 3 times a day. However, the community does not yet understand that, more than that, a good eating pattern is not only about the frequency of eating 3 times a day but also about the regularity of eating and consistency of meal times, which is also important to balance the work of organs such as the stomach so as not to experience dyspepsia.

2. The Relationship Between Coffee Consumption and the Incidence of Dyspepsia in the Community Aged 15-64 Years in Oesao Village, Oesao Health Center Working Area

The habit of drinking excessive coffee every day can contribute to stomach disorders (Khotimah, 2012). Caffeinated drinks such as tea, coffee, soda, or energy drinks can trigger dyspepsia. This is because caffeine can trigger increased gastrin secretion, thereby increasing stomach acid production. Caffeine is a bitter-tasting compound that can activate several type 2 bitter taste receptors (TAS2Rs) and is usually known as a trigger for stomach acid production (Liszt et al., 2017). The coffee drinking habits measured in this study were how often and how much coffee was consumed by respondents every day.

The results of the study conducted in Oesao Village showed a relationship between coffee consumption habits and the incidence of dyspepsia in people aged 15-64 years in Oesao Village, the working area of Oesao Health Center where respondents with coffee consumption habits were 3.242 times more at risk of experiencing dyspepsia. Based on the findings in the field by the researcher, as many as 76 respondents from the control group also consumed coffee but did not experience dyspepsia, based on the results of interviews with respondents, it was found that the habit of consuming coffee that they did was usually not routine every day or it can be said that coffee is not a drink that is routinely drunk every day. Based on the results of interviews with respondents, it was found that the habit of consuming coffee that they did was usually in amounts that were not too much; most of them only consumed 1 cup of coffee a day with coffee that was not too strong or commonly known in the community as light coffee. In addition, it was

also found that as many as 15 respondents from the case group who did not consume coffee but experienced dyspepsia this was due to other habits that could also increase the risk of dyspepsia, including consumption patterns, alcohol consumption habits, and habits of consuming sour or spicy foods, which were also variables studied in this study.

This is in line with research from Levaniet al. On coffee consumption patterns with the incidence of dyspepsia syndrome in students of the Faculty of Medicine in 2022, which showed that there was a significant relationship between coffee consumption habits and the incidence of dyspepsia in students of the Faculty of Medicine, Muhammadyah University of Surabaya in 2022. The same results were also shown by a study conducted by Hidayat et al. on the effect of dietary patterns on the incidence of dyspepsia at the Tidore Islands City Hospital that there was a significant relationship between coffee consumption and the incidence of dyspepsia in patients at the Tidore Islands City Hospital. The results of a study by Nugroho (2018) on the characteristics of patients with dyspepsia at the Rumbai Health Center showed a relationship between coffee consumption and the incidence of dyspepsia. The results of a study by Palar and Waleng (2013) on the relationship between dietary patterns and dyspepsia in adolescents at the Manado Model State Islamic High School showed a relationship between people who consumed coffee and the incidence of dyspepsia.

From the results of research conducted on people aged 15-64 years in Oesao Village, researchers argue that people do not understand that the habit of drinking coffee is related to the occurrence of dyspepsia, so the habit of consuming coffee is not regular or exceeds the limits that should be, most people consume coffee to increase enthusiasm for work and also delaying drowsiness but with the wrong consumption pattern so that it has an impact on the occurrence of dyspepsia. However, there is nothing wrong with consuming coffee as long as it is in a good pattern and not excessive.

3. The Relationship Between Alcohol Consumption and the Incidence of Dyspepsia in the Community Aged 15-64 Years in Oesao Village, Oesao Health Center Working Area

Alcoholic beverages, beer, liquor, and wine consumption can affect the increase in stomach acid. Several types of alcoholic beverages are not very acidic. However, experts say that alcohol can relax the tract in the lower part of the esophagus (which is connected to the stomach area), and this can cause stomach acid to increase (Susanti, 2011). Alcoholic beverages are included in the category of irritant drinks that can increase stomach acid production and can cause dyspepsia. Consuming alcohol can cause increased stomach acid production, nausea, and decreased appetite, even when eating small amounts, and will result in damage to the gastric mucosa if consumed in large amounts. Alcohol can also cause a decrease in the ability to digest and absorb food because pancreatic enzymes are insufficient (Purbaningsih, 2020). The habit of consuming alcoholic beverages measured in this study was the amount, frequency, and duration

of alcohol consumption carried out by people aged 15-64 years in Oesao Village, the working area of the Oesao Health Center

The results of the study conducted in Oesao Village showed a relationship between alcohol consumption habits and the incidence of dyspepsia in people aged 15-64 years in Oesao Village, the working area of Oesao Health Center, where respondents with alcohol consumption habits were 5.303 times more at risk of experiencing dyspepsia. The habit of people who consume alcohol to the point of getting drunk and the habit of consuming alcoholic beverages has been going on for more than a year. Based on the findings in the field by the researcher, as many as 22 respondents from the control group had a habit of consuming alcoholic beverages but did not experience dyspepsia; based on the results of interviews conducted with respondents, it was found that the habit of consuming alcohol that they did was usually not routine every day or it can be said that alcohol is not a drink that is routinely drunk every day and based on the results of interviews with respondents it was found that the consumption habits they did were usually in amounts that were not too much or > 250ml, most of them only consumed 1 shot a day. In addition, it was also found that as many as 36 respondents from the case group who did not consume alcohol but experienced dyspepsia, this could be caused by other habits that could also increase the risk of dyspepsia, including consumption patterns, coffee consumption habits and habits of consuming sour or spicy foods, which were also variables studied in this study.

The results of this study are in line with research conducted by Wijaya et al. (2020) regarding the relationship between lifestyle and diet and the incidence of dyspepsia at the Bhayangkara Hospital in Makassar City, which found that there was a significant relationship between alcohol consumption habits and the incidence of dyspepsia at the Bhayangkara Hospital in Makassar City.

Based on the results of research conducted on people aged 15-64 years in Oesao Village, the working area of Oesao Health Center, researchers can opine that the habit of consuming alcohol in the community occurs because most people assume that the human body also needs alcohol so that the pattern of alcohol consumption in the community continues. This is also supported by the lack of public understanding that the body also has a dose of alcohol needs, so most people consume alcohol excessively, which of course, can increase the risk of dyspepsia.

4. The Relationship Between Consumption of Sour or Spicy Foods and the Incidence of Dyspepsia in the Community Aged 15-64 Years in Oesao Village, Oesao Health Center Work Area

Juliana Fitri et al. (2020) stated that the type of food is also a triggering factor for dyspepsia syndrome; the habit of consuming spicy food in large quantities can trigger the digestive system, especially the stomach, and intestines, to contract. In addition to spicy food, other types of food that can trigger dyspepsia are acidic and contain gas.

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According to Julaiha Fitri et al. (2020) stated that consuming types of food such as spicy foods and sour foods can stimulate the stomach wall to produce stomach acid so that in the end, there is a decrease in the strength of the stomach wall which is not uncommon for conditions like this to cause ulcers in the stomach wall which can cause dyspepsia. The habit of consuming sour or spicy foods in this study is the habit of consuming, the frequency of consuming sour or spicy foods, and the duration of consuming sour or spicy foods.

The results of the study conducted in Oesao Village showed a relationship between the habit of consuming sour or spicy foods and the incidence of dyspepsia in people aged 15-64 years in Oesao Village, the working area of the Oesao Health Center where respondents with the habit of consuming sour or spicy foods were 4.865 times more at risk of experiencing dyspepsia. Based on the findings in the field by the researcher as many as 79 respondents from the control group who had the habit of consuming sour or spicy foods but did not experience dyspepsia, based on the results of interviews with respondents, it was found that in this group although they had the habit of consuming sour and spicy foods but their consumption patterns or habits were not carried out at every meal or in other words their consumption frequency tended to be lower than those in the case group where the habit of consuming sour or spicy foods in the case group tended to have a higher frequency where sour or spicy foods were consumed at every meal every day. Another finding of this study is that there were 10 respondents from the case group or those who experienced dyspepsia but did not have a habit of consuming sour or spicy foods; this could be caused by other habits that can also increase the risk of dyspepsia, including consumption patterns, coffee consumption habits, and alcoholic beverage consumption habits which are also variables studied in this study.

According to information obtained from interviews with respondents, most respondents who experience dyspepsia tend to have a habit of consuming sour and spicy foods such as processed chili sauce dishes with high use of chili and vinegar, and it has been consumed for more than a year or in other words this habit has been going on for years. According to information obtained by researchers during the research period by conducting interviews with respondents, most respondents consume sour or spicy foods at every meal to increase appetite.

The results of this test are in line with research from Sumarni and Andriani (2019) on the relationship between diet and the incidence of Dyspepsia and that there is a relationship between consumption of sour or spicy foods and the incidence of Dyspepsia. The results of research conducted by Putri, et al. (2014) on the description of the incidence of dyspepsia also showed the same results, namely the influence of consumption of irritating foods including sour or spicy foods with the incidence of Dyspepsia, as evidenced by the fact that most respondents who experienced dyspepsia tended to have a habit of consuming sour or spicy foods.

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Based on the description of the research results above, the researcher opines that many respondents know that consuming these types of food can cause pain in the pit of the stomach which is one of the clinical signs of dyspepsia, but the habit of consuming sour or spicy foods continues to be done or in other words there is a gap between the respondents' knowledge and the respondents' attitudes or behavior towards dyspepsia. However, there is actually nothing wrong with consuming sour or spicy foods, but there needs to be a good and controlled diet so that it does not have a negative impact on health such as dyspepsia.

CONCLUSION

The conclusion of the study on risk factors for dyspepsia in the 15-64-year-old community in Oesao Village, the working area of the Oesao Health Center, is: There is a relationship between dietary patterns and the incidence of dyspepsia in people aged 15-64 in Oesao Village, Oesao Health Center Working Area. There is a relationship between alcohol consumption habits and the incidence of dyspepsia in people aged 15-64 in Oesao Village, the working area of Oesao Health Center. There is a relationship between coffee consumption habits and the incidence of dyspepsia in people aged 15-64 in Oesao Village, the working area of Oesao Health Center. There is a relationship between the habit of consuming sour or spicy foods and the incidence of dyspepsia in people aged 15-64 in Oesao Village, the working area of Oesao Health Center.

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Correlation of Side Effects of ARV (Antiretroviral) Drugs with ARV Therapy Compliance in PLWHA at KDS Jombang Care Center Plus of Jombang Regency

Riska Putri Dessyanti[1], Wira Daramatasia[2], Yuliyanik[3]

[1,2]Nursing Education Study Program, STIKES Widyagama Husada, Malang, Indonesia
[3]Midwifery Study Program, STIKES Widyagama Husada, Malang, Indonesia

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CORRESPONDENCE

E-mail: riska.putri.dessyanti@gmail.com

A B S T R A C T

Human Immunodeficiency Virus (HIV) attacks white blood cells, leading to a weakened immune system. Acquired Immune Deficiency Syndrome (AIDS) refers to the set of symptoms caused by the decline in immunity due to HIV. Antiretroviral therapy (ART) is used to suppress viral replication, with treatment success largely dependent on adherence to therapy. However, side effects of antiretroviral drugs can negatively impact adherence by causing unwanted symptoms that discourage patients from continuing treatment. This study aims to analyze the correlation between the side effects of antiretroviral drugs and adherence to antiretroviral therapy among people with HIV/AIDS in the Jombang Care Center Plus Peer Support Community, Jombang Regency. This study used a cross-sectional design with purposive sampling, involving 38 respondents. Adherence to ART was assessed using the Morisky Medication Adherence Scale-8 (MMAS-8) questionnaire, while the side effects of antiretroviral drugs were evaluated using the Group Clinical Trial AIDS questionnaire. Statistical analysis was performed using Somers' D test. The Somers' D test showed a significant correlation between the side effects of antiretroviral drugs and adherence to therapy ($p = 0.002$, $p < 0.05$). This study concludes that side effects of antiretroviral drugs are significantly associated with adherence to antiretroviral therapy among people with HIV/AIDS in the Jombang Care Center Plus Peer Support Community.

INTRODUCTION

HIV (Human Immunodeficiency Virus) is a virus that infects white blood cells and can damage the immune system. AIDS (Acquired Immunodeficiency Syndrome) is the impact of the development of the HIV virus in the human body (Kemenkes RI, 2020). HIV/AIDS is an infection caused by the Human Immunodeficiency virus which is a group of retroviruses (Anwar et al,2018). Transmission of HIV/AIDS can be through casual sex, the use of tattoo needles, piercings that are not sterile and used interchangeably, pregnant women who are HIV positive which can be transmitted to their babies (Nurarif and Kusuma, 2015).

HIV/AIDS is a serious health problem throughout the world, including in Indonesia. Based on prevalence data from WHO in 2021, there were 38.4 million HIV cases worldwide and most of them occurred in women, 19.7 million and men, 16.9 million (WHO, 2021). According to the UNAIDS Overview Human Immunodeficiency Virus (HIV), a retrovirus that targets the immune system, is the source of HIV/AIDS infection (Anwar et al., 2018). Unprotected sexual activity, the use of non-sterile needles for tattoos or piercings, and the nursing or childbearing of HIV-positive mothers may all result in HIV transmission (Nurarif & Kusuma, 2015).

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HIV/AIDS is still a serious worldwide health issue, which also affects Indonesia. WHO (2021) estimates that there were 38.4 million HIV cases globally, 19.7 million of which were in women and 16.9 million of which were in males. Globally, there were 37.7 million HIV patients and 1.5 million new infections in 2021, according to the UNAIDS study. 36,902 cases of HIV/AIDS were recorded in Indonesia in 2021; the majority of these infections were in the productive age range of 15–49 years (Kemenkes RI, 2022). 5,538 HIV/AIDS cases were recorded in East Java in 2021 (Profil Kesehatan Jatim, 2021). With 152 HIV cases and 32 AIDS cases recorded in 2021—an increase from 2020—Jombang Regency is second only to Surabaya City in East Java for the greatest number of HIV/AIDS cases (Dinkes Jombang, 2021).

The STOP approach (Education/Campaign, Test, Treat, Maintain) is emphasised in the Minister of Health Regulation No. 21 of 2013 as a means of preventing and controlling HIV/AIDS. By 2030, the objective is to attain "Three Zeros": Zero AIDS-related fatalities, zero new infections, and zero prejudice towards individuals living with HIV/AIDS (PLWHA) (Na'mah, 2022).

Because they prevent HIV replication and lower the death rate associated with AIDS, antiretroviral (ARV) medications are essential for enhancing the quality of life for people living with HIV/AIDS (Achappa et al., 2013). For ARV therapy to be successful virologically, adherence is essential. Patients who do not comply to their medication may face treatment failure and the development of their illness, as well as an increase in viral load and viral resistance.

Studies conducted in West Java discovered that treatment failure was indicated by medication resistance and viral loads more than 400 copies/ml in PLWHA who did not comply to their treatment plans (Fibriani, 2013). In a similar vein, Salma (2020) documented that six PLWHA's noncompliance led to a 100% therapeutic failure rate, with all patients exhibiting viral loads higher than 400 copies/ml. Some PLWHA discontinue or postpone treatment because to the side effects of ARV medications, which provide a serious obstacle to adherence. In addition to causing physical pain, these side effects make it difficult to go about everyday tasks (Puspasari, Wisaksana, & Ruslami, 2018).

In January 2023, a preliminary survey conducted at the Jombang Care Centre Plus registered 1,160 cases of HIV/AIDS, of whom 349 were active members of PLWHA. Patients who get ARV medication report experiencing a range of adverse effects, such as weight gain, decreased haemoglobin levels, and dizziness, according to PLWHA interviews. The purpose of this research is to examine the connection between PLWHA at Jombang Care Centre Plus, Jombang Regency, and adherence to ARV medication in terms of side effects.

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METHOD

This research used a cross-sectional design and a correlational analysis strategy. In March 2023, the study was carried out in Jombang Regency's KDS Jombang Care Centre Plus. People living with HIV/AIDS (PLWHA) who actively participated in KDS Jombang Care Centre Plus activities made up the sample. A purposeful sampling technique was used to choose 38 participants. Utilising the AIDS Clinical Trial Group (ACTG) questionnaire to determine the adverse effects of ARV medications experienced by the respondents and the modified Morisky Medication Adherence Scale-8 (MMAS-8) to evaluate adherence to antiretroviral (ARV) treatment among PLWHA were the methods used for data collecting. The data was analysed using bivariate analysis using Somers' D statistical test to evaluate the association between adherence to ARV treatment and side effects of ARV drugs, and univariate analysis to characterise the frequency distribution of each variable. SPSS version 25 was used to process the data. The Chakra Research Ethics Committee of the Brahmanda Lentera Foundation granted ethical permission for this research, with approval number No.015/028/II/EC/KEP/LCBL/2023.

RESULT

Table 1. Distribution of Respondent Characteristics Data (n=38)

Respondent Characteristics	n	%
Age		
15-25 years	13	34.2
26-35 years old	10	26.3
36-45 years old	15	39.5
Gender		
Man	32	84.2
Woman	6	15.8
Marital status		
Not married yet	25	65.8
Marry	5	13.2
Widower	4	10.5
Widow	4	10.5
Education		
Elementary school	3	7.9
Junior high school	7	18.4
Senior high school	22	57.9
Diploma	2	5.3
Bachelor	4	10.5
Work		
Doesn't work	16	42.1
Work	22	57.9
Income		
No income	16	42.1
Rp.500,000-Rp.1,000,000	11	28.9
> Rp. 1,000,000	11	28.9
Long diagnosed		

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< 1 year	25	65.8
1-2 year	13	34.3
Transmission		
Free sex	18	47.4
Same sex	16	42.1
Etc	4	10.5
Types of ARV		
TLD	21	55.3
TLE	17	44.7

Based on table 1, the characteristics of respondents based on age, the majority were between 36-45 years old, there were 15 respondents (39.5%). Most gender was male, 32 respondents (84.2%) and female, 6 respondents (15.8%). The marital status in this study was that most respondents were unmarried, amounting to 25 respondents (65.8%). The majority of PLWHA's education was senior high school, 22 respondents (57.9%). Many respondents worked 22 respondents (57.9%) and did not work 16 respondents (42.1%) and had an income between Rp. 500,000–Rp. 1,000,000/month 11 respondents, > IDR 1,000,000/month 11 respondents and 16 respondents (42.1%) had no income. The majority were diagnosed with HIV/AIDS < 1 year 25 respondents (65.8%), the source of infection was the majority contracted through free sex 18 respondents (47.4%), and the type of ARV therapy used by the majority was TLD 21 respondents (55.3%) and TLE 17 respondents (44.7%).

Table 2. Distribution of Respondent Data Based on ARV Side Effects

ARV Side Effects	Amount	
	f	%
Low	24	63.2
Moderate	11	28.9
High	3	7.9
Total	38	100.0

Based on table.2 ARV side effects felt by PLWHA, the majority felt low side effects, 24 respondents (63.2%), 11 respondents (28.9%) felt moderate side effects, and 3 respondents (7.9%) experienced high side effects.

Table 3. Distribution of Respondent Data Based on Adherence to ARV Therapy

Adherence to ARV Therapy	Amount	
	f	%
Lov	4	10.5
Moderate	12	31.6
High	22	57.9
Total	38	100

Based on table 3, 22 respondents (57.9%) had high adherence to ARV therapy for PLWHA, 12 respondents (31.6%) had moderate ARV therapy adherence, and 4 respondents (10.5%) had low adherence to ARV therapy.

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Table 4. Distribution of Data on the Relationship ARV Side Effect and Adherence to ARV Therapy among PLWHA in KDS Jombang Care Center Plus Jombang Regency

ARV Side Effects	Adherence to ARV Therapy						Total	
	Low		Moderate		High			
	f	%	f	%	f	%	f	%
Low	1	2,6	5	13, 2	18	47,4	24	63, 2
Moderate	1	2,6	6	15,8	4	10,5	11	28,9
High	2	5,3	1	2,6	0	0,0	3	7,9
p = 0,002; n=38								

Based on table 4, the results of the analysis of the relationship between ARV side effects and adherence to ARV therapy among PLWHA show that PLWHA who experienced low ARV side effects with low adherence to ARV therapy were 1 respondent (2.6%), moderate therapy adherence was 5 respondents (13, 2%), and high adherence to ARV therapy by 18 respondents (47.4%). Meanwhile, PLWHA who experienced moderate ARV side effects with low ARV therapy adherence was 1 respondent (2.6%), moderate ARV therapy adherence was 6 respondents (15.8%), and high ARV therapy adherence was 4 respondents (10.5%). Then PLWHA who experienced high side effects with low adherence to ARV therapy were 2 respondents (5.3%) and moderate adherence to ARV therapy was 1 respondent (2.6%). Based on the results of statistical tests using the test *somerd's* significant results were found, namely *p-value* 0.002 - 0.05 which means there is a relationship between ARV side effects and adherence to ARV therapy among PLWHA in KDS Jombang *Care Center Plus* Jombang Regency.

DISCUSSION

Based on the research results presented in Table 2, many respondents (63.2%) experienced mild side effects from antiretroviral (ARV) therapy. The side effects of ARV drugs can play a significant role in treatment decisions, including changes in medication regimens among people living with HIV/AIDS (PLWHA). Each individual experiences side effects differently and at varying times. According to Nursalam (2018), up to 25% of PLWHA discontinue ARV treatment within the first year due to side effects, and another 25% reduce their prescribed doses out of fear of these adverse effects. Similarly, Chim et al. (2018) reported that some PLWHA in Cambodia stopped ARV therapy because their side effects worsened over time, leading to a perceived decline in health.

In this study, a questionnaire completed by 20 respondents revealed that while most respondents reported experiencing side effects, these symptoms were generally not highly bothersome. However, some respondents reported mild discomfort from symptoms such as nausea, vomiting, insomnia, skin rashes, and weight gain. These findings align with the research by Hadisaputro and Sofro (2020),

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which indicated that PLWHA at VCT Undata Hospital Palu experienced similar ARV side effects, including nausea and vomiting (50%), itching (69.4%), and insomnia (69.4%). The CDC (2020) also notes that common ARV side effects include dizziness, fatigue, nausea, and rashes, although not all individuals experience these symptoms.

The specific side effects encountered by respondents are related to the ARV drug regimens they were prescribed. For instance, nausea and vomiting are common gastrointestinal side effects caused by tenofovir, a nucleoside reverse transcriptase inhibitor (NRTI). Holly et al. (2018) found that tenofovir frequently causes nausea, vomiting, and diarrhea. Similarly, lamivudine, another NRTI, can lead to nausea. Insomnia, on the other hand, is associated with dolutegravir, a second-generation integrase strand transfer inhibitor (INSTI). Mackenzie et al. (2014) observed that dolutegravir use could result in headaches, insomnia, and weight gain. The skin rash reported by respondents is linked to efavirenz, a non-nucleoside reverse transcriptase inhibitor (NNRTI). Corbet and Diana (2016) reported that between 5% and 26% of PLWHA experience dermatological side effects, such as itching and rashes, when using efavirenz.

The data presented in Table 3 shows that 57.9% of respondents had high adherence to ARV therapy. Adherence to ARV therapy is critical to treatment success, as uninterrupted medication use improves the quality of life, reduces viral resistance, and enhances overall health outcomes (Fachriati et al., 2021). Education level emerged as one of the factors influencing adherence, with the majority of respondents having a high school or vocational school education (57.9%). This finding is consistent with Nurhaida (2022), who found that individuals with low educational attainment have a 1.3 times higher risk of non-adherence compared to those with higher education levels.

The questionnaire responses provided insight into the adherence challenges faced by respondents. In response to the question, "Do you sometimes forget to take your medication?" 55% of respondents admitted to occasionally forgetting their doses. This was often attributed to their busy schedules, particularly among those with work commitments. Work schedules that conflicted with medication times resulted in delayed or missed doses. Puspasari et al. (2018) similarly reported that 41.8% of respondents missed doses due to work-related distractions. Additionally, 50% of respondents indicated that they often forgot to take their medication, reinforcing the finding that occasional lapses contributed to more frequent non-compliance. Fatimatuzahro et al. (2023) noted that 36.7% of PLWHA failed to adhere to ARV schedules due to frequent forgetfulness.

Table 4 shows a significant relationship between ARV side effects and adherence among PLWHA at KDS Jombang Care Center Plus. This finding aligns with research by Djumadi and Gobel (2023),

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which demonstrated a significant relationship between ARV side effects and non-compliance among HIV patients at Bhayangkara Hospital, Makassar, with a p-value of 0.018. Sitorus et al. (2021) also found that PLWHA experiencing side effects were 2.131 times more likely to be non-compliant with therapy. In Semarang, Arisudhana et al. (2019) similarly observed that ARV side effects negatively impacted adherence. Uswatu (2014) reported a statistically significant relationship (p = 0.045) between ARV side effects and adherence at the VCT clinic of Dr. Soebandi Hospital, Jember.

While side effects pose challenges for PLWHA, they should not discourage the initiation or continuation of ARV therapy. The Ministry of Health (2012) emphasized that managing side effects is essential, as untreated HIV presents far greater risks, including mortality. Effective side effect management, including adjusting treatment regimens, is critical to maintaining adherence and ensuring long-term health benefits for PLWHA.

CONCLUSION

At KDS Jombang Care Centre Plus, PLWHA usually had strong adherence to ARV treatment; 22 responders (57.9%) showed good compliance. Furthermore, the majority of responders (n=24; 63.2%) said they had experienced minor adverse effects from ARV medications. With a p-value of 0.002, the research discovered a strong correlation between ARV medication side effects and PLWHA at KDS Jombang Care Centre Plus adherence to ARV treatment. This finding implies that even minor side effects may have an impact on adherence, emphasising the need of tracking and controlling side effects to guarantee ongoing and successful ARV therapy.

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Factors Influencing the Completeness of Basic Immunization for Infants in the Catchment Area of Simpangkatis Health Center, Central Bangka District, 2023

Monica[1], *Harmendo*[2], *Fahd Asmaruddin*[3], *Ernest Hemingway*[4]

[1,2,3,4]*Public Health Study Program, Health Faculty, Universitas Anak Bangsa, Indonesia*

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E-mail: mm61179044@gmail.com

A B S T R A C T

Immunization plays a crucial role in children's development by preventing various dangerous diseases and disabilities such as chickenpox, polio, and tuberculosis. This research employed an analytical method with a cross-sectional study design. Data was collected through questionnaires in September 2023, with a sample size of 91 respondents. The study's findings revealed significant relationships between the level of maternal education (p = 0.025), maternal knowledge (p = 0.024), and maternal employment status (p = 0.021) with the completeness of basic immunizations for babies. However, family support did not show a significant relationship (p = 0.074) with immunization completeness. In conclusion, maternal education, knowledge, and employment status significantly influence the completeness of basic immunizations for infants. However, family support does not appear to play a significant role in ensuring immunization completeness in the work area of the Simpangkatis Health Center, Central Bangka Regency, in 2023.

INTRODUCTION

To guarantee the best possible health standards, the National Health System (SKN) acts as an integrated structure that coordinates numerous health initiatives across Indonesia. Through the alignment of social, economic, and environmental factors to enhance public welfare, it symbolises the nation's commitment to health development. According to Wiku Adisasmito (2007), health development is seen as an ongoing process that connects national health initiatives with international health development goals.

The Millennium Development Goals (MDGs), which prioritised lowering mortality and enhancing mother and child health, served as a framework for international development initiatives between 2000 and 2015. Following the conclusion of the Millennium Development Goals (MDGs), the Sustainable Development Goals (SDGs) were unveiled, focussing on enhancing global wellbeing and spanning from 2016 to 2030. Reducing maternal mortality, preventing avoidable infant and newborn deaths, lowering neonatal mortality, and managing infectious illnesses like hepatitis and TB are among the SDGs' top priorities. Additionally, they want to guarantee that everyone has access to healthcare services, especially preventative care, and to reduce the number of early deaths from non-communicable illnesses (Rully, 2022).

In Indonesia, national and regional development policies place a strong emphasis on disease prevention and control. Policies aim to treat infectious and non-communicable illnesses, manage stunting, and lower maternal and newborn mortality. All governmental levels use a preventative and promotional strategy. One

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such preventative approach is immunisation; certain vaccinations, such as the polio vaccine, are given orally, while others, such as the DPT, measles, and BCG vaccines, are supplied by injections (Eva Yusnita Nasution, 2022).

The child mortality rate in Indonesia was 22.32 per 1,000 live births in 2021, down 3.25% from 23.07 per 1,000 the year before, according to the United Nations. According to data from the Directorate General of Public Health (2021), congenital anomalies, newborn tetanus, pneumonia, meningitis, and neurological problems are among the reasons of infant mortality that have been documented. Additional significant causes were high incidence of infectious illnesses and malnutrition (Shilvina Widi, 2022).

Infant mortality (0–12 months) decreased in Bangka Belitung Islands Province from 186 deaths in 2020 to 181 deaths in 2021. With 24.30% of all baby deaths in 2021, Belitung Regency had the highest rate, while Pangkalpinang City had the lowest rate, at 6.07%. Of the seven districts, Central Bangka Regency came in fifth place and accounted for 10.44% of all newborn fatalities. The number of fatalities for children under five (0–5) dropped from 213 in 2020 to 196 in 2021. Similar patterns were seen, with Pangkalpinang City contributing the least (6.12%) and Belitung Regency giving the largest amount (25%). Sixth place Central Bangka Regency was responsible for 9.69% of all fatalities involving children under five (Bangka Belitung Islands Provincial Health Office, 2021).

Over the previous three years, Indonesia's baby basic immunisation coverage has varied. The COVID-19 pandemic caused the full immunisation coverage to drop to 83.3% in 2020 from 93.7% in 2019. Coverage increased little to 84.2% in 2021 (Kusnandar, 2022).

This information emphasises how crucial it is to keep up health development initiatives, such as immunisation campaigns, in order to lower mortality and enhance public health outcomes in Indonesia.

METHOD

This study uses a cross-sectional study design and analytical methodologies. Stratified random sampling is the sampling method used, and it guarantees that samples are taken from each group according to predetermined criteria, including inclusion and exclusion criteria. There were 436 newborns in the study population, and 91 moms who participated as responders made up the sample size. The Simpangkatis Community Health Centre, which is situated in the Bangka Belitung Islands Province's Central Bangka Regency, carried out research in September 2023.

Interviews, documentation, health cards (KMS), and questionnaire sheets were some of the techniques used to gather data. Techniques including editing, coding, tabulation, and entry were used for data processing. The Ethics Committee for Health Research at Anak Bangsa University approved this study with recommendation number 03/438/UNABA/VIII/2023 for ethical clearance.

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RESULT

Table 1 Distribution of Respondents Based on Age in the Catchment Area of the Simpangkatis Health center, Central Bangka Regency, 2023

Variable	Amount	Percentage %
Mother's Age		
< 20	3	3,3
21 – 35	73	80,2
> 35	15	16,5
Total	91	100

Based on table 1 above, it was found that the respondents who were at least < 20 years old were 3 people (3,3%), the respondents who were most aged 21-35 were 73 people (80,2%), and the respondents who were > 35 years old amounting to 15 people (16,5%).

Table 2 Distribution of Respondents Based on Income in the Catchment Area of the Simpangkatis Health Center, Central Bangka Regency, 2023

Variable	Amount	Percentage %
Income		
< 1.000.000	15	16,5
1.000.000 - 3.000.000	72	79,1
> 3.000.000	4	4,4
Total	91	100

Based on table 2 above, it was found that respondents with an income of < Rp1.000.000 were 15 people (16,5%), respondents with the highest income of Rp1.000.000-3.000.000 were 72 people (79,1%), and respondents with the most with a small income of Rp3.000.000 were 4 people (4,4%).

Table 3 Distribution of Babies Based on Gender in the Working Ares of the Simpangkatis Health center, Central Bangka Regency, 2023

Variable	Amount	Percentage %
Gender		
Man	44	48,4
Woman	47	51,6
Total	91	100

Based on table 3 above, there were 44 male babies (48,4%), less than 47 female babies (51,6%).

Table 4 Distribution Based on Completeness of Basic Immunization for Babies in the Catchment Area of Simpangkatis Community Health Center, Central Bangka Regency, 2023

Variable	Amount	Percentage %
Completeness of Basic Immunization for Babies		
Complete	54	59,3
Incomplete	37	40,7
Total	91	100

Based on table 4 above, it was found that there were 54 babies (59,3%) who had complete basic immunization, more than 37 babies who had incomplete basic immunizations (40,7%).

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Table 5 Distribution of Basic Immunization Completeness for Babies Based on Mothers's Education in the Catchment Area of Simpangkatis Community Health Center, Central Bangka Regency, 2023

Variable	Amount	Percentage %
Education		
Height	16	17,6
Low	74	81,3
Total	91	100

Based on table 5 above, it is found that respondets with higher education amounted to 16 people (17,6%), less than respondents with low education, the number 74 people (81,3%).

Table 6 Distribution of Basic Immunization Completeness for Babies Based on Mother's Knowledge in the Catchment Area of Simpangkatis Community Health Center, Central Bangka Regency, 2023

Variable	Amount	Percentage %
Knowledge		
Good	40	44,0
Not Good	51	56,0
Total	91	100

Based on table 6 above, it was found that the respondents who had good knowledge about basic immunization for babies were 40 people a (44,0%), less than the respondents who had not good knowledge were 51 people (56,0%).

Table 7 Distribution of Basic Immunization Completeness for Babies Based on Mother's Occupation in the Catchment Area of the Simpangkatis Community Health Center, Central Bangka Regency, 2023

Variable	Amount	Percentage %
Job Status		
Work	35	38,5
Not Working	56	61,5
Total	91	100

Based on table 7 above, it is found that the number of respondents who work is 35 people (38,5%), less than the number of respondents who do not work, numbering 56 people (61,5%).

Table 8 Distribution of Basic Immunization Completeness for Babies based on Family Support in the Catchment Area of the Simpangkatis Community Health Center, Central Bangka Regency, 2023

Variable	Amount	Percentage %
Family Support		
Supported	41	45,1
Not Supported	50	54,9
Total	91	100

Based on table 8 above, it is found that the number of respondents who were supported by their families was 41 people (45,1%), less than the 50 respondents who were not supported by their families (54,9%).

Table 9 Bivariate Analysis of the Relationship between Completeness of Basic Immunization for Babies Based on Mother's Education

Variable	Completeness				Total		P Value
	Complete		Incomplete				
	n	%	N	%	N	%	
Education							0,025
Height	14	87,5	2	12,5	16	100	
Low	40	53,3	35	46,7	75	100	

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Based on table 9 above, it is found that there are 14 respondents (87,5%) fewer babies with complete basic immunization requirements when compared to mothers with low education, while there are fewer babies with incomplete basic immunization equipment among mothers who 2 respondents (12,5%) had higher education compared to mothers with low education. From the results of the statistical test, the p value was obtained (0,025), where this value is < α (0,05), which means that H0 is rejected, so it can be concluded that there is a significant relationship between the completeness of basic immunization for babies and maternal education.

Table 10 Bivariate Analysis of the Relationship between Completeness of Basic Immunizations for Babies Based on Mother's Knowledge

Variable	Completess						P Value
	Complete		Incomplete		Total		
	n	%	N	%	N	%	
Knowledge							0,024
Good	18	45,0	22	55,0	40	100	
Not Good	36	70,6	15	29,4	51	100	

Based on table 10 above, it is found that there are fewer babies with complete basic immunizations among mothers with good knowledge, as many as 18 respondents (45,0%) when compared to mothers with poor knowledge, while there are more babies with incomplete basic immunizations among mothers. There were 22 respondents (55,0%) who had good knowledge compared to mothers who had less good knowledge. From the statistical test results, the p value was obtained (0,024), which is < α (0,05), which means that H0 is rejected, so it can be concluded that there is a significant relationship between the completeness of basic immunization for babies and the mother's knowledge.

Table 11 Bivariate Analysis of the Relationship between Completeness of Basic Immunizations for Babies Based on Mother's Employment Status

Variable	Completeness						P Value
	Complete		Incomplete		Total		
	n	%	N	%	N	%	
Job Status							0,021
Work	15	42,9	20	57,1	35	100	
Not Working	39	69,6	17	30,4	56	100	

Based on table 11 above, it is found that there are fewer babies with complete basic immunizations among mothers whose employment status is working, as many as 15 respondents (42,9%) when compared to mothers whose employment status is not working, while there are more babies with incomplete basic immunization requirements. There were 20 respondents (57,1%) in mothers whose employment status was working compared to mothers whose employment status was not working. From the statistical test results, the p value was obtained (0,021), where this value is < α (0,05), which means that H0 is rejected so it can be concluded that there is a significant relationship between the completeness of basic immunization for babies and the mother's employment status.

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Table 12 Bivariate Analysis of the Relationship between Completeness of Basic Immunizations for Babies Based on Family Support

Variable	Completeness						P Value
	Complete		Incomplete		Total		
	n	%	N	%	N	%	
Family Support							0,074
Supported	29	70,7	12	29,3	41	100	
Not Supported	25	50,0	25	50,0	50	100	

Based on table 12 above, it is found that there are more babies with complete basic immunizations among mothers whose family support is supported by 29 respondents (70,7%) when compared to mothers whose family support is not supported, while there are fewer babies with incomplete basic immunization equipment. There were 12 respondents (29,3%) in mothers whose family support was supported, compared to mothers whose family support was not supported. From the statistical test results, the p value was obtained (0,074), which is > α (0,05), which means that H0 is accepted so it can be concluded that there is no significant relationship between the completeness of basic immunization for babies and family support.

DISCUSSION

Education is essential for improving a person's skills via hands-on training or practical learning methods. In keeping with predetermined principles and objectives, it promotes self-direction, offers fresh knowledge, and attempts to assist people in making defensible judgements (Adventus et al., 2019). Informal education influences everyday behaviours and routines in families, including eating, speaking, dressing, and etiquette. While non-formal education in society is acquired via life experiences and interactions including language, ethnicity, and religion, formal education in schools gives information, skills, and socialisation. In the end, education helps a generation become more educated (Aas Siti Sholichah, 2018).

With a p-value of 0.008, research by Mira Silviana (2021) at the Pangkalan Balai Community Health Center's work area in Banyuasin Regency revealed a strong correlation between the degree of maternal education and the completeness of newborns' basic immunisations. Similarly, with a p-value of 0.000, Yanti Mulyanti (2013) found a substantial correlation between education level and immunisation completion.

Making decisions and addressing problems needs knowledge, which is described as the outcome of feeling and comprehending via the five human senses (Adventus et al., 2019). According to Lawrence Green (1980), predisposing factors, such as ignorance about the advantages of immunisation, may prevent people from participating in immunisation programs. Behaviour is also influenced by reinforcing and enabling variables, such as community support and the availability of health services. A substantial association (p-value of 0.001) was seen between maternal knowledge and the completion of fundamental immunisations,

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according to Rafidaini Sazarni Ratiyun (2019). Similarly, a substantial correlation (p-value of 0.000) was found between maternal knowledge and immunisation completion by Atika Putri Dewi et al. (2014).

Another factor relating to the completion of immunisations is the job position of the mother. Working mothers may have time restrictions that prevent them from taking their kids to be immunised, which increases the risk of incomplete immunisation. Despite often facing extra fees, some moms can vaccinate their children despite their work (Rizki Amalia et al., 2021). A substantial correlation (p-value of 0.004) was found between mother work status and immunisation completion in a study by Rizki Amalia et al. (2021); a p-value of 0.026 was observed by Gita Sekar Prihanti et al. (2016).

When it comes to putting information into practice, attitudes are crucial. Encouraging circumstances like family support and access to immunisation services are necessary to make this possible (Adventus et al., 2019). A mother's capacity to vaccinate her kid is greatly impacted by the support she receives from her spouse, parents, and other family members. Nonetheless, a few participants have mentioned that their spouses don't provide enough support, especially when their kids have negative side effects like fever after vaccination. Mothers may be discouraged from finishing their children's vaccination regimens because of this lack of assistance. With a p-value of 0.124, research by Riska Ramadhani Hendrik (2022) revealed no discernible link between immunisation status and family support. Nevertheless, Wahyuni Hafid et al. (2017) found a substantial correlation—with a p-value of 0.000—that shows how much a mother's chance of completely immunising her kid is increased by family support, especially from husbands.

CONCLUSION

This research was carried out in 2023 at the Simpangtis Community Health Center's Catchment Area in Central Bangka Regency found a number of significant connections between several parameters and the completion of newborns' basic immunisations. Notably, it was shown that there was a substantial relationship between the mother's education level and the completeness of her immunisation record. This suggests that moms with higher education levels may prioritise and comprehend immunisations better. Furthermore, mothers' knowledge had a major role in how comprehensive their children's basic immunisations were, as moms who knew more about the value of immunisations were more likely to make sure their kids got all the shots they needed. The mother's job position also shown a strong correlation with the completion of her child's immunisations, suggesting that working women may have time restrictions that affect their capacity to bring their kids to the doctor for shots.

On the other hand, the research found no evidence of a significant correlation between the completeness of a baby's immunisations and parental support, indicating that other variables may be more important in determining immunisation behaviours. up of all the variables examined, education stood up as the most important factor pertaining to how comprehensive an infant's basic immunisation program is. This

suggests that although family support may not be as important a factor as previously thought, educational initiatives targeted at raising mother awareness about immunisation might successfully raise vaccination rates in this location.

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Relationship between Respondent Characteristics and Noise Intensity with Increased Blood Pressure in Production Unit Workers of PT Japfa Comfeed Indonesia, Tbk. Plant Margomulyo

Sofia[1], Endang Dwiyanti[2], Nisrina Oksigendaru Dicha[3], Andrea Thrisiawan Pradhana[4]

[1,2,3,4]*Universitas Airlangga, Surabaya, Indonesia*

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CORRESPONDENCE

E-mail: endang.dwiasfar@fkm.unair.ac.id

A B S T R A C T

The most common physical risk at work is noise, which may cause several health issues. These include diseases of the auditory system and non-auditory impacts including poor communication, tension, anxiety, high blood pressure, and decreased productivity. At the production unit of PT Japfa Comfeed Indonesia, Tbk. Plant Margomulyo, this research aimed to examine the association between respondent characteristics and noise intensity in the workplace and changes in workers' blood pressure before and after work. 51 respondents participated in the cross-sectional study using an analytical and observational methodology. The results showed that elevated blood pressure was significantly correlated with age ($p = 0.000$), duration of service ($p = 0.007$), usage of personal protective equipment (PPE) ($p = 0.011$), and noise intensity ($p = 0.000$). Nonetheless, no statistically significant correlation was seen between elevated blood pressure and dietary state ($p = 0.467$), smoking behaviors ($p = 0.763$), or history of hypertension ($p = 0.170$). These findings suggest that while lifestyle factors like smoking and nutritional status have less impact in this context, occupational factors—particularly noise exposure—as well as certain personal characteristics like age and length of service are linked to elevated blood pressure in workers.

INTRODUCTION

Occupational health and safety (OHS) is one aspect that is very important in the sustainability of an institution or company. The Indonesian government has specifically regulated Law No. 13 of 2003 concerning Manpower Article 86, which states that all workers have the right to obtain occupational safety and health protection. This right needs to be upheld to protect the safety and health of workers to create optimal productivity (Fahlevi, 2020). The regulation explicitly states that implementing OSH aspects must be carried out in every company that involves many workers and hazardous activities. OHS in an institution or company includes safety risks regarding safe conditions from damage, loss, or suffering and workers' health in the work environment. Every institution or company must enforce OSH aspects to avoid suffering or losses for companies or workers, especially institutions or companies that have physical, ergonomic, chemical, and biological hazards in the work environment (Hamali, 2018).

The work environment cannot be separated from the presence of physical hazards such as noise, lighting, vibration, temperature, lighting, ergonomics, or psychology. The most dominant physical hazard factor found is noise hazard. Noise hazards can be caused by machinery, equipment, production processes, and other work activities (Ulfa, 2022). The threshold value or TLV regarding noise in the work environment has been regulated in the Minister of Manpower Regulation No. 5 of 2018 based on the duration of noise exposure per day. According to Sumardiyono (2019), noise intensity in the work environment that exceeds

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the established safe limit or TLV can cause safety and health problems in workers, such as the onset of work stress and increase the risk of accidents, injuries, and diseases or hearing loss. Workers who are exposed to high and continuous noise can cause disorders or health problems such as auditory system disorders and non-auditory system disorders in the form of communication disorders, stress, anxiety, sleep disturbances, discomfort, increased risk of accidents, difficulty concentrating, decreased quality of life of workers, affecting social interactions, reducing self-confidence, increased blood pressure to decreased work productivity (Purnawan, 2019).

PT Japfa Comfeed Indonesia Plant Margomulyo is a manufacturer engaged in the production of animal feed (Asmoko, 2020). The existence of this phenomenon encouraged researchers to analyze the relationship between the characteristics of respondents and the intensity of noise in the work environment with the increase in blood pressure of workers in the production unit before and after work.

METHOD

This study is included in the type of analytic observational research. This study uses a cross sectional approach design. The object of this research is 51 respondents who are workers in the production unit of PT Japfa Comfeed Indonesia Plant Margomulyo. The data analysis used was the Chi-Square statistical test accompanied by a table explaining the test results.

RESULT

Table 1. Distribution of Respondent Characteristics

Characteristics of Respondents	Number (n)	Percentage (%)
Age		
15 – 24	7	13,7
25 – 34	15	29,4
35 – 44	19	37,3
45 – 54	9	17,6
55 – 64	1	2
Nutrition Status		
Skinny	3	5,9
Normal	22	43,1
Fat	26	51,0
Working Period		
< 5 Years	14	27,5
≥ 5 Years	37	72,5
Smoking Habit		
Yes	30	58,8
No	21	41,2
History of Hypertension		
Yes	4	7,8
No	47	92,2
PPE Usage		
Yes	20	39,2
No	31	60,8

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Table 1 is a description of the distribution of respondent characteristics, including age, nutritional status, tenure, smoking habits, history of hypertension, and use of PPE. The table shows that the majority of respondents were in the age range of 35 - 44 years, namely 19 people (37.3%). In addition, most respondents had a fat nutritional status, namely 26 people (51%). Respondents who worked for more than 5 years were 37 people (72.5%). The majority of respondents were smokers, as many as 30 people (58.8%). A total of 47 people (92.2%) did not have a history of hypertension. Respondents who worked without using PPE were 31 people (60.8%).

Table 2. Distribution of Noise Intensity

Noise Intensity	Number (n)	Percentage (%)
Below TLV	26	51,0
Above TLV	25	49,0

**sumber data: data primer*

Table 2 shows the distribution of respondents who work in the environment based on noise intensity values. A total of 26 people (51%) of respondents work with noise in an environment that does not exceed the TLV. While the other 25 people (49%) work with noise in an environment that exceeds the TLV.

Table 3. Distribution of Blood Pressure Increase

Blood Pressure Increase	Number (n)	Percentage (%)
Yes	34	66,7
No	17	33,3

**source of data: primary data*

Table 3 shows the distribution of respondents who experienced increased blood pressure. A total of 34 people (66.7%) experienced an increase in blood pressure. Meanwhile, 17 people (33.3%) did not experience an increase in blood pressure.

Table 4. Distribution of Bivariate Analysis

Variable	Blood Pressure Increase		*p-value*
	Yes	No	
Age			
15 – 24 Years	0	7	
25 – 34 Years	9	6	
35 – 44 Years	18	1	0,000
45 – 54 Years	6	3	
55 – 64 Years	1	0	
Nutritional Status			
Skinny	2	1	
Normal	12	9	0,467
Fat	20	7	
Working Period			
<5 Years	5	9	0,007
≥5 Years	29	8	
Smoking Habit			
Yes	19	11	0,763
No	15	6	
History of Hypertension			
Yes	9	1	0,170

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No	25	16	
PPE Usage			
Yes	18	2	0,011
No	16	15	
Noise Intensity			
Below TLV	9	17	0,000
Above TLV	25	0	

Table 4 is a description of the distribution of the relationship analysis between the independent variables and the dependent variable in this study using the chi square test. It was found that there was a relationship between age (p = 0.000), tenure (p = 0.007), PPE use (p = 0.011) and kebi intensity (p = 0.007).

DISCUSSION

Relationship Between Age and Increased Blood Pressure

This study shows there is a relationship between age and increased blood pressure (p = 0.000) in PT Japfa Comfeed Indonesia Plant Margomulyo production unit workers. The influence of the age of the respondent can cause an increase in blood pressure between before work and after work. The older an individual's age, the weaker the arterial elasticity. In line with Arini's research (2021) there is a correlation between age and changes in blood pressure. Decreased arterial elasticity due to aging can cause an increase in systolic blood pressure. Meanwhile, individuals aged 55 tend to experience an increase in diastolic blood pressure due to stiff arteries due to atherosclerosis.

However, this is not supported by Indriyanti's research (2019) which states that there is no relationship between age and increased blood pressure (p = 0.384). Indrayani (2020) also stated that age and non-auditory complaints, such as increased blood pressure, had no correlation (p = 0.301). This is due to a decrease in the physiological function of the worker's body which is decreasing accompanied by a decrease in sound stimuli or noise in the work environment.

Relationship between Nutritional Status and Increased Blood Pressure

This study shows no relationship between nutritional status and increased blood pressure (p = 0.467) in PT Japfa Comfeed Indonesia Plant Margomulyo production unit workers. Many workers who have normal nutritional status experience an increase in blood pressure, which indicates that not only workers with more nutritional status have a risk of increasing blood, but workers with normal nutritional status also have the same risk of experiencing increased blood pressure.

In contrast, Indriyanti (2019) suggested that nutritional status is another factor affecting the blood pressure increase (p = 0.006). Increasing an individual's nutritional status will be accompanied by an increase in fat in the visceral layer and blood pressure. This can be caused by the consumption of fat or carbohydrates, which can cause an increase in sympathetic activity, which affects blood pressure.

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Relationship Between Working Period and Increased Blood Pressure

This study shows that there is a significant relationship between working periods and increased blood pressure (p = 0.007) in PT Japfa Comfeed Indonesia Plant Margomulyo production unit workers. The working period can be interpreted as the accumulation of years of exposure received by workers. A long period of work in a noisy work environment can cause health problems. This is in line with Maulana's research (2022), which suggests that noise-induced disorders in the work environment are likely to be experienced by workers with long working periods.

Contrary to Indriyanti's research (2019), which found no significant relationship between tenure and increased blood pressure (p = 0.174). The same thing was stated by Indrayani (2020), in which the working period with non-auditory complaints such as increased blood pressure did not have a significant relationship (p = 0.305). Widya (2018) also supports that the working period with systolic blood pressure (p = 0.972) and diastolic blood pressure (p = 0.252) has no relationship.

Relationship Between Smoking Habits and Increased Blood Pressure

This study shows there is no significant relationship between smoking habits and increased blood pressure (p = 0.763) in PT Japfa Comfeed Indonesia Plant Margomulyo production unit workers. Smoking habits are not a factor that directly affects the increase in blood pressure. Increased blood pressure can be influenced by the frequency of cigarettes smoked per day.

This is contrary to Indriyanti's research (2019), which states that there is a significant effect of smoking habits on increasing blood pressure (p = 0.017). The presence of nicotine in cigarettes can activate free radicals and affect the blood pressure of consumers. Lestari (2019), in her research, found that there were 77.3% of respondents who experienced increased blood pressure were smokers compared to respondents who did not smoke, namely 30.0%. The statistical test also obtained a p-value = 0.018, which shows that increased blood pressure has a significant relationship with smoking habits.

Relationship Between History of Hypertension with Increased Blood Pressure

This study shows no significant relationship between the history of disease and increased blood pressure (p = 0.170) in PT Japfa Comfeed Indonesia Plant Margomulyo production unit workers. A family's genetic history of disease has the potential to be passed on to their children. However, the history of the disease is only a risk and sometimes does not decrease for their children due to a healthy lifestyle that can reduce the risk of the disease. The existence of a noisy work environment is also a factor in increasing blood pressure because all workers with a history of disease or no history of disease get noise exposure and have the same risk of increasing blood pressure. This was supported by Indrayani (2020), who found that a history of

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illness and non-auditory complaints, such as increased blood pressure, did not have a significant relationship (p = 0.909). Suryani (2018), in her research, added that a hereditary history of hypertension and increased blood pressure also had no significant relationship (p = 0.545).

Relationship Between PPE Use and Increased Blood Pressure

This study shows there is a significant relationship between the use of PPE and increased blood pressure (p = 0.011) in PT Japfa Comfeed Indonesia Plant Margomulyo production unit workers. The use of PPE during work can reduce noise exposure in the work environment, which can affect workers' blood pressure. This is reinforced by Indriyanti's research (2019), which found that the use of PPE can prevent the impact of high noise intensity.

Contrary to Indrayani's research (2020) which found that the use of PPE and non-auditory complaints such as increased blood pressure had no relationship (p = 0.233). This can be influenced by the inconsistent use of PPE or sometimes workers remove the PPE when working, PPE that does not function properly, to the size of PPE that does not fit the worker.

Relationship between Noise Intensity and Increased Blood Pressure

This study shows that there is a significant relationship between noise intensity and increased blood pressure (p = 0.000) in production unit workers of PT Japfa Comfeed Indonesia Plant Margomulyo. Maulana (2022) stated that noise intensity affects blood pressure due to the heart rate released through the release of stress hormones. In addition, Maulina (2022) also emphasized that sympathetic nerves aroused by noise can cause an increase in blood pressure. The presence of noise in the work environment will be responded by the brain as stress or threat. This triggers the release of hormones such as cortisol and epinephrine to norepinephrine by the adrenal glands which cause an increase in blood pressure. Supported by Sumardiyono (2020) that high noise intensity will increase cortisol levels in the blood and affect blood pressure.

This is supported by Kelirey's research (2023) which found that noise exposure and increased blood pressure had a significant relationship (p = 0.023). Zainudin's research, et al (2020) found that 32 respondents (46.7%) who worked in a work environment with high noise intensity, of whom 23 respondents (38.3%) had increased blood pressure. Arini (2021) also confirmed that the increase in blood pressure before or after work with noise intensity had a significant relationship (p = 0.001). Indriyanti (2019) also states that workers who work with noise intensity exceeding the TLV have a risk of 19.8 times experiencing an increase in blood pressure.

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CONCLUSION

The study's results indicate that there is a significant correlation between the use of personal protective equipment (PPE) (p = 0.011), age (p = 0.000), length of service (p = 0.007), and other respondent characteristic factors and higher blood pressure in employees at the PT Japfa Comfeed Indonesia Plant Margomulyo production unit. Other respondent characteristics, including smoking behaviors (p = 0.763), dietary state (p = 0.467), and history of hypertension (p = 0.170), do not, however, significantly correlate with elevated blood pressure. Furthermore, the research discovered a strong correlation (p = 0.000) between the production unit workers' elevated blood pressure and noise levels. These results indicate that although lifestyle variables like smoking and nutritional status may have less influence in this particular environment, occupational factors—such as noise exposure and personal protective equipment (PPE)—play a significant role in determining workers' blood pressure.

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Modifying Factors and Level of Knowledge About Pregnancy Danger Signs That Influence Antenatal Care Utilization Compliance

Sulistiyah[1], *Widia Shofa Ilmiah*[2]

[1,2]*Institut Teknologi, Sains, dan Kesehatan RS dr. Soepraoen Kesdam V/ Brw, Malang City, Indonesia*

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CORRESPONDENCE

E-mail: widiashofailmiah@itsk-soepraoen.ac.id

A B S T R A C T

The 3rd Sustainable Development Goal (SDG) is to guarantee healthy lives and to promote well-being. Reducing the maternal mortality ratio (MMR) to 70 per 100,000 live births is one of the SDG's primary metrics. In Indonesia, 74.1% of expectant mothers had at least four antenatal care (ANC) appointments in 2018, while 70.67% of mothers finished six ANC visits in 2022. The percentage was 74.92% in East Java, while the coverage in Nganjuk Regency decreased slightly from 79.90% in 2017 to 77.92% in 2019. The purpose of this research was to examine the moderating variables and the impact of pregnancy risk sign information on ANC use compliance. The study included all 53 pregnant women in the community and used a quantitative, cross-sectional, analytic correlation design. Total sampling, questionnaires, MCH books, and observation sheets were used as data-collecting techniques. A study of binary logistic regression was used. According to the findings, there was no discernible impact of schooling on ANC compliance (p = 0.546). ANC compliance was, however, substantially correlated with knowledge (p = 0.050; PR = 7.099), gestational age (p = 0.005; PR = 0.023), parity (p = 0.020; PR = 0.089), and information (p = 0.029; PR = 0.051). Notably, ANC adherence was seven times more impacted by knowledge level. Six ANC visits must be completed to identify and avoid issues early on, which emphasizes the need to raise pregnant women's knowledge in order to increase compliance.

INTRODUCTION

Antenatal care (ANC) services are provided to women during pregnancy. These antenatal care services are considered very important in ensuring that both the mother and the baby carrying will be safe during pregnancy and delivery. Antenatal care is not only considered important but is a must for women during the process of pregnancy by visiting health workers, in this case, midwives to find out the condition of pregnant women and fetal development and early detection of risk pregnancies (Firdausia, Budihastut, and Dewi 2021). The purpose of antenatal care is a screen for pregnancy complications, to respond to the complaints of pregnant women, to prepare for labor and delivery to run safely, comfortably, and positively (Yeoh, Hornetz, and Dahlui 2016). In addition, to achieve the Sustainable Development Goals (SDGs in 2030) goal 3rd on healthy living and well-being for all, with one of the indicators being a reduction in maternal mortality (MMR) by 70 per 100,000 live births (Gutteres 2023).

Pregnancy that was originally physiological can turn abnormal as a danger sign of pregnancy if not screened properly. Danger signs of pregnancy are signs that indicate that the condition of mother and or baby are experiencing a state of potential emergency or emergency conditions that can threaten the life of the mother and or babies that are carrying (Kusmintarti *et al.*, 2022). The proportion of pregnancies that

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are expected to take place physiologically is known to be around 80-90% and only about 10-12% of pregnancies are abnormal (Antono & Rahayu, 2014).

Indicators of monitoring the health status of pregnant women are based on the mortality rate (MMR) of pregnant women. According to the World Health Organization (WHO), the maternal mortality rate (MMR) is maternal mortality during pregnancy up to 42 days after termination of pregnancy due to direct or indirect causes and its implementation (Fauziah, Hilmi, and Salman 2023). Data on MMR amount to 500,000 deaths per year in the world and 99% occur in developing countries including Indonesia (Damayanti and Nur 2020).

According to the World Health Organization (WHO), antenatal care is carried out at least 8 times during pregnancy (Susanto and Aspar 2021). ANC in developing countries, one of which is Indonesia since 2021 ANC examination is carried out at least 6 times (K6) according to government programs with details 2 times (K1-K2) carried out pregnancy checks at 1st trimester gestational age (1-12 weeks gestational age), 1 time (K3) pregnancy checks are carried out at 2nd trimester gestational age (13-27 weeks gestational age), 3 times (K4-K6) by conducting pregnancy checks in the 3rd trimester (28-40 weeks gestational age). However, antenatal care or pregnancy checks can be carried out beyond the minimum standards set by the government according to health promotion delivered by midwives (Koestuanti 2023). ANC services during the COVID-19 pandemic at least 6 times during pregnancy are a form of efforts made to improve the health of pregnant women (Susanto and Aspar 2021).

Basic Health Research Data in 2018 about the percentage of ANC achievement at least 4 times during pregnancy of 74.1% and the achievement of childbirth by health workers in health facilities of 79.3% (Ministry of Health of the Republic of Indonesia 2018). Based on data from the Director General of Public Health and Director of Nutrition for Maternal and Child Health (MCH) in 2022, the percentage of achievement of K6 pregnancy checks (at least 6 pregnancy checks) for health workers, both doctors and midwives, is 70.67% of the target of 60% set by the Indonesian government, while the percentage of achievement of pregnancy checks of at least 6 times by province in 2022 is the highest in Banten Province at 84.59%, while in East Java Province of 74.92% ranks 8th after West Java Province of 77.82%, and the lowest in Papua province with a percentage of achievement of 17.91%. Based on these data, it shows that there are still problems with the achievement of minimum pregnancy checks set by the Indonesian government (Mulati, 2023).

The K4 coverage data in Nganjuk Regency in 2017 amounted to 79.90%, 2018 data was 79.60%, and 2019 data was 77.92%. This shows that the percentage of antenatal care achievement of pregnant women in Nganjuk Regency decreases from year to year. Data on the number of MCH book ownership for pregnant women tends the fluctuate in Nganjuk Regency in 2017-2019. Data in 2017 amounted to 14,975

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pregnant women (100%), in 2018 amounted to 6,900 pregnant women (97.26%), and in 2019 amounted to 14,612 pregnant women (98.13%) (Efendi, 2021).

Using medical records, the results of a preliminary study conducted by researchers at one of the independent midwife practices in Nganjuk Regency found that the number of pregnant women in trimesters 1-3 was 34. Of the 34 pregnant women, 12 (35.3%) had ANC screening and 22 mothers did not have regular ANC (64.7%). This shows that there is still a low achievement of compliance with antenatal care utilization for pregnant women in one of the independent midwife practices in Nganjuk Regency. From the 12 people who carried out the ANC services, it is known that pregnant women experience various discomforts and complications, including postdate, hypertension, edema on the leg, pregnancy with too old age with the age of >45 years old.

The factors causing the lack of compliance of pregnant women to carry out antenatal care include ownership of MCH books, knowledge of the importance of MCH books and low utilization of MCH books information, employment factors, knowledge of the importance of antenatal care, attitudes, family support, accessibility of health facilities (Susanto and Aspar 2021). According to other causative factors, namely the age of pregnant women, parity, pregnancy distance, and availability of adequate health facilities and infrastructure (Qomar, Na'mah, and Yelvin 2020). The impact of pregnancy checks are not carried out routinely includes not detecting early complications during pregnancy, increasing morbidity rates in mothers and babies, and mortality rates in mothers and babies (Fauziah *et al*., 2023).

The efforts that are conducted to improve visit compliance are through increasing health promotion to pregnant women through classes for pregnant women and entertainment pregnancy services, midwives collaborating with cadres (Firdausia *et al*. 2021); (Dwiyanti Purbasari 2018). This study aims to analyze modifying factors and the level of knowledge about pregnancy danger signs that influence antenatal care utilization compliances.

METHOD

The type of research based on the data is quantitative and based on the intervention, such as ex post facto, and based on the time approach, namely cross-sectional studies. This research design uses correlation analytics. The study population is all pregnant women in independent midwife practice X in 2022 Nganjuk district were 53 people. The number of samples was 53 pregnant women with a total sampling technique. Data collection techniques use questionnaire instruments, MCH books and observation sheets. The independent variable is demographic factors (age, employment, level of education, information, parity, gestational age, level of knowledge about pregnancy danger signs, dependent variable is antenatal care utilization compliance. Univariate analysis of the study using descriptive frequency, bivariate analysis of the study using Chi-Square test ($p < \alpha$ 0.25 as a condition of entry to the multivariate model),

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multivariate analysis using multiple logistic regression (p <α 0.05, then H0 failed to accept). Ethical approval by Institut Teknologi, Sains, dan Kesehatan RS. dr. Soepraoen Kesdam V/ Brw.

RESULT

The study conducted in an independent midwife practice in X Nganjuk district in 2022 with 53 respondents of pregnant women found that most pregnant women have a low-risk age (between 20-35 years) 35 people (66.0%), the highest level of education is higher education in the high school and college categories is 28 mothers (52.8%), mothers mostly have employment is 29 people (54.7%), Most of the information obtained about antenatal care has been obtained either from family, health workers or through social media is 29 people (54.7%), parity is mostly multipara amount of 33 people (62.3%), gestational age is partly the 3rd trimester amount of 27 people (50.9%), the level of maternal knowledge about pregnancy danger signs is mostly high at 32 people (60.4%), and compliance with the use of antenatal care services is mostly compliance amount of 33 people (62.3%) (table1). The result of the Chi-square test is that age, level of education, employment, get information about antenatal care, parity, gestational age and level of knowledge about pregnancy danger signs of compliance with the use of antenatal care services respectively, namely (p1=0.334; p2=0.041; p3=0.600; p4=0.001; p5=0.002; p6=0.001; p7=0.000) (table 1). The results of statistical tests using multiple logistic regression found that the level of education did not affect the compliance of the antenatal care utilization while getting information about antenatal care, parity, gestational age, level of knowledge about the danger signs of pregnancy had a positive effect toward antenatal care utilization compliance. Level of knowledge has a 7 times chance of influencing antenatal care utilization compliance (table 2).

Table 1. Modifying Factors and Characteristics of Respondents

No	Variable	f (n = 53)	%	p value
1.	Age (Years)			
	High Risk (<20 & >35)	18	34.0	0.334
	Low Risk (20-35)	35	66.0	
2.	Level of Education			
	Low (Junior High School)	25	47.2	0.041
	High (Senior High School and Collage)	28	52.8	
3.	Employment			
	No employment	24	45.3	0.600
	Have employment	29	54.7	
4.	Get Information about ANC			
	Notyet	24	45.3	0.001
	Ever (Family, Health worker, social media)	29	54.7	
5.	Parity			
	Primipara	20	37.7	0.002
	Multypara	33	62.3	
6.	Gestational Age			
	Young pregnancy (1st and 2nd Trimester)	26	49.1	0.001
	Old pregnancy (3rd Trimester)	27	50.9	
7.	Level of Knowledge			
	Low	21	39.6	0.000

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No	Variable	f (n = 53)	%	p value
	High	32	60.4	
8.	ANC Utilization Compliance			
	Not compliance	20	37.7	
	Compliance	33	62.3	

Table 2. Modifying Factors and Level of Knowledge that Influence Antenatal Care Utilization Compliance

No	Variable	B	p-value (CI 95%)	Prevalence Risk (PR)
1	Level of Education	0.639	0.546	01.895
2	Get Information about ANC	2.983	0.029	0.051
3	Parity	2.421	0.020	0.089
4	Gestational Age	3.773	0.005	0.023
5	Level of Knowledge	1.960	0.050	7.099

DISCUSSION

The results of the study in Table 1 showed that of the 53 pregnant women studied, it was known that most pregnant women had a low-risk age, the highest level of education was higher education in the high school and college categories, most worked both in the private sector, and as state civil servants, most pregnant women had received information about antenatal care both from their families, health workers, namely midwives or doctors or through social media, most mothers are multiparous or have experienced giving birth before with a minimum pregnancy of at least 2 times with the current gestational age including the 3rd trimester, the level of maternal knowledge about the danger signs of pregnancy is mostly high, and most mothers are obedient in the use of routine antenatal care examinations as recommended by health workers, namely midwives and doctors.

Chi-square test results show that age, level of education, employment, obtaining information about antenatal care, parity, gestational age, and knowledge about pregnancy danger signs affect compliance with antenatal care test utilization. The results of statistical tests using multiple logistic regression found that the level of education did not affect the compliance with the use of antenatal care examination, while the acquisition of information about antenatal care, parity, gestational age, level of knowledge about the danger signs of pregnancy had a positive effect on compliance with the use of antenatal care examination. The level of knowledge has a 7 times chance of influencing compliance with antenatal care examinations for pregnant women.

Pregnancy is a natural event that will be experienced by almost all women and is a physiological condition that occurs after the process of conception and fertilization. However, the development of pregnancy can be abnormal or pathological, and there are complications if routine monitoring is not done through pregnancy checks. Naturally, the process of pregnancy due to hormonal changes in chorionic gonadotropin estrogen and progesterone can result in physical and psychological changes in pregnant women (Oktavia 2018).

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For the pregnancy process to run normally and have a low risk, routine pregnancy checks are needed according to gestational age starting from trimester 1 (gestational age 1-12 weeks), trimester 2 (gestational age 13-27 weeks), and trimester 3 (gestational age 28-40 weeks) (Idris & Sari, 2023). According to the government program, pregnancy checks should be carried out at least 6 times with details 2 times in the 1st trimester, 1 time in the 2nd trimester, and 3 times in the 3rd trimester to be able to detect danger signs during pregnancy earlier (Susanto and Aspar 2021).

Antenatal care is one type of obstetric care provided by midwives or doctors to pregnant women with the aim of monitoring, providing health support to pregnant women, and early detection of complications that can occur at any time during pregnancy (Fasiha, 2017). Pregnancy examination is carried out with a minimum standard of "10 T" in Indonesia (Weigh and measure height, take blood pressure measurements, determine the mid-upper arm circumference or MUAC to determine the value of nutritional status of pregnant women, Measurement of Fundus Uterine Height, Determine fetal presentation and fetal heart rate or fetal heart rate, Screening Tetanus Toxoid or TT immunization and give it if needed, Administration of Fe tablets, Routine laboratory tests in the form of hemoglobin and protein tests as well as urine reduction and special laboratory tests, case management, speech meetings or counseling) (Ilmiah, 2022).

Various factors affect the compliance of pregnant women in the use of routine pregnancy checks as recommended by midwives and doctors, including demographic factors (employment), knowledge factors, attitudes, ease of obtaining information about antenatal care, family support, complaints of illness or discomfort experienced by pregnant women during pregnancy, ownership of health insurance (Indrastuti 2019). Other factors, according to (Kurniasih *et al.*, 2019) are cost or socioeconomic factors, mothers living with nuclear families, distance, health facilities, media utilization, and maternal health status.

The results of the researcher's study with multiple logistic regression showed that the factors that influenced mothers to comply with utilizing routine pregnancy checks at the Midwife Independent Practice as a primary-level health facility were the acquisition of information about antenatal care, parity, gestational age, level of knowledge about pregnancy danger signs had a positive effect on compliance with the use of antenatal care utilization, while the level of education did not affect antenatal care compliance. The level of knowledge of mothers is known to have a 7 times chance of influencing pregnant women's compliance in carrying out antenatal care utilization. The results of the researcher's research are in line with research (Hijazi *et al*., 2018) that one of the factors that can affect the compliance of pregnant women to antenatal care visits is the provision of adequate information from health workers about pregnancy checks, physiological and psychological changes and signs of symptoms of danger in pregnancy. Midwives and doctors provide information through adequate counseling. According to (Ilmiah, 2022), counseling, also called interpersonal communication, is a form of health information delivery activities

delivered by midwives or doctors to pregnant women with implications, opportunities, and feedback from pregnant women.

The second factor that affects compliance with the use of routine pregnancy checks is parity. This is as the study conducted (Heaman *et al*., 2018) The parity factor is a factor causing non-compliance in conducting antenatal care examinations, and parity is the number of children a mother has born. Pregnant women who have no experience giving birth at all allow mothers to immediately do pregnancy checks earlier, while mothers who have previously had childbirth experience have a smaller possibility to immediately come for pregnancy checks to health workers, both doctors, and midwives, by government and WHO recommendations.

Likewise, (Roobiati *et al.*, 2019) show that the parity or number of children owned by mothers where if the woman has never had childbirth experience, the motivation to do an early pregnancy check immediately is known to be lower than women who are pregnant for the first time and have not had experience giving birth. Other studies have also shown that higher parity is associated with late ANC visits. Women with multiple children in the Zambian study also showed lower utilization of prenatal care because they preferred their time to care for their children, making mothers forget about quality prenatal care. They prefer antenatal care services to non-healthcare providers such as dais, elderly women in households or communities, nearby drug stores, etc. Based on this, contact with skilled healthcare providers suggests it is essential for the use of services in rural remote communities (Kurniasih *et al*., 2019).

The third factor is the gestational age of pregnant women. Gestational age is the gestational age of the fetus conceived by the mother from the first day of the last menstrual period to the current pregnancy. The results of the researcher's study (Mkandawire *et al.*, 2018) show that gestational age affects initiation to start antenatal care utilization earlier. The initiation of antenatal care in Rwanda is the same as in Indonesia, where mothers will be initiated to do pregnancy checks if their gestational age is older or at least 2nd trimester. This is because one of them is the lack of husband support in initiating early pregnancy checks. Pregnant women in Rwanda who leave without their husband's permission will be subjected to violence in the form of beatings and refusal to have sex with their mothers. Meanwhile, in Indonesia, socioeconomic reasons are the determining factor in decision-making, including initiating pregnancy checks.

According to (Hailu *et al*., 2022) pregnant women who start antenatal care visits after 16 weeks gestation will receive higher quality antenatal care services compared to pregnant women who visit antenatal care earlier at ≤ 12 weeks gestation. This affects pregnant women's perceptions of quality antenatal care services and the importance of early pregnancy checks since they are found positive for pregnancy. This happens because pregnant women do not immediately get services, or waiting times for services are

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longer. WHO recommends a good pregnancy check before 16 weeks of gestation to find out early the danger signs of pregnancy.

According to (Mkandawire *et al*. 2018) starting antenatal care at the recommended gestational age also allows time for mothers to develop a birth plan in consultation with family and health workers, both doctors and midwives. Starting antenatal care late can also lead to less than the recommended number of visits and reduce the overall number and quality of care for pregnant women.

The fourth factor is the level of knowledge of pregnant women about antenatal care and the danger signs of pregnancy. Knowledge is the result of knowing or understanding and being able to apply what is known through the five senses possessed by individuals. An individual's level of knowledge is the basis that shapes behavior. Other factors affect the level of knowledge of pregnant women about the use of antenatal care services in health facilities. According to (Kurniasih *et* al., 2019) Factors that affect the knowledge of pregnant women are the quality of counseling and health services carried out by health workers.

The results of the researcher's study are in line with the research (Roobiati *et al*. 2019) There is a relationship between the level of knowledge about the dangerous signs of 3rd-trimester pregnancy and maternal motivation to carry out antenatal care utilization by the government and WHO recommendations. Other studies also explain that the level of knowledge significantly positively affects compliance in antenatal care (Bashir, Ansari, and Sultana 2023). For mothers with high knowledge about pregnancy health, antenatal care visits are not just to fulfill obligations but become a necessity for their pregnancy (Rachmawati, Puspitasari, and Cania 2017). The mother's level of knowledge and awareness can be increased by participating in regular antenatal care during pregnancy, as complaints related to the disease tend to affect the utilization of antenatal care services significantly (Roobiati *et al*. 2019). Women who have a good understanding will have implications for the ability to receive and understand the information provided by health workers, including the symptoms of pregnancy danger, such as abnormal bleeding, severe abdominal pain, high blood pressure, or unnatural swelling, then mothers will be more likely to seek medical care sooner if these signs appear (Damayanti and Nur 2020).

CONCLUSION

The level of education has no discernible effect on compliance with antenatal care (ANC) use. On the other hand, compliance is favorably impacted by an understanding of pregnancy warning symptoms, parity, gestational age, and availability of information regarding ANC. Information is very important and has a seven-fold probability of affecting ANC adherence. Therefore, to promote early risk identification and avoid difficulties, pregnant women must attend at least six ANC checks. It is also essential for families, midwives, and health cadres to support moms in attending ANC services regularly. Complying with programs like prenatal courses may improve compliance even more. It is advised that to have a

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deeper understanding of the elements influencing ANC use compliance, future studies investigate other variables and utilize diverse approaches.

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The Effectiveness of Digitalization in Family Caregiver Empowerment Model (FCEM) for Reducing Diabetes Incidence in Rural Areas: An App-Based Literature Review Study

Fahmi Wildana[1], Lutfian[2], Aufa Azizah[3], Izdihar Javier Wardika[4], Fariza Barika Ramadhani[5], Wahyu Dwi Utomo[6]

[1,3,4,5,6]*Faculty of Nursing, Universitas Jember, Jember, Indonesia*
[2]*Faculty of Medicine, Nursing and Health Science, Monash University, Melbourne, Australia*

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CORRESPONDENCE

E-mail: fahmiwildana12@gmai.com

A B S T R A C T

Diabetes mellitus (DM) is a condition characterised by anomalies in insulin production, action, or both, which result in hyperglycemia and insufficient management of blood glucose levels. Patients, their families, and the healthcare system must bear a heavy burden when it comes to the long-term management of diabetes mellitus (DM) via medication and lifestyle changes. To lower the prevalence of diabetes, especially in rural regions, this project aims to explore the possibility of incorporating the Family-Centered Empowerment Model (FCEM) into a digital application. Using a literature review technique, this study gathered information from books, articles from relevant organizations, and journal publications. The search was conducted using keywords like Empowerment, Family, Diabetes, Telehealth, and FCEM to find sites that fit the inclusion requirements. According to the findings, the FCEM intervention significantly improves quality of life, psychological management, physical activity, and health education in addition to encouraging lifestyle changes. Additionally, it raises health literacy, which boosts psychological support, increases adherence to blood sugar management, and lessens disease-related anxiety.

INTRODUCTION

Diabetes mellitus (DM) is characterized by inadequate blood glucose control (Sapra & Bhandari, 2022). It manifests as elevated blood glucose levels or hyperglycemia, resulting from abnormalities in insulin secretion, insulin action, or a combination of both (Banday et al., 2020). Managing DM requires long-term treatment and lifestyle modifications, which place considerable burdens on both patients and healthcare systems (Al-Matrouk & Al-Sharbati, 2022).

DM significantly impacts various aspects of life, including physical, psychological, and social well-being. It is associated with numerous short- and long-term complications that may impair the ability to work or engage in daily activities (Puspasari & Farera, 2021). Therefore, healthcare support and continuous monitoring are crucial to ensure effective blood sugar control and successful patient rehabilitation. Furthermore, such support enhances patient satisfaction, improves healthcare quality, and reduces overall healthcare costs (Tekir et al., 2021). This aligns with the Sustainable Development Goals (SDGs), particularly Goal 3, which focuses on ensuring healthy lives and promoting well-being.

Globally, DM cases have been increasing. As of 2021, 536.6 million people were living with diabetes, with this figure expected to rise to 783.2 million by 2025 (International et al., 2021). In Indonesia, diagnosed DM cases rose from 1.5% to 2% between 2013 and 2018, according to the Ministry of Health

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(2018). Indonesia now ranks fifth globally, with 19.5 million diabetes patients, and the number is projected to reach 28.6 million by 2045 (International Diabetes Federation, 2021).

The current era, marked by the Fourth Industrial Revolution and the transition towards Society 5.0, is characterized by rapid technological advancements and globalization. These changes present opportunities to positively impact health outcomes through economic, social, and political development (Jani, Joshi, & Mehta, 2019). Addressing the rising incidence of DM requires empowering patients using digital tools that align with contemporary needs.

Digital health empowerment goes beyond process modifications, serving as a tool to help healthcare providers maintain engagement with patients (Foadi & Varghese, 2022). Empowering DM patients through digital platforms simplifies disease management and reduces healthcare costs while addressing primary healthcare needs. However, many existing technologies remain limited to measuring specific physiological parameters and lack comprehensive healthcare integration (Andreoni, Caiani, & Castaldini, 2022).

Empowerment, a central concept in social work, involves equipping individuals to exert influence over their lives (Joseph, 2020). Empowering caregivers in the context of DM management considers factors such as cultural beliefs, caregiving responsibilities, and available resources to improve outcomes (Rondhianto, 2021). Family-centered care plays a critical role in DM management by supporting caregivers in planning care strategies (Luthfa & Ardian, 2019). Empowered caregivers can enhance diet regulation, physical activity, medication adherence, glucose monitoring, and foot care (Rondhianto et al., 2022).

Rural areas, defined as regions where agriculture is the primary livelihood, require interventions tailored to local cultural and environmental contexts (Susanto, 2022). Farmers in these areas face health risks linked to their work environment and activity patterns. Health interventions must consider the sociodemographic, occupational, and environmental factors that influence diagnoses in rural populations (Susanto, 2022).

In response to these challenges, various diabetes management applications, such as Track-3 Diabetes Planner, Diabetes Checker, and DM Assistant, have been introduced. However, these applications face limitations, including the absence of theoretical frameworks and insufficient integration with healthcare services. Addressing these gaps requires a sustainable healthcare model that integrates digital solutions with broader healthcare infrastructure.

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METHOD

The writing method employed in this scientific work is through a narrative literature review, which is one of the methods without a systematic approach. The narrative method aims to summarize previous research findings, reduce duplicate publications, and identify new studies. Articles were obtained through Google Scholar, NCBI, ProQuest, Science Direct, and Scopus. Several steps in the narrative review include literature searches in databases that meet the criteria. Keywords will be identified to find sufficiently relevant articles and synthesize findings from selected articles for integration into the manuscript.

Inclusion Criteria	Exclusion Criteria
a. The research design of the analyzed articles includes randomized controlled and quasi-experimental designs. b. The study participants in the research articles are families with diabetes mellitus patients. c. The Family Caregiver Empowerment Model (FCEM) involves primary healthcare providers, particularly nurses. d. The articles are written in either Indonesian or English. e. The articles were published between the years 2019 and 2023. f. f. The articles elaborate on the relationship between family empowerment and the incidence of diabetes mellitus.	a. Studies deviating from the intended topic; b. Articles lacking in full paper content; c. Articles containing only abstracts; d. Articles derived from conferences or proceedings; e. Articles published in more than one journal, in which case one of them is retracted; f. Articles retracted due to violations of publication ethics; g. National journals that do not include a type-setting examination.

Table 1. PICO

Analysis	Contents
Problem/Population	Sufferers of diabetes in rural areas.
Intervension	Digitization of the Family Caregiver Empowerment Model (FCEM) based on an application.
Comparison	Existing programs are not operating optimally due to time and cost constraints.
Outcome	Reduction in the incidence of diabetes and improvement in disease management.

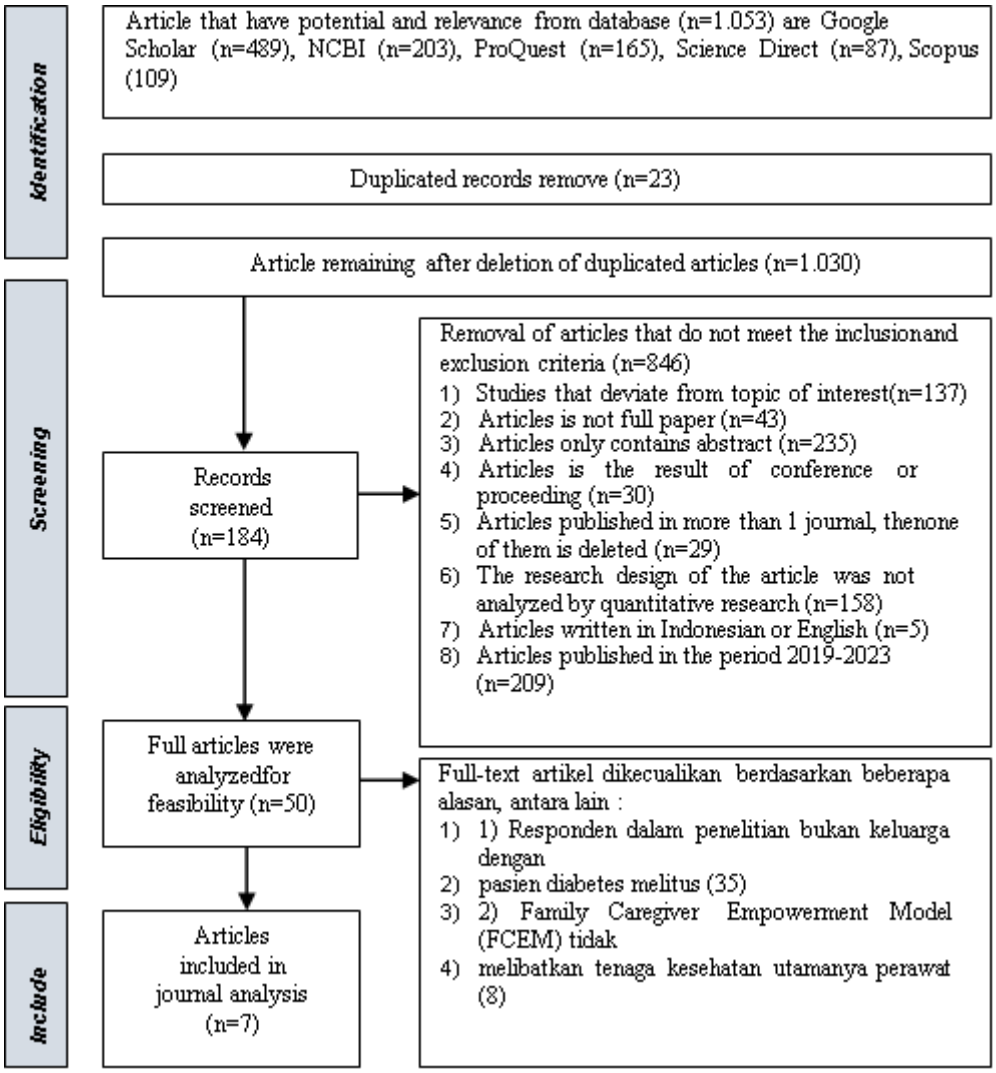
Data Selection

The potential and relevant articles identified from electronic databases (n=1,053) include Google Scholar (n=489), Science Direct (n=87), Scopus (n=109), NCBI (n=203), and ProQuest (n=165). Duplicate records were removed (n=650). Elimination of articles not matching keywords and abstracts was conducted (n=219). Articles deemed not highly relevant based on inclusion and exclusion criteria were excluded (n=134). Full-text articles were assessed for eligibility and analyzed (n=50). Full-text articles were excluded for several reasons, including 1) Lack of relevance to the issue of stunting (n=36), and 2) The Family Centered Care theory does not involve healthcare professionals, particularly nurses (n=8). Research articles included in the main journal analysis amounted to six (n=6). Article selection, as

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depicted in the PRISMA diagram, resulted in obtaining and analyzing six articles, as presented in Table 2 of the article analysis.

Figure 1. PRISMA Diagram



RESULT

Table 2. Analisis Jurnal

Author & Tahun	Judul	Negara	Jumlah Responden	Metode	Hasil
Yazdanmanesh et al (2023)	Relieving care burden and promoting health-related quality of life for family caregivers of elderly people with Alzheimer‟s disease via an empowerment program	Iran	70 responden	Experimental study	The decrease in care burden and improvement in health-related quality of life among Alzheimer's patients based on the Family Caregiver Empowerment Program show significance with the value of $p < 0.001$
Shoghi et al (2019)	The Effect of the Family-Centered Empowerment Model (FCEM) on the Care	Iran	78 responden	Quasy Experimental	The influence of FCEM on caregiving burden in children with cancer is evidenced by a p-value of < 0.001.

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	Burden of the Parents of Children Diagnosed with Cancer				
Jafari et al (2020)	Family-centred empowerment program for health literacy and self- efficacy in family caregivers of patients with multiple sclerosis	Iran	70 responden	Quasy Eksperimental	Health intervention with FCEM can enhance health literacy and self-efficacy among caregivers of sclerosis patients, with a significant value of $p < 0.001$.
Hsu et al (2023)	Applying the theory of planned behavior to investigate type 2 diabetes patients' intention to receive injection therapy	China	254 Responden	Randomized Controlled	FCEM has an impact on care burden and can enhance the role of caregivers in elderly individuals with Parkinson's, as demonstrated by a significant value of $p < 0.001$
Mahdi et al (2020)	The Effect of Family Empowerment in Nursing Implementation Toward Self-Efficacy among Patients with Diabetes Mellitus	Indonesia	40 responden	Quasy Eksperimental	The influence of FCEM on increasing motivation and self-efficacy in patients with diabetes mellitus is observed with a value of $p < 0.05$
Shahabi et al (2022)	The efect of telenursing training based on family- centered empowerment pattern on compliance with diet regimen in patients with diabetes mellitus type 2: a randomized clinical trial	Iran	60 responden	Randomized Controlled Trial	FCEM through telenursing affects the improvement of dietary compliance in diabetic patients, with a significant value of $p < 0.001$.
Deyhoul et al (2019)	The efect of family-centered empowerment program on the family caregiver burden and the activities of daily living of Iranian patients with stroke: a randomized controlled trial study	Iran	90 responden	Randomized Controlled Trial	There is an increase in the quality of life of stroke patients and a decrease in caregiving burden for stroke patients through FCEM, with a significant value of $p < 0.001$.

1. Development Trends of Diabetes and Technology

Diabetes stands as one of the largest global public health challenges, imposing a substantial burden on public health and socio-economic development. While its prevalence is decreasing in some countries, diabetes has surged over the past decades in most developed and developing nations. In 2021, a staggering 536.6 million individuals worldwide were diagnosed with diabetes, and this figure is projected to rise to 783.2 million by 2025 (IDF, 2021). Paradoxically, Indonesia currently ranks fifth globally, with 19.5 million individuals afflicted by diabetes, which is expected to escalate to 28.6 million by 2045 (International Diabetes Federation, 2021). Diabetes has become a leading global cause of death, contributing to over 80% of premature deaths from non-communicable diseases (NCDs). Individuals with diabetes face a 2-3 times higher risk of all-cause mortality. The presence of diabetes is associated with increased mortality from infections, cardiovascular diseases, stroke, chronic kidney disease, chronic liver

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disease, and cancer. Despite progress in promoting population health and extending life expectancy, diabetes remains the second-largest negative contributor to global health-adjusted life expectancy (Chen et al., 2019).

In the current era of globalization and the rapid growth of technology, entering the 5.0 era of society provides an opportunity to develop internet connectivity and applications tailored to public health needs. This is supported by the increasing number of internet users in Indonesia, reaching 171.17 million, accounting for 64.8% of the total population (Mudawamah, 2020). Internet usage percentages based on age indicate 74.23% for those aged 19-34 and 44.06% for those aged 35-54. Regarding economic class, 58.55% of lower-class individuals and 82.95% of middle-class individuals use the Internet. Regarding health applications, 51.06% of individuals search for health information online, and 14.05% use the Internet to consult with healthcare professionals. Given the sophistication of the current digital era, these figures are expected to rise over time.

2. Utilization of Applications in Family Empowerment

The current use of applications extends to health interventions, as applications can serve as promotive, preventive, and rehabilitative tools (Novianto et al., 2019). Current health applications focus on increasing knowledge and promoting healthy lifestyles to empower individuals or groups. Mobile technology has successfully integrated into people's lives from all walks of life due to its low cost, mobility, and time efficiency (Suciati, 2022).

This increase should be maximized, and one way to do that is through digitizing empowerment. This is supported by the fact that the number of healthcare workers in Indonesia is far below the standard, considering the country's population. Additionally, the chronic and lifelong nature of diabetes suggests the need for comprehensive interventions (Sulastri et al., 2023). Consistency in treatment is the solution to diabetes-related problems, contrasting with challenges such as quantity, mobilization, time, and costs. Empowering clients and their environment through digital empowerment are the way to initiate and improve diabetes treatment consistency. The empowerment application will address issues related to the quantity of healthcare workers, mobilization, time, and costs (Suciati, 2022).

3. The FCEM Theory in Application and Family Empowerment

The Family Caregiver Empowerment Model (FCEM) broadly focuses on promotive, preventive, and rehabilitative efforts in integrated management. As analyzed earlier, the inclusion of a supportive environment in consistent treatment is essential. Shahabi et al. (2022) asserts that the interpretation of FCEM in applications significantly influences the improvement of dietary compliance in DM patients, with a p-value < 0.001. This statement reinforces the fact that there is an increase in motivation and self-efficacy in DM patients through application-based empowerment using the FCEM theory (Mahdi et al.,

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2020). Moreover, based on previous research, there is a general improvement in the quality of life for both patients and their families after a series of application-based empowerment interventions, not only for diabetes patients but also for several other chronic long-term diseases.

DISCUSSION

1. Effectiveness of FCEM Digitalization

Digitalization of FCEM represents an advancement in family empowerment tailored to the society 5.0 era. The program directly integrates digitalization into the concept of family empowerment through the interpretation of the FCEM theory. The implementation process collaborates with various fields of health and sciences. The program encompasses five interventions aligned with FCEM components, such as knowledge, motivation, coping, spirituality, and perception (Liang, 2023). With the integration of the FCEM theory into each feature, the application's interventions are expected to be effective, as indicated by previous research. This application will assist patients with diabetes and their families in improving their quality of life.

2. Concept of Developing FCEM Digitalization based on Applications

The concept of telehealth will be incorporated into the application's development by adapting the FCEM theory's components. Five components will be developed in the effort to digitize family caregiver empowerment: knowledge, motivation, coping, spirituality, and perception. This digitalization of FCEM will help diabetes patients and their families enhance their quality of life. The interventions within the application, assessed or implemented over one month, will be submitted to relevant health centers for evaluation and comparison with the previous month as an assessment of the program's success and sustainability. The components in the digitalization of FCEM are as follows:

1) Screening

Screening is something that must be passed to determine the next intervention that will be recommended by the application based on level of education, health, economy, etc.

2) Education

Education in health is not only an instrument of prevention, but also the foundation for creating a healthier, more informed and empowered society. The research results of Mahdi et al (2020) explain that education in FCEM increases motivation and self-efficacy in DM patients with a p value < 0.05. These results will have implications for prevention of diabetes through empowered families or individuals.

3) Consultation

The exchange of messages via chat channels is interpreted as a form of two-way communication in which the sender and recipient are involved, supported by technology, such as communicating via messages on

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applications (Greenwood et al., 2017). Short message services and multimedia messages are a practical and economical way to support self-management and provide benefits in the management of chronic diseases, such as diabetes (Huo et al., 2017). The use of chat services in the form of groups by individuals with type 2 diabetes mellitus aims to share daily experiences to improve glucose control (Wang et al., 2019; Yu et al., 2019)

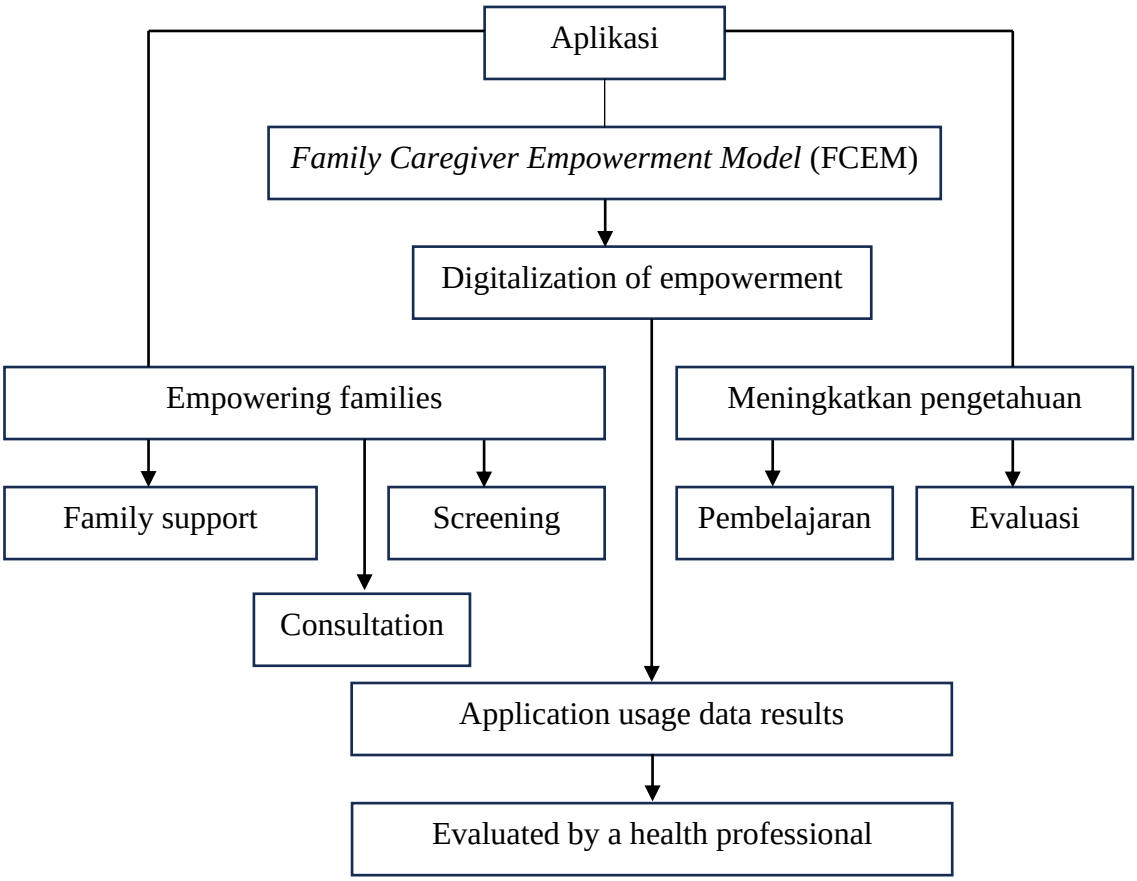
4) Support

It is an interpretation of the motivational, coping and spiritual components that will encourage the family to become a support system for patients undergoing treatment so that the family can be strengthened as caregivers and can also minimize the burden on the family. Family support can provide informative support by providing information related to diabetes problems, as well as providing emotional support such as providing motivation, calm, and accompanying when carrying out treatment. Apart from that, the family can also provide material support (Amilia, 2018).

5) evaluasi

Functioning as a post-intervention assessment, the components contained in the evaluation are the activeness and effectiveness of health workers, the level of family empowerment, and the quality of life of sufferers so that later it will become a benchmark for the success of the program and become a reference for program sustainability

3. Road Map Aplikasi



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4. Implementation of Application Program as an Effort for the Digitalization of FCEM

The implementation of this application program is carried out using the Multimedia Development Life Cycle (MDLC) method, which begins with the concept stage, involving formulating the foundation of the project, its objectives, and the type of application to be developed. Subsequently, the design phase encompasses specifying the program's architecture, style, display, and material requirements. The third stage involves obtaining content material, where the collection of necessary materials or content for the application is conducted. The fourth stage, assembly, represents the production phase and requires IT expertise. After the production phase, the testing stage is conducted by applying the application on a minor scale to assess its feasibility before mass implementation. The final stage, distribution, involves disseminating the results to the target audience after confirming the application's suitability for mass implementation.

CONCLUSION

The high prevalence of diabetes in Indonesia is a critical issue that demands immediate attention. The integration of technology in the healthcare sector, particularly in the Society 5.0 era, enhances the potential to achieve the Sustainable Development Goals (SDGs) by 2030, especially Goal 3, which emphasizes the importance of addressing diabetes. One promising intervention strategy involves utilizing applications based on the Family-Centered Empowerment Model (FCEM) to empower families affected by or at risk of diabetes. This approach considers the physical, psychological, and social dimensions of care to restore patients to their highest possible level of independent function. The program within the application is designed around key components of diabetes management, including screening, education, nutrition management, and psychological support. Leveraging the Internet of Things (IoT) and featuring a user-friendly interface, the application aligns with the goals of technological advancement in the Society 5.0 era. Expected outcomes of the application’s implementation include a reduction in diabetes risk, improved family health, adoption of healthier lifestyles, and an enhanced quality of life for individuals and their families.

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Prevalence and Determinant Analysis of Scabies Incidence in Rumak Village

Idham Halid[1], Musparlin Halid[2], Beny Binarto Budi Susilo[3]

[1]*Department of Occupational Safety and Health, Politeknik Medica Farma Husada Mataram, Indonesia*
[2,3]*Department of Medical Records and Health Information, Politeknik Medica Farma Husada Mataram, Indonesia*

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CORRESPONDENCE

E-mail: idhamhalid1988@gmail.com

A B S T R A C T

Scabies is a global public health problem that affects millions of people worldwide, especially in crowded and underdeveloped places. Similar difficulties arise at Rumak Village, a rural community in West Lombok, where cramped living quarters encourage the development of scabies. The primary goal of this research is to pinpoint the critical factors affecting the village's scabies transmission. Using a cross-sectional methodology, 483 families' preventive practices were investigated between January and July of 2023. Chi-Square tests were used to analyse the data, which were gathered by questionnaires. A p-value threshold of 0.05 and a 95% confidence interval were used for the analysis. The results showed a substantial correlation (p = 0.000) between the occurrence of scabies and poor handwashing habits, poor household cleanliness, sharing personal objects, and infrequent bathing. Scabies is more common in families who bathe only once a day, interchange personal belongings regularly, have dirty surroundings, and wash their hands infrequently.

INTRODUCTION

Scabies is an infectious skin condition caused by the Sarcoptes scabiei mite. The condition is characterized by intense itching, redness, and rashes. These mites burrow into the skin, lay eggs, and cause discomfort to the infected individual (Mutiara and Syailindra, 2016). Mites can also survive on clothing, bedding, and other personal items for a short period of time. It is important to note that scabies can be transmitted even before symptoms appear, making it difficult to identify and prevent their spread in some cases (Aminah, Sibero and Ratna, 2015). The disease is a global health problem that affects millions of people worldwide, especially in densely populated and underprivileged communities (Majid, Astuti and Fitriyana, 2020). Rumak Village, which is in a rural area, is no exception to this problem.

Scabies have become a silent epidemic in Rumak Village. This small rural community located in West Lombok, West Nusa Tenggara (WNT) is grappling with the devastating effects of this neglected tropical disease. Scabies are mainly spread through close personal contact, such as prolonged skin-to-skin contact or shag-contaminated items (Dtoro et al., 2023). In Rumak Village, where people often live in crowded conditions, the transmission of scabies is easier. Lack of awareness about proper hygiene practices further exacerbates the problem, leading to a cycle of repeated infections.

The impact of scabies on society is multifaceted. For instance, the physical discomfort and unbearable itching caused by scabies can have a major impact on the quality of life of affected individuals. Sleeplessness and constant scratching can lead to secondary infections, further compromising their health

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(Purwanto and Hastuti, 2020). In addition, scabies have far-reaching social and economic consequences. Affected individuals, especially children, are often stigmatized and excluded from school or social activities. This not only hampers their education but also perpetuates the cycle of poverty in the community. In addition, the loss of productivity due to illness and caregiving responsibilities also puts a strain on already fragile local economies (Marga, 2020).

Diagnosing scabies in Rumak Village poses significant challenges. Limited access to health facilities and trained medical personnel make it difficult to accurately identify cases of scabies. In addition, the lack of specialized diagnostic tools means many cases go undiagnosed or misdiagnosed, leading to ineffective treatment. Several factors also complicate the treatment of scabies in Rumak Village. The high cost of treatment, coupled with limited availability, leaves many people without adequate treatment. In addition, a lack of education and awareness about proper treatment regimen often leads to incomplete or inappropriate use of medication, allowing mites to persist and infect others.

Collaboration between local governments, health organizations, and non-governmental organizations (NGOs) is essential in tackling the scabies epidemic. By pooling resources and expertise, comprehensive prevention and treatment programs can be implemented (Haiya et al., 2014). These programs should include regular mass drug administration, public health education campaigns, as well as long-term monitoring and evaluation to ensure continued progress (Fitria, Tosepu and Nurmaladewi, 2020).

The scabies epidemic in Rumak Village requires urgent attention and concerted efforts from all stakeholders. Addressing the underlying causes, improving diagnosis and treatment, and implementing comprehensive prevention strategies can reduce the burden of scabies in the community. Ultimately, eradicating scabies in Rumak Village will improve the physical and mental health of its residents and contribute to the community's overall development and well-being. It is important to understand its transmission and implement effective preventive measures to prevent the spread of scabies. This study aimed to analyze the determinants and prevalence of scabies incidence in Rumak Village.

METHOD

This study used a cross-sectional design by analyzing prevention behaviors towards scabies transmission involving a sample in Rumak Village, West Lombok, of 483 families at one point in time to understand their behaviors, attitudes, and practices related to the prevention of scabies transmission. The study was conducted from January to July 2023. Data collection used a questionnaire or survey to ask respondents about their family history of scabies, hand washing behavior, cleanliness of the environment around the house, sharing behavior, and intensity of their bathing practices related to the prevention of scabies transmission.

The observed variables were preventive behaviors, i.e., evaluating the respondents' engaging in behaviors, such as regular hand washing, cleanliness of the environment around the house, sharing of personal items, and daily bathing practices. Data analysis was performed descriptively by calculating the frequency and percentage of various preventive behaviors performed by respondents. Bivariate analysis using Chi-Square analysis, p-value 0.05 with a 95% Confidence interval, was performed to analyze the relationship between variables, namely preventive behavior and the history of scabies incidence in the sample.

RESULT

Table 1. Frequency Distribution of Preventive Behaviour towards Scabies Transmission in Rumak Village

Variable		n = 483	%
Family History of Scabies	Available	294	60.9
	Not available	189	39.1
Handwashing	Irregular	257	53.2
	Regular	226	46.8
Cleanliness of the Home Environment	Less Clean	191	39.5
	Clean	292	60.5
Sharing Items	Often	197	40.8
	Rare	286	59.2
Shower	1 Time/Day	204	42.2
	2 Times/Day	279	57.8

Table 1 shows that the prevalence of scabies in the community is still relatively high at 60.9% and families who practice regular handwashing contribute quite well at 53.2%. However, many people in Rumak Village do not maintain cleanliness around their home environment with a percentage of 60.5%. In addition, the behavior of sharing personal items with others is rarely done by the community, and the practice of bathing twice a day is well done with a percentage of 59.2% and 57.8%, respectively.

Table 2. Analysis of Preventive Behaviour towards Scabies Transmission in Rumak Village

Variables		Family History of Scabies (n=483)				χ^2	*p-value*	OR (CI 95%)
		Available		Not Available				
		n	%	n	%			
Handwashing	Irregular	188	73.2	69	26.8	34.786	0.000*	3.084 (2.109-4.510)
	Regular	106	46.9	120	53.1			
Cleanliness of the Home Environment	Less Clean	151	79.1	40	20.9	43.879	0.000*	3.933 (2.591-5.970)
	Clean	143	49	149	51			
Sharing Items	Often	164	83.2	33	16.8	69.955	0.000*	5.964 (3.839-9.264)
	Rare	130	45.5	156	54.5			
Shower	1 Time/Day	164	80.4	40	19.6	56.511	0.000*	4.699 (3.094-7.138)
	2 Times/Day	130	46.6	149	53.4			

*: Significant; OR: Odds Ratio; CI 95%: Confidence Interval

Table 2 shows that there is a significant correlation between the incidence of scabies and hand-washing practices with a p-value of 0.000. Based on the OR value, it shows that families who do not regularly

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wash their hands have a 3.084 times higher risk of suffering from scabies than families who regularly practice hand washing. In addition, there was a significant correlation between environmental hygiene practices around the house and the incidence of scabies with a p-value of 0.000. The OR value shows that families with a less clean home environment have a 3.933 times higher risk of having scabies than families with a clean home environment.

There was a significant correlation between families who frequently shared personal items and the incidence of scabies with a p-value of 0.000. The OR calculation results inform that families who often share personal items have a 5.964 times higher risk of suffering from scabies than families who rarely share personal items in their environment. In addition, there is a significant relationship between bathing practices and the incidence of scabies with a p-value of 0.000. Based on the OR value, families who practice bathing 1 time/day have a 4.699 times higher risk of having scabies than families who practice bathing 2 times/day (Table 2).

DISCUSSION

One of the preventive measures is regular hand washing which plays an important role in reducing the incidence of scabies. Hand washing is a simple yet effective method to prevent the transmission of various infectious diseases. The results of this study are consistent with the Centers for Disease Control and Prevention (CDC) statement that regular hand washing is the single most important way to prevent the spread of germs. Proper hand hygiene can significantly reduce the risk of contracting or transmitting infections, including scabies (Yun, Yu and Kim, 2020).

Scabies mites are microscopic parasites that nest in the upper layers of the skin, where they lay their eggs. These mites can easily pass from one person to another through close physical contact, such as shaking hands or sexual activity. In addition, scabies mites can survive for up to 72 hours on bedding, clothing, or other surfaces, increasing the risk of transmission (Prayogi and Kurniawan, 2016). Several studies have demonstrated the effectiveness of regular handwashing in reducing scabies transmission. A study conducted by Romani et al. in 2015 focused on a population with a high prevalence of scabies in Fiji. The study implemented a multifaceted intervention, including promoting regular handwashing with soap and water. The results showed a significant reduction in the incidence of scabies, suggesting that handwashing plays an important role in preventing its spread (Romani *et al.*, 2015).

Another study conducted by Dagne et al. in 2019 examined the impact of hand hygiene interventions on scabies transmission in a healthcare setting. The study implemented a comprehensive hand hygiene program, including education, access to hand sanitizers, and regular monitoring of compliance. The results showed a significant reduction in scabies transmission, highlighting the effectiveness of hand hygiene practices in healthcare settings. Promoting regular handwashing with soap and water should be

emphasized in health education campaigns targeting high-risk populations, such as schools, healthcare facilities, and communities with a high prevalence of scabies. Proper handwashing techniques, including thorough handwashing with soap and water for at least 20 seconds, should be taught to ensure maximum effectiveness (Dagne *et al.*, 2019).

Regular handwashing plays an important role in reducing the transmission of scabies. It is a simple and cost-effective preventive measure that can be implemented in a variety of settings, from health facilities to communities (Trasia, 2021). While handwashing alone cannot eliminate the risk of scabies, it is an important component of a comprehensive prevention strategy (Raffi, Suresh and Butler, 2019). By promoting hand hygiene practices and ensuring their consistent implementation, we can significantly reduce the incidence of scabies and improve the overall health and well-being of individuals (May *et al.*, 2019).

Scabies can spread easily from person to person, especially in crowded living conditions or close personal contact. While personal hygiene plays an important role in preventing scabies, the cleanliness of the home environment can also have a great impact on the incidence of scabies. Keeping the home environment clean is essential in preventing the spread of scabies. Regular cleaning practices, such as washing bedding, vacuuming carpets, and disinfecting surfaces, can help eliminate mites and their eggs, thereby reducing the risk of infestation. In addition, practicing good personal hygiene, including frequent hand washing and regular bathing, can minimize the chances of scabies transmission (Roswendi and Zakiyah, 2022).

Overcrowded living conditions and poor sanitation can contribute to the rapid spread of scabies. When several people live in proximity, sharing bedding, furniture and personal belongings, the risk of scabies transmission increases significantly. In addition, inadequate access to clean water and sanitation facilities can hinder proper hygiene practices, making it difficult to control scabies outbreaks in such environments (Tresnasari *et al.*, 2019). A study conducted by researchers at the University of New South Wales in Australia examined the relationship between home environmental hygiene and the incidence of scabies in remote Aboriginal communities. The study found that overcrowding and poor sanitation were significant risk factors for scabies infestation. The researchers highlighted the importance of improving housing conditions and promoting hygiene practices in preventing scabies outbreaks in these communities (Ali, Foster and Hall, 2018).

Implementing effective environmental cleaning interventions can significantly reduce the transmission of scabies. In healthcare settings, where scabies outbreaks can occur, strict adherence to infection control measures, including regular cleaning and disinfection of surfaces, can help prevent the spread of scabies among patients and healthcare workers (Husna, Joko and Selatan, 2021). A study published in the Journal of Hospital Infection evaluated the impact of environmental cleaning programs on the transmission of

scabies in hospital settings. The study showed that the implementation of improved cleaning protocols, including the use of disinfectants and proper cleaning techniques, resulted in a significant reduction in scabies cases (Lee *et al.*, 2019).

Maintaining a clean home environment is essential in preventing the transmission of scabies. Overcrowding, poor sanitation, and socioeconomic factors can contribute to the spread of scabies (Ihtiaringtyas, Mulyaningsih and Umniyati, 2019). Implementing effective cleaning practices, improving housing conditions, and promoting hygiene education are important strategies in reducing the incidence rate of scabies (Khairani, 2017). In addition, targeted interventions and support systems are needed to address the specific challenges faced by disadvantaged communities (ALBERFKANI and MERO, 2020). By prioritizing the cleanliness of the home environment and implementing comprehensive prevention measures, we can make significant progress in controlling and minimizing the impact of scabies (Anggreni and Indira, 2019).

Several research studies have been conducted that correspond to this study to investigate the relationship between sharing personal items and the transmission of scabies. These studies have provided valuable insights into the importance of this mode of transmission. In a study published in the British Journal of Dermatology, researchers examined the role of shared personal items in outbreaks of scabies within households. The study involved 100 households where at least one member had been diagnosed with scabies. The researchers found that sharing personal items such as clothing, towels, and bedding significantly increased the risk of scabies transmission within the household. They concluded that sharing personal items is important in spreading scabies, especially in close-knit communities or dense living conditions (Cox *et al.*, 2021).

Another study published in the Journal of Epidemiology and Infection focused on scabies outbreaks in healthcare settings. The researchers investigated the impact of sharing personal items, including stethoscopes, blood pressure cuffs, and thermometers, on the transmission of scabies among healthcare workers and patients. The study found that healthcare workers who shared personal items were more likely to contract scabies compared to those who did not share items. In addition, patients who shared personal items were also at higher risk of developing scabies. This study highlights the importance of proper hygiene practices and the need to discourage the sharing of personal items in healthcare settings to prevent scabies outbreaks (Mounsey *et al.*, 2016).

A study published in the Journal of the American Board of Family Medicine examined the relationship between scabies and sharing personal items in community settings. The researchers conducted a survey among a large sample of individuals, collecting information on their personal hygiene practices and scabies history. The study revealed a positive correlation between sharing personal items and the incidence of scabies. Individuals who reported sharing items such as clothing, towels and bedding had a

higher likelihood of developing scabies. The researchers emphasized the importance of personal hygiene and recommended avoiding sharing personal items to reduce the risk of scabies transmission. The study results discussed above have important implications for public health and prevention strategies. They highlight the need for increased awareness about the risks associated with sharing personal items and the role it plays in the transmission of scabies (Anderson and Strowd, 2017).

One common preventive measure that is often recommended is frequent bathing. Bathing is believed to help remove scabies mites from the skin surface and reduce the risk of transmission. However, the effectiveness of this practice in preventing scabies incidence has been a topic of debate among health professionals. Several research studies have been conducted to understand the relationship between bathing practices and the incidence of scabies. One such study published in the World Journal of Biology Pharmacy and Health Sciences examined the bathing habits of individuals living in scabies-endemic areas. The study found that individuals who bathed at least once a day had a significantly lower incidence of scabies compared to those who bathed less frequently. This suggests that regular bathing may play a role in preventing scabies attacks (Emeka *et al.*, 2021).

Another study conducted in a school setting investigated the impact of daily bathing on the transmission of scabies among children. The researchers divided the participants into two groups: one group practiced daily bathing, while the other group maintained their usual bathing routine. The study revealed that the group that practiced daily bathing had a significantly lower incidence of scabies compared to the control group. This supports the notion that regular bathing can be an effective preventive measure against scabies (Ugbomoiko *et al.*, 2018).

However, it is important to note that bathing alone may not be enough to completely prevent a scabies infestation. Scabies mites can survive a short period of time away from the human body, and they can easily spread through close physical contact or sharing contaminated items such as clothing or bedding (Nisa and Rahmalia, 2019). Therefore, other preventive measures such as avoiding close contact with infected individuals and practicing good hygiene, including frequent washing of clothes and bedding, are equally important in controlling the spread of scabies (Novitasari and Ferizqo, 2021).

Bathing practices, especially regular bathing, have been shown to have a positive impact in reducing the incidence of scabies. However, this should be considered one component of a comprehensive approach to scabies prevention. Other measures, such as avoiding close contact with infected people and practicing good hygiene, are equally important (Ariningtyas, 2019). It is also important to balance good hygiene practices and preserving the skin's natural barrier. By adopting a multi-faceted approach, individuals can significantly reduce their risk of scabies attacks and improve overall skin health (Triana and Razi, 2020).

CONCLUSION

Preventive behaviors are essential in controlling the spread of scabies. Good hygiene practices, such as regular hand washing and avoiding sharing personal items, are important in preventing transmission. Knowledge and awareness about scabies transmission are also important in promoting preventive behaviors. Education campaigns and informed healthcare providers can help disseminate this knowledge.

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Potential for Rehabilitation Management Utilizing A Theory of Planned Behavior Approach Via Telehealth in Home Treatment-Based Diabetes Management: A Literature Review

Fahmi Wildana[1], Lutfian[2], Aufa Azizah[3], Essarani Oktaviana[4]

[1,3,4]*Faculty of Nursing, Universitas Jember, Jember, Indonesia*
[2]*Faculty of Medicine, Nursing and Health Science, Monash University, Melbourne, Australia*

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CORRESPONDENCE

E-mail: fahmiwildana12@gmai.com

A B S T R A C T

Diabetes Mellitus is a metabolic disorder characterized by insufficient insulin production or ineffective utilization of insulin, resulting in elevated blood glucose levels. The prevalence of Diabetes Mellitus continues to rise annually, highlighting the urgent issue of inadequate blood sugar control among diabetic patients. Ineffective management of blood glucose levels poses significant risks for complications and adversely affects the quality of life of individuals with diabetes. This article employs a literature review methodology to explore the potential of rehabilitation management for diabetic patients. A comprehensive literature search was conducted across various databases, including Google Scholar, Science Direct, PubMed, and ProQuest. The search utilized keywords such as "Diabetes Mellitus," "Theory of Planned Behavior," "Rehabilitation of Diabetic Patients," and "Telehealth." The inclusion criteria encompassed publications in both Indonesian and English languages from 2016 to 2021. Eligible publications were identified and analyzed using the PRISMA method for synthesis. Rehabilitation interventions for diabetic patients focus on utilizing resources available within the home environment. These interventions have demonstrated a significant impact on various aspects of lifestyle, including physical activity, medication adherence, health education, and psychological support. Furthermore, telehealth has emerged as an effective medium for delivering remote health interventions, facilitating improved patient engagement and outcomes. In the context of the Social 5.0 era, telehealth presents a promising alternative for home-based rehabilitation of diabetic patients. By leveraging patient resources, telehealth can enhance the effectiveness of diabetes rehabilitation care and improve overall health outcomes for individuals living with diabetes.

INTRODUCTION

Diabetes is a chronic illness defined by either insufficient insulin production by the pancreas or inefficient insulin uses by the body (International Diabetes Federation [IDF], 2020). Diabetes is a chronic illness that needs lifetime care and significantly reduces an individual's productivity at work (Syatriani, 2023). Diabetes patients often experience a range of health issues, including discomfort, anxiety, sadness, sleep difficulties, low energy, and limited mobility, all of which lower their overall quality of life. Maintaining appropriate blood sugar levels is a crucial problem that requires attention from healthcare providers, patients, and their families.

Even after their blood sugar levels return to normal, diabetics still struggle with several health issues. Anxiety and sadness are common psychological problems that may prevent patients from maintaining appropriate blood sugar levels. Furthermore, several studies show that individuals with diabetes often lose a large amount of weight (Syamsiyah, 2022). In line with the aims of Sustainable Development Goal

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(SDG) 3, successful blood sugar control and rehabilitation need ongoing monitoring and assistance from healthcare experts.

Diabetes mellitus has become a major global health concern due to its rising incidence in Indonesia as well as other countries. Globally, 537 million people (9.3% of the population) had diabetes in 2021; by 2030, that number is expected to rise to 575 million (10.2%) and 700 million (10.9%) by 2045 (IDF, 2023). 6.7 million fatalities worldwide were attributed to diabetes in the same year. Unbelievably, Indonesia has the seventh-highest number of diabetes patients worldwide in 2015; by 2040, it is predicted to move up to sixth position (Laili, 2022). The Indonesian government must give diabetes a high priority considering these figures.

Numerous health apps have been created in response to the rising incidence of diabetes to help individuals manage their disease. In addition, we are moving from the Fourth Industrial Revolution to the Society 5.0 age, which is defined by an increased emphasis on digital technology (Sudipa et al., 2023). Many diabetic programs already in use, however, have drawbacks. For example, Diabetes Checker does not have a particular theoretical foundation or interaction with healthcare services; instead, it focuses mainly on diabetes monitoring. Similarly, Track3-Diabetes Planner is a diabetes patient's companion app but is not integrated with other healthcare services. Considering these drawbacks, this research aims to assess the efficacy of telehealth treatments based on the Theory of Planned Behaviour.

METHOD

The method for writing this article is employing a literature review appropriate to the topic used as a reference for discussion. The literature used is articles obtained from electronic media using the keywords Diabetes mellitus, Rehabilitation of Diabetic Patients, Telehealth, and articles obtained through search sites such as Google Scholar, Science Direct, and NCBI. As well as books relevant to the topic.

Eligibility Criteria

The criteria used in the search were Indonesian and English, with publications from 2018 to 2023 for journals and textbooks from 2013 to 2023. The literature collected according to the criteria will be analyzed and synthesized by categorizing it into problem analysis and potential problem solutions until ideas emerge based on scientific evidence and supported by previous research. The PICO method was used to determine the articles to be analyzed.

Tabel 1. PICO

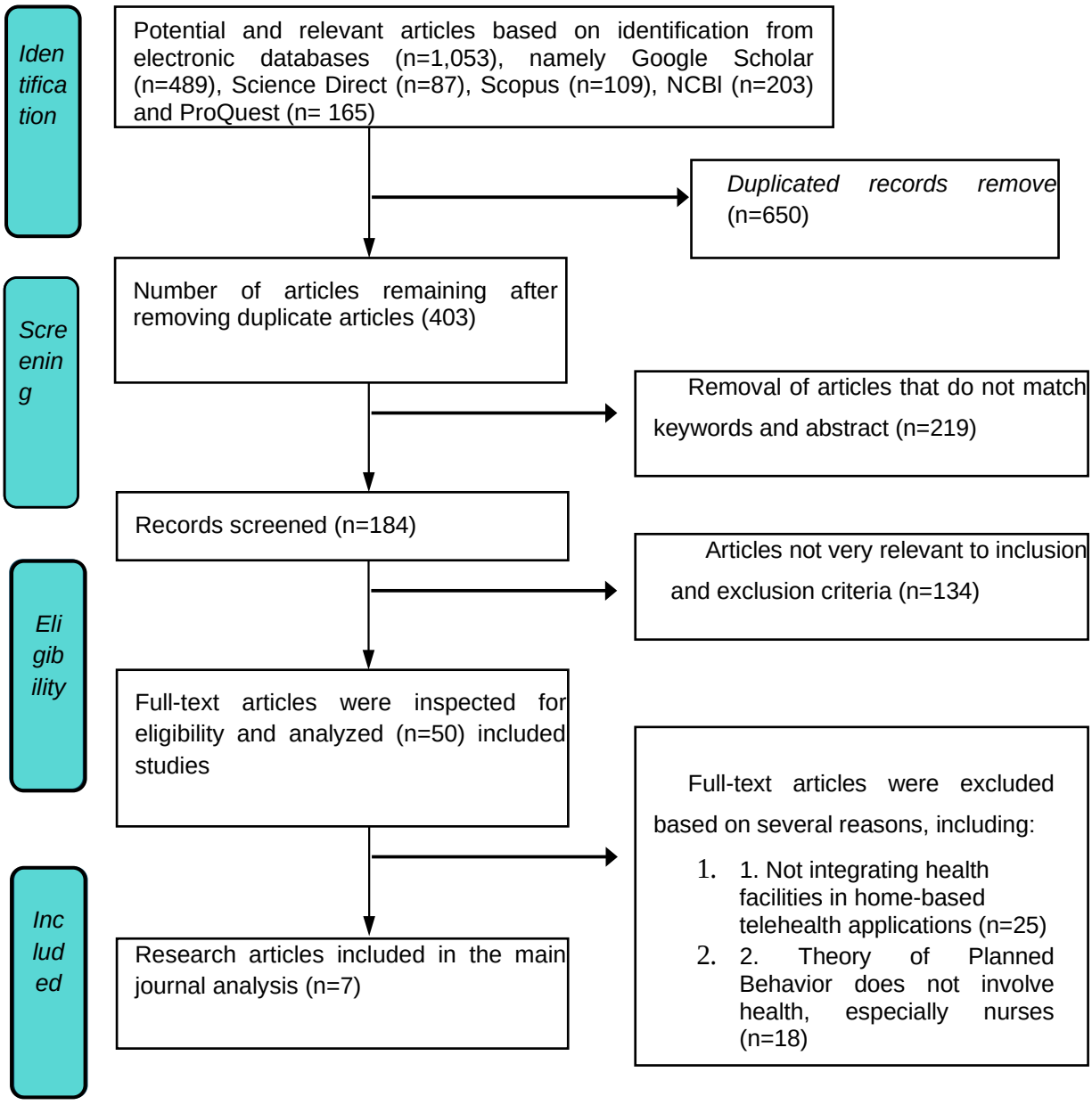
Analysis	Contents
Problem/Population	Manajemen kadar gula darah penderita diabetes dan rehablitasi
Intervention	Theory of Planned Behavior (TPB)
Comparison	Telehealth, Mhealth, Telenursing
Outcome	Membantu dalam manajemen gula darah dan rehabilitasi penderita diabetes di rumah

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Data Selection

Potential and relevant articles based on identification of electronic databases (n=1,053) were Google Scholar (n=589), Science Direct (n=92), Scopus (n=104), NCBl (n=103) and ProQuest (n= 165). Duplicate data were removed (n=650). Articles that did not match the keywords and abstract were removed (n=219). Articles that were less relevant to the inclusion and exclusion criteria (n=134). Full-text articles were checked for eligibility and analyzed (n=50). Full-text articles were excluded for several reasons, including 1) Not relevant to diabetes problems (n=36), and 2) Theory of Planned Behavior is not (n=8). Research articles included in the primary analysis of journals (n=6). Using the PRISMA diagram, there are 6 articles analyzed in Table 2 Article Analysis.

Figure 1. PRISMA Diagram



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RESULT

Table 2. Analysis Journal

Author & Year	Title	Country	Respondents	Method	Result
Zeidi et al (2020)	A theory of planned behavior-enhanced intervention to promote health literacy and self-care behaviors of type 2 diabetic patients	Iran	166 respondents	Randomized Controlled Trial	The application of TPB-based education is recommended to maintain and improve self-care behavior and health literacy in patients with type 2 diabetes and other chronic diseases.
Hosseini et al (2021)	The effect of educational program based on theory of planned behavior on promoting retinopathy preventive behaviors in patients with type 2 diabetes: RCT	Iran	94 respondents	Randomized Controlled Trial	The application of the TPB model has proven to be very effective in developing educational programs for diabetes patients, to control their blood sugar and improve retinopathy prevention behavior.
Sakitri & Astuti, (2020)	Strategi Kontrol Gula Darah dengan Theory of Planned Behaviour pada pasien Diabetes Mellitus tipe 2 di Puskesmas Stabelan	Indonesia	73 respondents	Quasy Eksperimen	There are differences in changes in blood sugar levels before and after intervention with the Theory of Planned Behavior through lifestyle modification by adjusting food, physical exercise or physical activity training, changes in risk behavior for smoking and alcohol consumption and DM patients need assistance.
Hsu et al (2023)	Applying the theory of planned behavior to investigate type 2 diabetes patients' intention to receive injection therapy	China	254 respondents	Cross Sectional	Attitude and PBC towards injection therapy have a positive and significant effect on the patient's intention to use injection therapy.
wahyu Lestarina (2018)	Theory of Planned Behavior sebagai Upaya Peningkatan Kepatuhan pada Klien Diabetes Melitus	Indonesia	100 respondents	Cross Sectional	The implementation of TPB-based education has an influence on compliance with a t-statistic value of 7.80 and Compliance has an influence on blood sugar levels with a t-statistic value of 4.592
Yang et al (2020)	Effect of a Mobile Phone-Based Glucose-Monitoring and Feedback System for Type 2 Diabetes Management in Multiple Primary Care Clinic Settings: Cluster Randomized Controlled Trial	Korea Selatan	247 respondents	Randomized Controlled Trial	Mobile-based glucose monitoring and feedback systems are effective, and they can be utilized effectively with a variety of institutions and patients.
Myers et al (2021)	Telemedicine for Disparity Patients With Diabetes: The Feasibility of Utilizing Telehealth in the Management of Uncontrolled Type 2 Diabetes in Black and Hispanic Disparity Patients; A Pilot Study	Amerika	30 respondents	Randomized Controlled Trial	Enhancing care as usual with telehealth delivered via telephone or tablet may be beneficial in improving glycemic control in NHB and H/L with type 2 diabetes.

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Development Trends of Diabetes and Technology

In the current era of globalization, technological development is growing the faster we enter the era of society 5.0, this can become opportunities to develop internet connectivity and applications according to needs public health This is supported by the growth of internet users in Indonesia it increased to 171.17 million, which is the number Internet users amount to 64.8% of the total population of Indonesia (Mudawamah, 2020). Based on the percentage of the population who use internet based on age 19-34 is 74.23% and at age 35-54 years is 44.06%. Percentage of internet users by level the economic level in the lower social class is 58.55% and in the middle class 82.95%. In terms of application, internet use in the health sector, 51.06% of people search for health information on the internet, and 14.05% use the internet to consult a health professional. This figure may increase over time the passage of time, considering the sophistication of today's digital era (Association Indonesian Internet Service Provider, 2017).

DISCUSSION

1. The Effectiveness of Telehealth Utilization in Minimizing Stunting Rates

Recent technological developments have had a big influence on many industries, including healthcare. Healthcare services are now more effective and efficient due to these advancements. Technology is advancing faster in the contemporary globalized period, signaling the shift to Society 5.0. This development offers a special chance to provide internet access and apps suited to public health requirements. This trend is further supported by the increasing number of internet users in Indonesia, which reached 171.17 million in 2020, accounting for 64.8% of the country's total population (Palinggi & Limbongan). Diabetes management and preventive concerns may be successfully addressed by using this vast digital ecosystem.

2. Rehabilitation Management for Diabetes Mellitus Patients Based on Home Care

For individuals with diabetes mellitus, home-based care rehabilitation is essential for maximizing metabolic control, enhancing the quality of life, and averting both acute and long-term problems. Normalizing insulin activity and maintaining steady blood glucose levels are the major objectives. An emphasis on the patient's objectives and behaviors is necessary for effective rehabilitation. One essential element is nutritional management, which controls and limits the amount of carbohydrates consumed to avoid overtaxing the body's systems for controlling blood sugar. This entails planning meals, choosing the right foods, and figuring out how many calories you need (Alfi et al., 2019). Patients have a far better chance of effectively treating their diabetes when they practice proper dietary management. Appropriate serving sizes, consistent meal schedules, and thoughtful food category selection are essential components of a diabetic diet (Hestiana, 2017).

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Furthermore, it is critical to motivate patients to participate in physical activities like exercise by assisting in creating exercise regimens, scheduling workouts, and encouraging them to establish enduring commitments. Exercise increases the muscles' ability to absorb glucose, which lowers blood sugar levels. Moreover, family members and close relatives must actively participate in home-based care rehabilitation by monitoring and supervising the patients' everyday activities. The effective treatment of diabetes requires this kind of group assistance.

3. The Potential of Telehealth in Diabetes Mellitus Rehabilitation

Research conducted by Alromaihi et al (2020) states that around 1351 (86.5%) patients have used telemedicine methods to receive diabetes mellitus treatment services. This indicates great potential for telehealth innovation demonstrated in self-care for diabetes mellitus patients. The potential use of telehealth in rehabilitating diabetes mellitus patients has positive impacts according to Warsito (2018), including increased patient knowledge showing that the level of patient knowledge about self-management of diabetes in the community environment increased by 80%, improvement in patient's ability to cope with problems indicating that type 2 diabetes mellitus patients who engage in self-management are able to proactively improve their abilities, and changes in patient behavior indicating that many patients engaging in self-management are able to change their healthy lifestyle behaviors such as exercising, relaxing, etc.

The planned behavior theory implementation with telehealth concepts is highly suitable as an extension of hospitals aimed at diabetes patients as a home-based rehabilitation program that collaborates with various health fields in its implementation process. The features in this application focus on rehabilitating diabetes patients by increasing compliance with blood sugar control using the Theory of Planned Behavior approach where the components of the Theory of Planned Behavior will be implemented in the features of this application. This application will help diabetes patients improve their quality of life. Interventions developed in this application may include client data assessment for 1 month which will be submitted to the related hospital for evaluation and comparison with the previous month. The following are the components of home-based diabetes rehabilitation:

1) Diabetes Education, Family Empowerment, Goal Planning

Diabetes patients in their efforts to improve their quality of life are supported by good levels of knowledge, support, and good life planning. With interventions in these three aspects, the goal of TPB as a theory focusing on changing the behavior of diabetes patients from maladaptive behavior to adaptive behavior will be achieved. Education will increase literacy, where application users will understand the negative impact of not maintaining normal blood sugar levels and the positive impact of maintaining blood sugar levels. This aligns with the Behavioral Belief component of the Theory of Planned Behavior.

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Continuous support from loved ones can take the form of conversations, voices, and even videos with the hope that this support will serve as a reminder that they need to move forward, where this intervention is the implementation of Normative Belief. After receiving support, the last thing to do is to plan steps and future goals. In the telehealth concept, visitors can write their life plans that they want to achieve later. in line with the Control Belief component of the Theory of Planned Behavior.

2) Consultation and Learning from Other Patients' Experiences

Diabetes patients need to have access to reliable information, and it's better if obtained directly from healthcare providers. Additionally, the learning process emphasizing experience, according to several studies, is very effective both physically and psychologically. So, the combination of these two types of interventions will greatly assist in the rehabilitation process of diabetes patients.

3) Exercise, Healthy Eating, and Blood Sugar Management

This intervention presents several types of exercises suitable for Diabetes Mellitus patients. Then patients can choose the type of exercise they want to do, equipped with a timer suitable for the condition of Diabetes Mellitus patients. This is followed by the Healthy Eating intervention, the second which focuses on managing the food and beverage intake that will be consumed by Diabetes Mellitus patients. In this intervention, a bar menu is provided, namely breakfast, lunch, dinner, and snacks. Patients will manage their own food and drink consumption by considering sugar content through this feature. Furthermore, the third intervention is Blood Sugar Management, in this feature there is a score that will be given to patients regarding the blood sugar value on the examination day, then blood sugar development will be automatically recorded in the application as progress data. In conducting this therapy, the goal is to increase patient independence and compliance in the rehabilitation of their Diabetes Mellitus condition.

4. Implementation of Application Program as an Effort for the Digitalization of FCEM

The implementation of this application program is carried out using the Multimedia Development Life Cycle (MDLC) method, which begins with the concept stage, involving formulating the foundation of the project, its objectives, and the type of application to be developed. Subsequently, the design phase encompasses specifying the program's architecture, style, display, and material requirements. The third stage involves obtaining content material, where the collection of necessary materials or content for the application is conducted. The fourth stage, assembly, represents the production phase and requires IT expertise. After the production phase, the testing stage is conducted by applying the application on a minor scale to assess its feasibility before mass implementation. The final stage, distribution, involves disseminating the results to the target audience after confirming the application's suitability for mass implementation.

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CONCLUSION

The evaluation of low compliance among diabetes patients in managing their blood sugar levels indicates the need to enhance their functional capacity and rehabilitation by applying the Theory of Planned Behavior (TPB) approach. Integrating telehealth with the TPB framework offers various intervention strategies aimed at improving the rehabilitation management of diabetes patients. This approach emphasizes the importance of addressing physical, psychological, and social functions, ultimately striving to restore physical and psychological capabilities to their highest level of independent functioning. The combination of telehealth and the TPB approach has proven successful in minimizing various challenges faced by patients, including reducing time commitments, transportation needs, costs, and potential health risks associated with traditional in-person healthcare visits. This innovative model not only facilitates better health outcomes but also promotes a more accessible and sustainable method of diabetes management.

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Analysis of Hematological Examination Results in Pulmonary Tuberculosis (TB) Patients Undergoing Intensive Phase Anti-Tuberculosis Drug Therapy

Asbar Tanjung[1]

[1]*Medical Laboratory Department STIKes Prima Indonesia, Bekasi, Indonesia*

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CORRESPONDENCE

E-mail: asbartanjung@gmail.com

A B S T R A C T

The intensive phase of anti-tuberculosis (TB) drug therapy consists of a combination of antibiotics, including Isoniazid (INH), Rifampicin (RIF), Pyrazinamide (PZA), and Ethambutol (EMB). The primary goal of this therapy is to inhibit the growth and spread of Mycobacterium tuberculosis, preventing its migration from the lungs to other organs. However, intensive-phase therapy may result in both major and minor side effects. This study aims to analyze the hematological profiles of pulmonary TB patients undergoing intensive-phase anti-tuberculosis treatment. The respondents were pulmonary TB patients recruited from primary healthcare centers within the East Bekasi District, Bekasi City. Those who met the sample criteria underwent hematological examinations, including hemoglobin (Hb), hematocrit (HCT), red blood cell count, white blood cell count, and platelet count. The tests were conducted using the electrical impedance method with a hematology analyzer. The hematological examination revealed a trend of low hemoglobin levels, with the average Hb recorded at 11.98 ± 8.65 g/dL. Additionally, abnormal blood parameters were observed, with 33.3% of patients experiencing erythropenia, 57% showing thrombocytopenia, 33% presenting leukopenia, and 20% exhibiting leukocytosis. These findings confirm that intensive-phase anti-tuberculosis therapy affects the hematological profiles of pulmonary TB patients, highlighting the need for close monitoring during treatment.

INTRODUCTION

Tuberculosis (TB) is one of the serious global health problems. Southeast Asia contributes 39% of the total global TB incidents. An estimated 3.4 million new cases of TB occur in Southeast Asia every year, with the majority occurring in India, Bangladesh, Indonesia, Myanmar, and Thailand. TB is caused by the bacterial infection of Mycobacterium tuberculosis (M. TB) and mainly affects the lungs, known as pulmonary TB. Besides lung involvement, M. TB is reported to attack extrapulmonary organs (extrapulmonary TB), including the pleura, lymph nodes, abdomen, urinary tract, skin, joints, bones, and even the meninges (Khan et al., 2019; Rodriguez-Takeuchi et al., 2019).

TB management in Indonesia is conducted comprehensively involving the government from the central to regional levels with 6 main strategies: strengthening commitment and leadership of stakeholders, increasing access to services, optimizing promotion, prevention and infection control, utilizing research findings (screening technology, diagnosis, and management), enhancing the role of communities, partners, and other multisectoral entities, as well as strengthening program systems and management with the ultimate goal of achieving the TB elimination target by 2030 (Kemenkes RI, 2020).

The treatment of pulmonary TB consists of two phases, namely the intensive phase and the continuation phase. The therapy target in the intensive phase of treatment is to halt the growth and invasion of bacteria

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in the patient's body, primarily suppressing the invasion of Mycobacterium tuberculosis into extrapulmonary organs. The intensive phase comprises a 2-month treatment with a combination of antibiotics: isoniazid (INH), rifampicin (RIF), pyrazinamide (PZA), and ethambutol (EMB). Whereas in the continuation phase, a combination of isoniazid and rifampicin is administered for 4 months. The dosage of the treatment should follow the recommendations of the WHO (Kemenkes RI, 2018; Burhan et al., 2020; Sotgiu et al., 2015).

Intensive Phase Anti-Tuberculosis Drug Therapy (OAT) consists of a combination of antibiotics Isoniazid, Rifampicin, Pyrazinamide, and Ethambutol. The combination of antibiotics (isoniazid, rifampicin, pyrazinamide, and ethambutol) in intensive phase TB treatment has different pharmacological effects, but overall aims to inhibit the growth and spread of Mycobacterium tuberculosis, including inhibiting its migration from the lungs to other organs (extrapulmonary) (Pratama et al., 2021; Wallis et al., 2021). According to the Indonesian Ministry of Health's 2020 tuberculosis management guidelines, the use of OAT can cause side effects, both major and minor. In minor side effects, OAT treatment should continue with appropriate symptomatic therapy. However, if the patient experiences severe major side effects, OAT treatment should be discontinued, and the patient should preferably be referred to further healthcare facilities for appropriate management (Burhan et al., 2020).

Hematological examination (Hemoglobin, Hematocrit, Erythrocytes, Leukocytes, and Platelets) is a routine laboratory test performed at various levels of healthcare facilities, including primary healthcare facilities such as community health centers and primary clinics (Balepur & Schlossberg, 2017). Hematological examination plays an important role in monitoring and prognosis of a disease (Jamwal et al., 2020).

This study aimed to analyze the results of hematological examination (Hemoglobin, Hematocrit, Erythrocytes, Leukocytes, and Platelets) in TB patients undergoing intensive phase OAT treatment with the hope that this research can contribute to more effective monitoring and management of pulmonary TB patients, especially during the intensive phase.

METHOD

This research was conducted using a descriptive-analytic design with a cross-sectional approach. The population of this study was pulmonary TB patients in East Bekasi District, Bekasi City, West Java, Indonesia. Respondents were recruited from primary health centers in the working area of East Bekasi District, Bekasi City, Indonesia. Thirty respondents who met the research criteria underwent blood draw using an open system with a syringe and collected into vacuum tubes with EDTA anticoagulant, blood specimens underwent hematological examinations, including hemoglobin (Hb), hematocrit (HT),

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erythrocyte count, leukocyte count, and platelet count, conducted with the electrical impedance method using a hematology analyzer. Hematological parameters were interpreted based on normal values: Hb: 12-15 g/dL, HT: 13-17 g/dL, Erythrocytes: 3.80 - 5.20 x 10^6/µl, MCV=80-100 fL, Leukocytes: 3.5 - 10.5 x 10^3/µl, Platelets: 1.5 x 10^5 - 4.5 x 10^5/µl(Lasocki et al., 2020). The data were analyzed descriptively using the statistical analysis software SPSS version 25.

RESULT

Respondent characteristics

Respondent characteristics including age and gender obtained from medical record summarized in table 1

Table 1 Respondent Characteristics

Respondent characteristics	n (%)	Rerata±(SD)	Median (Min - Max)
Age (Years)	30	33,37 ±8,64	33,37 (21 – 45)
Gender			
Male	22 (73,3 %)	-	-
Female	8 (26,7 %)	-	-

Table 1 shows of 30 respondents consisting of 22 respondents (73.3%) men and 8 respondents (26.7%) women. Respondents' ages were in the range of 21 – 45 years, where 8 respondents (26.7%) were teenagers, 18 respondents (60%) were adults, and 4 respondents (13.3%) were elderly.

Hematological Examinations

Hematological examination including Hb, HT, erythrocyte count, leukocyte count, and platelet count using a hematology analyzer presented in table 2

Table 2. Mean, standard deviation (SD), median, & Min-Max of hematological examinations

Hematological Examinations	n	Mean ±(SD)	Median (Min - Max)
Hb (gr/dL)	30	11,98 ±8,65	11,07 (9,30 - 16,53)
RBC (10^6/µl)	30	3,94 ±0,74	3,63 (3,00 - 5,51)
HT (%)	30	36,79 ±6,01	35,72 (22,20 - 48,09)
MCV (fL)	30	93,23 ±8,19	97,85 (72,29 – 99,67)
MCH (pg)	30	30,00 ±0,00	30,00 (30,00 -30,00)
MCHC (%)	30	32,22 ±2,67	30,65 (30,09 - 37,84)
WBC (10^3/µl)	30	5,77 ±3,43	3,70 (3,05 – 12,05)
PLT (10^5/µl)	30	1,76 ±0,83	1,31 (1,00 – 3,58)

The mean, standard deviation (SD), median, and Min-Max of each hematological parameter in 30 respondents indicate a low trend in Hb, with a mean Hb of 11.98 ± 8.65 g/dL (Normal Hb values: female: 12-15 g/dL, male: 13-17 g/dL). The mean erythrocyte count is within the normal range; 3.94 ± 0.74 x 10^6/µl (Normal erythrocyte values: 3.80 - 5.20 x 10^6/µl). The mean hematocrit (HT) and erythrocyte indices (MCV, MCH, MCHC) are within the normal range with mean values of HT 36.79 ± 6.01% (Normal HT value 13-17 g/dL), MCV 93.23 ± 8.19 fL (Normal MCV values 80-100 fL), MCH 30.00 ± 0.00 pg (Normal MCH values 28-34 pg), and MCHC 32.22 ± 2.67% (Normal MCHC values 32-36%).

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The mean leukocyte count is within the normal range: 5.77 ± 3.43 x 10^3/µl (Normal leukocyte values 3.5 - 10.5 x 10^3/µl), and the mean platelet count is within the normal range; 1.76 ± 0.83 x 10^5/µl (Normal platelet values 1.5 - 4.5 x 10^5/µl).

Erythrocyte, leukocyte and platelet cell count

Interpretative erythrocyte, leukocyte, and platelet cell count of 30 respondents included in this study present in figure 1

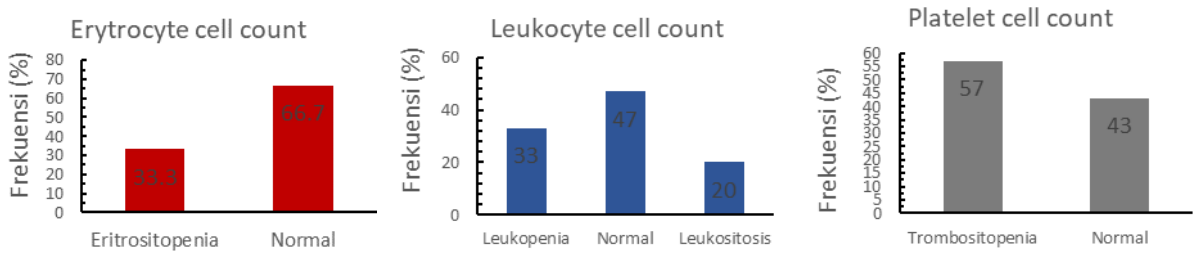


Figure 1 Abnormalities in the Number of Erythrocytes (a), Leukocytes (b), and Platelets (c)

Erythrocyte count (Figure 2a) shows that the proportion of normal erythrocyte count (3.80 - 5.20 x 10^6/µl) is more dominant (66.7%) compared to erythrocytopenia (erythrocytes < 3.80 x 10^6/µl), which is 33.3%. Leukocyte count (Figure 2b) shows that the proportion of normal leukocyte count (3.5 – 10.5 x 10^3/µl) is more dominant (47 %) compared to leukopenia (< 3.5 x 10^3/µl) which is 33 % and leukocytosis (>10.5 x 10^3/µl) which is 20 %. Platelet count (Figure 2c) shows that the proportion of thrombocytopenia (>1.5 x 10^5/µl) is more dominant at 57 % compared to normal (1.5 – 4.5 x 10^5/µl) which is 43 %, and no cases of thrombocytosis (>4.5 x 10^5/µl) were found.

Anemia

The proportion of anemia combined with non-anemia (normal) of 30 respondents included in this study and the type of anemia presented in figure 2

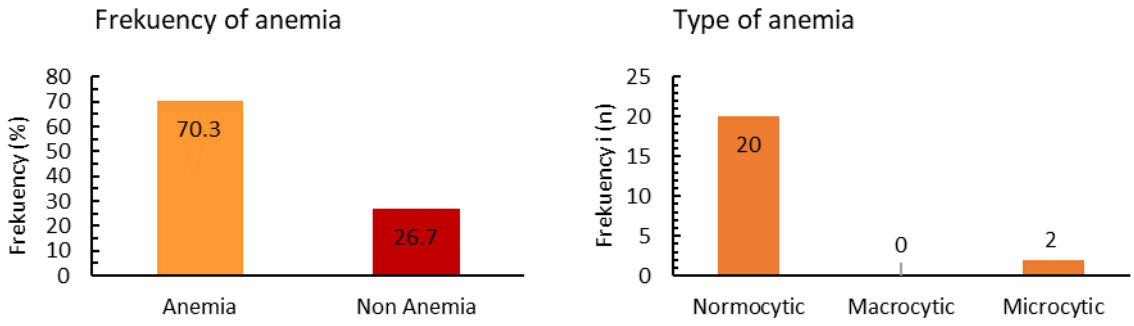


Figure 2 proportion of anemia and non-anemia (a) and type of anemia (b)

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Figure 2 shows the proportion of anemia (70.3%) compared to non-anemia (26.7%). Furthermore, most anemia cases are normocytic anemia (MCV=80-100 fL), with 20 respondents, while only 2 respondents have microcytic anemia (MCV<80 fL), and no cases of macrocytic anemia were found.

DISCUSSION

Tuberculosis (TB) remains a serious global health issue, with Southeast Asia contributing to 39% of the total global TB incidents. An estimated 3.4 million new cases of TB occur annually in Southeast Asia, with a majority concentrated in India, Bangladesh, Indonesia, Myanmar, and Thailand (1). This study analyzed hematological examination results in TB patients undergoing intensive phase OAT treatment in the East Bekasi District, covering 4 community health centers (Duren Jaya, Aren Jaya, Bekasi Jaya, and Karangkitri health centers). The study included 30 respondents, 73.8% male and 26.2% female.

Hematologic effect

Hematological disorders are common findings in TB patients undergoing OAT treatment phase I, clinically manifest as abnormalities in cell count, morphology, or substance of blood cells population. Hematological examination results reflect the hematopoiesis process in the bone marrow microenvironment and the interaction of cellular and plasma components in the periphery (Pinho & Frenette, 2019). The erythrocyte, leukocyte, and platelet counts (Figure 2) indicate that the proportion of normal erythrocyte count is greater at 66.7% compared to erythrocytopenia at 33.3%. The proportion of leukocyte count falls within the normal range at 47%, with 33% leukopenia and 20% leukocytosis. Thrombocyte count shows a predominance of thrombocytopenia at 57% compared to 43% normal counts, with no cases of thrombocytosis. Erythrocyte, leukocyte, and platelet counts are essential examinations in nearly all pathological conditions. In TB patients, hematological examination is crucial for monitoring prognosis and complications and providing clinical information on the effects of OAT therapy (Shah et al., 2022). Furthermore, OAT is known to have side effects such as thrombocytopenia, thrombocytosis, leukopenia, and leukocytosis (Balepur & Schlossberg, 2017). Intensive phase TB treatment involves the highest dose and duration of OAT exposure, combining INH, RIF, PZA, and EMB for 4 months allows for potential OAT side effects in patients; INH is reported to affect all hematopoiesis pathways, leading to erythrocyte abnormalities, thrombocytopenia, and neutropenia. RIF is known to cause megaloblastic anemia and thrombocytopenia. Thrombocytopenia due to RIF side effects is mediated by mechanisms involving decreased production and increased destruction of erythrocytes (Anemia Is a Strong Predictor of Wasting, Disease Severity, and Progression, in Clinical Tuberculosis (TB), 2022).

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Anemia

Anemia is defined as a condition characterized by low hemoglobin levels below normal value based on age and gender. It is a clinical manifestation of certain pathological conditions. Anemia can occur through various mechanisms depending on its etiology (Chaparro & Suchdev, 2019). Proportion and type of anemia (Figure 2) show a high proportion of anemia 70% compared to non-anemia at 30% with most of the anemia are normocytic anemia (MCV=80-100 fL), with 20 respondents, while only 2 respondents have microcytic anemia (MCV<80 fL), and no cases of macrocytic anemia were found. This study indicates that anemia is a common complication in TB, especially in patients undergoing intensive phase treatment. Additionally, 33.3% of respondents show a decrease in the number of erythrocytes, indicating inadequate hematopoiesis processes in producing erythrocytes or an acceleration of erythrocyte apoptosis (Zivot et al., 2018). This study demonstrates consistency with previous research conducted on 168 TB patients at the University of Gondar Hospital, Northwest Ethiopia, where hemoglobin, hematocrit, and platelet levels significantly decreased after patients completed the intensive phase of treatment compared to levels before starting treatment. Moreover, high Red Cell Distribution Width (RDW) and Platelet Distribution Width (PDW) during the second month of intensive phase treatment indicate variations in erythrocyte and platelet sizes (Kassa et al., 2016). Furthermore, this research aligns with a study conducted on 692 TB patients at the Pulmonary Disease Treatment Unit of West Kalimantan Province, Indonesia, where 76.4% of pulmonary TB patients experienced anemia. It was further reported that normocytic normochromic anemia is the most common type of anemia (Sadewo et al., 2016). A cohort study conducted by Dasaradhan et al (2022) indicates a strong correlation between anemia in tuberculosis (TB) and persistent inflammation. Furthermore, anemia from the early stages of infection to the development phase of Mycobacterium TB directly impacts treatment outcomes. This suggests that the condition of anemia serves as a significant predictor in the management of anemia therapy (Dasaradhan et al., 2022).

CONCLUSION

Hematological analysis of TB patients undergoing intensive treatment reveals that the most common complications and side effects are primarily linked to anemia, with normocytic normochromic anemia being the most frequently observed type. Additionally, thrombocytopenia is present in nearly half of the respondents, alongside cases of leukocytosis and leukopenia. Regular hematological examinations play a vital role in managing TB therapy by enabling early detection of treatment-related complications. These examinations provide essential clinical data that support informed decision-making, particularly in adjusting and optimizing therapeutic strategies for TB patients.

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The Influence of Physical Activity, Knowledge, and Diet on The Incidence of Degenerative Diseases in The Gymnastics Community

Effendi[1], *Budhi Setianto*[2,3], *Agus Aan Adriansyah*[3], *Difran Nobel Bistara*[4], *Susanti Susanti*[5]

[1]*Departement of Medicine, Faculty of Medicine, Universitas Nahdlatul Ulama Surabaya, Surabaya 60237, East Java, Indonesia*
[2]*Head of Planning, Development and Information Systems, Surabaya Islamic Hospital, Surabaya 60246, East Java, Indonesia*
[3]*Department of Public Health, Faculty of Health, Universitas Nahdlatul Ulama Surabaya, Surabaya 60237, East Java, Indonesia*
[4]*Departement of Nursing, Faculty of Nursing and Midwifery, Universitas Nahdlatul Ulama Surabaya, Surabaya 60237, East Java, Indonesia*
[5]*Department of Nursing, Sekolah Tinggi Ilmu Kesehatan Adi Husada, Surabaya, Indonesia*

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CORRESPONDENCE

E-mail: budhisetianto@yahoo.com

A B S T R A C T

According to statistics from the 2018 Basic Health Research, 65.7% of Indonesians suffer from degenerative illnesses, such as diabetes, high blood pressure, stroke, and joint disease. According to Ministry of Health data, the number of persons with diabetes would have increased to 6.2% (10.8 million) by 2020, and 236,710 diabetes-related fatalities were recorded in 2021. Data on risk variables and outcomes were gathered concurrently in this cross-sectional research, which uses a descriptive quantitative approach. Data for the research was gathered using Google Forms, and the study population consists of 62 senior citizens from RW 07, Wonokromo Village. The incidence of degenerative illnesses is the dependent variable, while physical activity, knowledge, food, and lifestyle are the independent factors. The Chi-Square test and cross-tabulation were used for analysis. The findings indicate that, albeit just once a week, most respondents participate in physical activities like gymnastics largely for their physical well-being. Most respondents stick to a set eating schedule even when they do not strictly follow a diet. The results suggest that although education, nutrition, and lifestyle do have a major impact on the occurrence of degenerative diseases, physical exercise alone does not.

INTRODUCTION

The general definition of degenerative disease is decreasing the function of the body's organs, which generally occurs in old age. However, there are times when it can occur at a young age; the result is a health decline, usually followed by disease. The most dangerous consequence of this disease is pain, and it is also costly, especially in old age, and can also end in death (Widiasari et al. 2021). Generally, before someone suffers or experiences a degenerative disease, some symptoms point to the disease but are often ignored. This collection of symptoms is known as metabolic syndrome. Metabolic syndrome can be defined as a condition where a person experiences high blood pressure, obesity, high blood sugar levels, and abnormal blood fat levels (Erik Kusuma, Ayu Dewi Nastiti, R.A Helda Puspitasari 2022).

The general definition of degenerative disease is decreasing the function of the body's organs, which generally occurs in old age. However, there are times when it can also occur at a young age (Sholikah, Febrinasari, and Pakha 2021), the result is a decline in health, usually followed by disease. The most dangerous consequence of this disease is pain, and it is also costly, especially in old age, and can also end in death. Generally, before someone suffers or experiences a degenerative disease, some symptoms point to the disease but are often ignored. This collection of symptoms is known as metabolic syndrome.

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Metabolic syndrome can be defined as a condition where a person experiences high blood pressure, obesity, high blood sugar levels, and abnormal blood fat levels (Khasanah et al. 2022).

The main risk factors for degenerative diseases are unhealthy eating patterns, lack of physical activity, cigarette consumption, increased stress, and exposure to causes of degenerative diseases (Widiasari et al. 2021). This change in lifestyle regarding food consumption is mainly triggered by an increase in economic income, high work activity, and the promotion of trendy Western foods, especially fast food, which is popular in America and Europe but is not balanced with nutritional knowledge and awareness. Eventually, the food culture changed to one high in saturated fat and sugar, low in fiber, and low in micronutrients (Pane, Fikri, and Ritonga 2018). Socio-economic changes and food tastes will result in changes in people's eating patterns which tend to move away from the concept of a balanced diet, thus having a negative impact on health and nutrition (Harmawati and Etriyanti 2019). A diet high in saturated fat and sugar, as well as low in fiber and low in micronutrients, will cause problems of obesity, excess nutrition, and increased free radicals, which ultimately result in changes in disease patterns from infections to non-infectious chronic diseases or the emergence of degenerative diseases (Indrahadi, Wardana, and Pierewan 2021).

According to 2018 Basic Health Research (Riskesdas) data, the prevalence of degenerative diseases in Indonesia reached 65.7%. The degenerative diseases in question include diabetes, hypertension, stroke, and joint disease. Data from the Indonesian Ministry of Health also shows that the prevalence of diabetes sufferers in Indonesia rose to 6.2% in 2020 or 10.8 million people. In 2021, the number of deaths caused by diabetes in Indonesia will reach 236.71 (Khasanah et al. 2022).

This change in lifestyle regarding food consumption is mainly triggered by an increase in economic income, high work activity, and the promotion of trendy Western foods, especially fast food, which is popular in America and Europe but is not balanced with nutritional knowledge and awareness. Eventually, the food culture changed to one high in saturated fat and sugar, low in fiber, and low in micronutrients (Nurullita et al. 2022). Socio-economic changes and food tastes will result in changes in people's eating patterns, which tend to move away from the concept of a balanced diet and have a negative impact on health and nutrition. A diet high in saturated fat and sugar, low in fiber, and low in micronutrients will cause problems of obesity, excess nutrition, and increased free radicals, which ultimately result in changes in disease patterns from infections to non-infectious chronic diseases or the emergence of degenerative diseases (Sholikah, Febrinasari, and Pakha 2021).

The study's objectives are to: (1) investigate the roles of physical activity, knowledge, dietary patterns, and lifestyle in the incidence of degenerative diseases; and (2) evaluate the association between these factors and the occurrence of degenerative diseases.

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METHOD

This type of research is descriptive quantitative using a cross-sectional design. Cross-sectional design is the implementation of data collection carried out simultaneously between risk factors and their impacts. The total population in this study is all elderly people in RW 07, Wonokromo Village, totaling 62 people. Data was collected using a Google form. The data in the research variable collection consists of the independent variables: physical activity, knowledge, diet, lifestyle, and dependent variables. The incidence rate of degenerative diseases was cross-tabulated, and the relationship test was calculated using Chi-Square.

RESULT

The following are the characteristics of the respondents

Table 1 Characteristics of Respondents

No	Characteristics	Frequency	Percentage
Gender			
1	Man	2	3.2%
2	Woman	60	96.8%
Age Range			
1	< 45 Years	20	32.3%
2	> 65 Years	5	8.1%
3	45 - 55 Years	25	40.3%
4	56 - 65 Years	12	19.4%
Profession			
1	Housewife	55	88.7%
2	Private	7	11.3%
The type of disease			
1	Diabetes	5	8.1%
2	Hypertension/High Blood	9	14.5%
3	Does not have a generative disease	48	77.4%
Total		62	100.0%

Physical activity is any body movement that results from the work of skeletal muscles and increases energy and energy expenditure. Generally, physical activity is divided into 3 categories based on the intensity and amount of calories used, namely light physical activity, moderate physical activity, and heavy physical activity (Silalahi 2019). Physical activity is an important thing the WHO (World Health Organization) recommends preventing non-communicable diseases such as coronary heart disease, diabetes, hypertension, stroke, and other non-communicable diseases. Some of the diseases that have been mentioned are often suffered by the elderly, including the physical activities carried out by the respondents (Salsabila and Sjaaf 2022).

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Table 2 Physical Activity of Respondents

No	Physical Activity	Frequency	Percentage
Exercise Frequency			
1	2 Times a Week	5	8.1%
2	Once a week	49	79.0%
3	Every day	7	11.3%
4	Not doing sports activities	1	1.6%
Type of Sport			
1	Walk	7	11.3%
2	Exercise	54	87.1%
3	Bicycle	1	1.6%
Sports Goals			
1	Lose weight	2	3.2%
2	To become healthy	60	96.8%
Total		62	100.0%

Table 2 shows that most respondents did physical activity once a week, with physical activity in gymnastics. Respondents have the most physical activity to be healthy. The following is the lifestyle of the respondents.

Table 3. Respondents' Lifestyles Related to Health Routines

No	Routinely carry out inspections	Frequency	Percentage
1	Sometimes	35	56.5%
2	Never	3	4.8%
3	Yes Routine	24	38.7%
Total		62	100.0%

Table 3 provides information that respondents carry out health checks occasionally. The following are the respondents' eating patterns.

Table 4. Respondents' eating patterns

No	Eating habit	No	Percentage	Yes	Percentage	Total
1	Currently on a diet	56	90%	6	10%	62
2	Scheduled meals	28	45%	34	55%	62
3	Food composition always varies	18	29%	44	71%	62

Table 4 shows that most respondents do not diet but only follow a scheduled eating pattern with food composition. The following are the incidence rates of degenerative diseases.

Table 5. Respondents' eating patterns

No	Degenerative disease incidence	Frequency	Percentage
1	No	49	71.0%
2	Yes	13	29.0%
	Total	62	100.0%

Table 5 provides information that most respondents do not have degenerative diseases. The following are the degenerative diseases suffered by respondents.

Table 6. Degenerative diseases suffered by respondents

No	The type of disease	Frequency	Percentage
1	Diabetes	5	8.1%
2	Hypertension/High Blood	9	14.5%
3	Does not have a generative disease	48	77.4%
Total		62	100.0%

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Table 6. The diseases suffered by respondents are hypertension and diabetes. The following is a cross-tabulation of physical activity on the incidence of degenerative diseases.

Table 7 Cross-tabulation of physical activity on the incidence of degenerative diseases

Physical_Activity	Degenerative Pain		Total	Exact Sig. (2-sided)
	Sick	Painless		
Good	1	11	12	0.159867
Not good	15	35	50	
Total	16	46	62	

Table 7 provides information that most respondents who did not engage in physical activity did not experience degenerative disease. SIG 2 tailed > 0.05 means there is no relationship between physical activity and the incidence of degenerative disease (Nurullita et al. 2022).

Table 8 Cross Tabulation of Dietary Patterns on the Occurrence of Degenerative Diseases

Dietary habit	Degenerative Pain		Total	Asymp. Sig. (2-sided)
	Sick	Painless		
Pretty good	0	2	2	
Good	12	39	51	0.0248
Not good	4	5	9	
Total	16	46	62	

Table 8 provides information that most respondents who have a diet do not experience degenerative diseases. sig 2 tailed < 0.05 means a relationship exists between a good diet and the incidence of no degenerative disease.

Table 9 Cross Tabulation of Dietary Patterns on the Occurrence of Degenerative Diseases

Lifestyle	Degenerative Pain		Total	Exact Sig. (2-sided)
	Sick	Painless		
Good	14	32	46	0.0199
No	2	14	16	
Total	16	46	62	

Table 9 provides information that most respondents who have a diet do not experience degenerative diseases. sig 2 tailed < 0.05 means a relationship exists between a good diet and the incidence of no degenerative disease.

Table 10 Cross Tabulation of Dietary Patterns on the Occurrence of Degenerative Diseases

Descendants	Degenerative Pain		Total	Exact Sig. (2-sided)
	Sick	Painless		
No	12	32	44	0.0472
Yes	4	14	18	
Total	16	46	62	

Table 10 provides information that most respondents who have a diet do not experience degenerative diseases. sig 2 tailed < 0.05 means a relationship exists between a good diet and the incidence of no degenerative disease.

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DISCUSSION

Physical activity Physical activity is any body movement that is caused by the work of skeletal muscles and increases energy and energy expenditure (Azrin and Suyanto 2020). Generally, physical activity is divided into 3 categories based on the intensity and number of calories used, namely light physical activity, moderate physical activity, and heavy physical activity. Physical activity is one of the important things recommended by the WHO (World Health Organization) to prevent non-communicable diseases such as coronary heart disease, diabetes, hypertension, stroke, and other diseases (Pane, Fikri, and Ritonga 2018).

In this study, it was illustrated that respondents carried out the most physical activity once a week; the activity they carried out was exercise, which aimed to maintain health. According to WHO, regular physical activity has been proven to help prevent and treat non-communicable diseases such as heart disease, stroke (Nurbidayah et al. 2024), diabetes, and various types of cancer. In addition, physical activity can also help prevent high blood pressure and maintain a healthy weight. Physical activity can also help to maintain and improve mental health, quality of life, and well-being (Hafsah et al. 2022).

Knowledge efforts to maintain the health of the elderly need to be made from the start. This aims to ensure that elderly people can continue to live healthy, quality, and productive lives with human dignity (Jamaluddin et al. 2022). The health of the elderly needs to be strived for by maintaining personal hygiene, consuming balanced nutrition, doing regular physical activity, having a social life, having opportunities to work, and having an environment that is friendly to the elderly. Physical and mental health are factors that need to be considered in the elderly. Someone who has entered old age must pay attention to healthy and balanced food intake. Apart from that, elderly people also need to do regular physical activity, such as walking or light exercise, to maintain a healthy heart, lungs, muscles, and bones (Amila, Sembiring, and Aryani 2021).

Eating Patterns Healthy eating patterns for elderly people may be different. This is because increasing age can cause a decrease in appetite, the body's ability to digest food, as well as health problems that affect the process of chewing and swallowing food (Shakespeare 2014). Lifestyle Healthy eating patterns for elderly people may be different. This is because increasing age can cause a decrease in appetite, the body's ability to digest food, as well as health problems that affect the process of chewing and swallowing food (Handa Muliasari, Candra Dwipayana Hamdin, Agus Dwi Ananto 2019).

CONCLUSION

The study concludes that participants' primary incentive is their physical health, and they participate in physical activity, primarily gymnastics, no more than once a week. Most responders have a set eating pattern but do not follow a particular diet. According to the data, the incidence of degenerative illnesses is

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not greatly impacted by physical exercise alone. However, the incidence of these illnesses is significantly influenced by lifestyle, food, and information.

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