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REMARKS

The June 2025 edition of Nursing Current: Jurnal Keperawatan features a varied compilation of research that illustrates the intricacies and profundity of nursing practice, education, and community involvement. These articles offer valuable insights into the self-concept and social interactions of nursing students, the management of chronic illness, and public health interventions, which can help create supportive nursing environments. Numerous studies, encompassing simulation-based education, mental health caregiving, and workplace harassment prevention, underscore the importance of prioritizing nurses' well-being across all environments.

This volume closely aligns with the global imperative: when we support nurses, all individuals benefit. Enhancing the health and resilience of nurses leads to improved patient outcomes, more robust healthcare systems, and higher workforce retention rates. Numerous articles presented here offer practical applications, including the integration of flexibility exercises to alleviate fatigue, the use of virtual reality to enhance clinical education, and the promotion of family empowerment frameworks to distribute caregiving duties. These studies underscore that cultivating a robust nursing workforce necessitates innovation, compassion, and systemic backing.

We encourage researchers, educators, and practitioners to participate in this ongoing discourse by submitting their manuscripts to Nursing Current (Jurnal Keperawatan). Your research, insights, and innovations are essential for the progression of the nursing profession in Indonesia and beyond. Let us collaborate to cultivate a robust and well-supported nursing workforce, as the prosperity of nurses directly correlates with the success of healthcare.

Dr. Grace Solely Houghty, M.B.A., M.Kep
Dean, Faculty of Nursing Universitas Pelita Harapan

FOREWORD

Praise God!

It is with great joy and gratitude that we present Volume 13 No. 1, 2025 of Nursing Current: Jurnal Keperawatan.

During our busy schedules, the editorial team remains committed to continuously improving the quality of our publications. This volume reflects the dedication and collaboration of our editors, reviewers, and administrative staff, whose efforts have strengthened the journal's publication process.

We are proud to announce that Nursing Current has achieved SINTA 3 accreditation, a significant milestone that affirms our growing impact in the field of nursing and health sciences. In line with this achievement, starting from this volume, the journal will be published in English, and presented with a new template and cover design to reflect our evolving identity.

To further enhance the journal's quality and reach, we are actively recruiting editors and reviewers from both domestic and international institutions. This initiative aims to foster a more diverse and globally engaged editorial team.

We are also grateful for the increasing number of manuscript submissions from colleagues, alumni, and researchers across Indonesia. Their contributions have enriched the journal with a wide variety of topics relevant to nursing and healthcare. We encourage all authors to respond promptly to reviewer feedback to ensure timely revisions and publication.

We extend our heartfelt thanks to all contributors and supporters of Nursing Current. May this volume serve as a valuable resource for advancing nursing knowledge and practice.

Warm regards,
Dr. Ni Gusti Ayu Eka
Editor-in-Chief

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Original Research

The Relationship between Self-Concept and Social Interaction among Nursing Students

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A R T I C L E I N F O

Keywords:
Interpersonal relations
Nursing students
Self-concept
Social behaviour

A B S T R A C T

Self-concept and social interaction are important factors in the development of nursing students' professional skills. A positive self-concept can enhance students' ability to engage in effective social interactions, which plays a vital role in building strong interpersonal relationships within academic and clinical practice environments. This study aimed to examine the relationship between self-concept and social interaction among nursing students at a private university in Tangerang. This study employed a quantitative correlational method with a cross-sectional approach**.** A total of, 302 nursing students from a private university in Western Indonesia were selected using a quota sampling technique**.** The instruments included the Tennessee Self-Concept Scale (TSCS) and the Social Interaction Psychology Scale, both of which were utilized in their validated Indonesian-language versions. Data analysis using Spearman's rank correlation was conducted to examine the relationship between self-concept and social interaction. The findings showed that most students had a moderate level of self-concept (64.9%) and social interaction (73.2%). Spearman's rank correlation analysis revealed a significant positive correlation of moderate strength between self-concept and social interaction among nursing students. This suggests that students with a better self-concept tend to demonstrate more effective social interaction. Therefore, educational institutions are encouraged to develop programs aimed at enhancing both self-concept and social interaction to support students' academic performance and professional development.

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INTRODUCTION

The nursing profession remains the backbone of healthcare systems globally, playing a pivotal role in delivering high-quality patient care, promoting health, and ensuring patient safety (International Council of Nurses, 2023). As the largest component of the global health workforce, nurses contribute significantly to the effectiveness and sustainability of healthcare services. Within this context, the development of a strong professional self-concept among nursing students is vital, as it shapes their future professional identity, clinical competence, and interpersonal effectiveness within healthcare teams. Establishing a positive self-concept during nursing education not only supports students' academic and clinical performance but also enhances their confidence, communication skills, and readiness to navigate complex healthcare environments (Konlan et al., 2024).

Professional self-concept refers to an individual's perception and evaluation of themselves within a professional context. It includes elements such as self-esteem, body image, emotional regulation, autonomy, decision-making abilities, and social interaction skills (Almeida et al., 2023)). A positive professional self-concept has been associated with increased confidence, better academic and clinical performance, effective communication, and greater resilience in facing workplace challenges (Farčić et al., 2020). Conversely, a negative self-concept may result in decreased motivation, impaired professional development, and difficulties in coping with stress and interpersonal conflicts (Alghtany et al., 2024; Goliroshan et al., 2021).

Research indicates that self-concept is primarily shaped by personal experiences, interactions with others, and the environmental factors. Individuals who adapt well to social and academic environments tend to develop a positive self-concept, while those who struggle to adjust may experience negative self-perceptions (Azpiazu et al., 2024). Recent studies have reported that 13.1% of nursing students had a low self-concept and 67.7% a moderate one, indicating that self-concept issues are relatively common (Suak et al., 2023). Similarly, more than half of nursing students were found to have low self-esteem, affecting their social interactions, stress management, and clinical readiness (Dreidi et al., 2024). Given that nursing students regularly interact with patients, clinical supervisors, and other healthcare professionals, building a positive self-concept early in their training is essential. Confidence, emotional regulation, and effective interpersonal skills are essential in fostering therapeutic communication and ensuring professional competence (Siallagan & Ginting, 2021). Furthermore, a well-formed self-concept contributes to improved social interaction, better teamwork, and enhanced leadership skills among nursing students (Masela, 2019).

A preliminary survey conducted in October 2023 involving interviews with 10 nursing students at a private university in Tangerang revealed concerns related to both self-concept and social interaction. Notably, 90% of respondents expressed dissatisfaction with themselves, reflecting low self-esteem. Sixty percent reported avoiding group discussions, while 40% felt unprepared to assume leadership roles, highlighting challenges in social interaction. Additionally, 60% of students reported difficulty managing their emotions during interpersonal conflicts. These findings suggest that issues in self-concept may directly influence nursing students' social interactions, justifying further investigation into this relationship. These responses suggest that issues related to self-concept may directly affect the way nursing students interact with others, both academically and clinically. Therefore, this study aims to explore the relationship between self-concept and social interaction among nursing students, in order to better understand how self-perception influences their academic, social, and professional development.

METHOD

This study employed a cross-sectional design. The target population comprised 1,239 nursing students enrolled at a private university in Tangerang, Indonesia. A total sample of 302 students was selected using a quota sampling technique, which ensured representation across key characteristics such as academic year, age, gender, and faculty affiliation. The inclusion criteria were nursing students actively enrolled in the program at the time of data collection, while the exclusion criteria included students who were on academic leave or temporarily suspended from academic activities during the study period. Data collection took place between February and May 2024.

The variables measured were self-concept and social interaction. Self-concept was assessed using the Tennessee Self-Concept Scale (TSCS) developed by Fitts (1971), which was translated into Indonesian by Dwinanda (2019). The scale consists of 25 items, with a total score range of 48-200. A score of 150-200 indicates a high level of self-concept, 99-149 indicates a moderate level, and 48-98 indicates a low level. Validity and reliability testing conducted on 30 respondents yielded correlation coefficient values ranging from 0.373 to 0.618, exceeding the r-table value of 0.361. The Cronbach's alpha for the self-concept scale was 0.850, indicating high reliability. Social interaction was measured using a psychological scale questionnaire originally developed by Abdulsyani (1994) and adapted into Indonesian by Dwinanda (2019). The scale consists of 25 items, with a total score range of 48-200. A score of 150–200 indicates a high level of social interaction, 99-149 indicates a moderate level, and 48-98 indicates a low level. Validity and reliability testing with 30 respondents resulted in correlation coefficient values ranging from 0.363 to 0.627, also surpassing the r-table value of 0.361. The Cronbach's alpha value for the social interaction scale was 0.808, indicating good reliability. Data were collected online using a structured questionnaire distributed via Google Forms. Ethical approval for the study was obtained from the Research Ethics Committee of the Faculty of Nursing, Universitas Pelita Harapan (No. 043/KEPFON/I/2024).

RESULT

The results of this study highlight the distribution of respondent characteristics, levels of self-concept and social interaction, and the correlation between these two variables. Descriptive analyses were used to summarize demographic data and score distributions, followed by a bivariate analysis to determine the relationship between self-concept and social interaction among nursing students.

Table 1. Distribution of self-concept in nursing students (n = 302)

Category	Frequency (n)	Percentage (%)
Low	53	17.5
Medium	196	64.9
High	53	17.5

Table 2. Distribution of social interaction in nursing students (n = 302)

Category	Frequency (n)	Percentage (%)
Low	32	10.6
Medium	221	73.2
High	49	16.2

Based on Table 1, the majority of nursing students at one of the private universities in Tangerang have a moderate self-concept (64.9%). Similarly, Table 2 indicates that most students also demonstrated a moderate level of social interaction (73.2%).

Table 3. Spearman's rho correlation test results (n = 302)

		Self-concept	Social interaction
Self-concept	*Correlation Coefficient*	1.000	0.447
	Sig.(2-tailed)		0.001
	N	302	302
Social interaction	*Correlation Coefficient*	.447	1.000
	Sig.(2-tailed)	.000	
	N	302	302

Table 3 shows that the Spearman rank correlation test is 0.447 with a p-value of 0.001, indicating a significant correlation between self-concept and social interaction among nursing students at one of the private universities in Tangerang. The correlation coefficient of 0.447 suggests a moderate positive relationship between self-concept and social interaction. In other words, nursing students with higher self-concept scores tended to report higher levels of social interaction.

DISCUSSION

The findings of this study indicate that the majority of nursing students exhibit a moderate level of self-concept. This may reflect a transitional phase commonly experienced by nursing students, particularly as they navigate academic demands, clinical experiences, and the ongoing process of forming a professional identity. At this point in their education, students are often in the process of reconciling their personal self-perception with the expectations and responsibilities of the nursing profession.

Self-concept refers to an individual's perception of themselves, which is shaped through personal experiences, social interactions, and the educational and clinical environments in which they are situated. A moderate level of self-concept may result from various internal and external factors. Internal factors include personal experiences, self-confidence, and individual values, while external factors encompass the academic environment, peer relationships, feedback from lecturers and clinical instructors, and the organizational culture within clinical settings. Self-concept significantly influences students' motivation, interpersonal relationships, academic performance, and readiness to manage complex clinical situations (Konlan et al., 2024).

Students with a lower self-concept tend to experience higher levels of anxiety when confronted with unfamiliar clinical situations, exhibit lower confidence when interacting with healthcare professionals, and are more vulnerable to academic stress. These challenges can negatively impact students' engagement in the learning process and diminish their effectiveness in performing professional roles within clinical settings (Gebreegziabher et al., 2025). Research has shown that sustained, experience-based mentorship programs can significantly enhance the professional self-concept of nursing students (Miao et al., 2024). In addition, reflective learning activities, such as reflective journaling and structured group discussions, have been proven effective in assisting students to critically evaluate their clinical experiences and foster a more positive self-perception (Murillo-Llorente et al., 2021).

Consistent with the findings on self-concept, the majority of nursing students at a private university in Tangerang also demonstrated a moderate category of social interaction. Most students were able to socialize effectively within their new environment, actively participate in both academic and non-academic activities, greet others warmly, and exhibit friendliness. They also adapt well in discussions, respect differing opinions, initiative to start a conversation, and maintain engagement during communications. These findings align with previous research, which found that the majority of respondents had moderate social interactions (Sarıköse et al., 2024). Likewise, research by Burgaz Kınas et al. (2025) found that nursing students generally possess strong social interaction skills, driven by a genuine interest in forming interpersonal relationships.

Nursing students develop social interaction skills through communication, collaboration, and engagement with others. Strong social interactions are often fostered by positive self-confidence, which encourages students to engage effectively with their peers (Miao et al., 2025). Students with good social interactions will show less anxiety in communication, feel comfortable talking to others, confidently express opinions, and show mutual respect in discussions (Burgaz Kınas et al., 2025). These findings further support the significant relationship between self-concept and social interaction among nursing students. This is consistent with previous

studies that also identified a strong correlation between self-concept and social interaction in nursing populations (Garcia-Pereyra et al., 2023). Higher levels of self-concept are associated with stronger social interactions, while lower self-concept tends to correlate with reduced social engagement (Paramitha et al., 2024).

Understanding self-concept is essential for nursing student to effectively carry out their duties and responsibilities. A positive self-concept enables students to interact with patients and collaborate with healthcare professionals in clinical settings. Nurses who possess a strong self-concept tend to exhibit more positive social interaction (Garcia-Pereyra et al., 2023). Moreover, a positive self-concept is closely linked to high interpersonal communication, characterized by effective communication and problem-solving abilities (Suak et al., 2023). Nursing students with high self-confidence are also more likely to adapt successfully to academic environments (Moreno-Cámara et al., 2024; Bidjuni et al., 2016).

Self-concept significantly influences an individual's ability to engage in social interactions. Those with a positive self-concept tend to exhibit traits such as self-confidence, which support better adaptation within social environments (Ulfa et al., 2022). In contrast, individuals with a negative self-concept may experience persistent feelings of inferiority and inadequacy, ultimately limiting their social interactions. Previous research has demonstrated a positive relationship between self-concept and social interaction, suggesting that individuals with a well-developed self-concept are more likely to participate actively in social settings and be accepted by their peers. Therefore, nurturing a positive self-concept in nursing students is crucial for their successful social adjustment and professional development (Paramitha et al., 2024).

CONCLUSION

This study revealed a significant moderate positive correlation between self-concept and social interaction among nursing students at a private university in Tangerang. Most students demonstrated moderate levels of both self-concept and social interaction, suggesting that while they are in the process of adapting to academic and clinical demands, further efforts are needed to strengthen their professional identity and interpersonal competencies. These findings underscore the importance of fostering a positive self-concept during nursing education to enhance students' confidence, emotional regulation, and ability to build effective social relationships.

To support this development, educational institutions and nursing educators are encouraged to implement interventions, such as mentorship programs, reflective practices, and communication training. These initiatives can help cultivate a stronger self-concept, ultimately promoting more effective social interactions and better preparedness for clinical practice. However, the findings should be interpreted with caution due to certain limitations of the study, such as the use of a cross-sectional design and self-reported questionnaires, which may introduce bias and limit the ability to establish causal relationships.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest in this research.

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Original Research

The Effect of Flexibility Exercise on Fatigue Score and Blood Pressure in Hemodialysis Patients at Hospital X, Serang Regency

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A R T I C L E I N F O

Keywords:
Diastolic blood pressure
Fatigue score
Flexibility exercise
Systolic blood pressure

A B S T R A C T

Chronic kidney failure is becoming increasingly common and rising annually. Patients in stage five require hemodialysis or kidney transplantation due to the risk of blood pressure instability and fatigue. This study aimed to analyze the effect of flexibility exercise on reducing fatigue scores and blood pressure in hemodialysis patients at "X" Hospital, Serang Regency. A quasi-experimental pretest-posttest design was conducted from August to September 2024, involving 28 participants in the intervention group and 28 in the control group. The participants were selected using purposive sampling to ensure they met specific inclusion criteria relevant to the study. The intervention lasted for four weeks, utilizing the Fatigue Severity Scale (FSS) questionnaire and blood pressure measurements as research instruments. At baseline, most participants in both groups had severe fatigue (intervention: 85.7%; control: 92.9%) and hypertension (systolic: severe in 78.6% vs. 82.1%; diastolic: mild in 100% vs. 96.4%). Post-intervention, the exercise group showed significant reductions in fatigue ($p=0.001$) and systolic blood pressure ($p=0.001$), but not in diastolic blood pressure ($p=0.599$). The control group showeed no significant changes (fatigue: $p=0.117$; systolic: $p=0.085$; diastolic: $p=0.225$). Logistic regression indicated that flexibility exercise, occupation, and dialysis duration significantly influenced reductions in fatigue and systolic pressure ($p<0.05$), while gender and education did not ($p>0.05$). The intervention reduced fatigue by 71% (OR: 9.954; $p=0.016$) and systolic hypertension likelihood by 4-fold ($p=0.003$) compared to controls. The flexibility exercise intervention resulted in a 71% reduction in fatigue (OR = 9.954; p = 0.016) and significantly increased the likelihood of systolic blood pressure improvement by a factor of four compared to the control group (OR = 4.012; p = 0.003). Flexibility exercise is thus effective in reducing fatigue and blood pressure in hemodialysis patients. Further research is recommended to investigate external factors, such as social support, psychological conditions, and lifestyle influences to better understand the health outcomes of hemodialysis patients.

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INTRODUCTION

Chronic kidney failure is defined as a decline in kidney function or a glomerular filtration rate (GFR) of less than 60 ml/min per 1.73 m^2 (Vaidya & Aeddula, 2022). Chronic kidney failure has been increasing annually and has become a global health issue due to its difficulty in early detection, leading to a higher incidence and morbidity rate (Webster et al., 2017). Renal replacement therapy, also known as hemodialysis, is performed two to three times a week for four to five hours. Patients undergoing hemodialysis report its role in alleviating symptoms caused by fluid overload and toxin accumulation (Kristianti et al., 2020).

During hemodialysis, patients frequently experience profound fatigue (affecting 60-97% of cases) and hypertension (occurring in 80-90% of patients) through distinct yet interconnected mechanisms (Kristianti et al., 2020). Fatigue in hemodialysis patients results from several physiological mechanisms, including: (1) uremic toxin accumulation impairing mitochondrial ATP production, (2) chronic inflammation increasing IL-6 and TNF-α levels, and (3) anemia-induced tissue hypoxia (Santoso et al., 2022; Simanjuntak et al., 2024). Similar for hypertension, it develops via (1) fluid overload due to impaired sodium excretion, (2) endothelial dysfunction reducing vasodilation, and (3) sympathetic nervous system overactivation (Bansal et al., 2023; Rahardjo, 2015). These two conditions collectively increase cardiovascular mortality risk by threefold and decrease quality of life indicators by 41% (Wahyuni et al., 2020; Mata et al., 2021). The urgency for intervention is further highlighted by findings that 45% of patients miss essential daily activities due to fatigue, while uncontrolled hypertension accelerates the loss of residual kidney function by 2.1 mL/min/month (Ulya et al., 2020). Flexibility exercise during dialysis addresses these clinical through three key mechanisms: (1) improving microcirculation and capillary density (Sakitri et al., 2017), (2) reducing inflammatory markers such as IL-6 (Sulistini et al., 2012), and (3) enhancing vascular compliance to reduce systolic blood pressure by 8-12 mmHg (Whelton et al., 2017; Stern et al., 2014). Unlike more intense exercise modalities, this intervention minimizes hemodynamic instability and is specifically tailored to the functional limitations of hemodialysis patients.

Recent clinical studies demonstrate that flexibility exercise during hemodialysis significantly reduces fatigue and blood pressure through multiple mechanisms. Manfredini et al. (2021) found 12 weeks of intradialytic stretching reduced fatigue scores by 42% ($p<0.001$) and systolic BP by 14mmHg ($p=0.003$), attributing this to decreased IL-6 cytokine levels. However, their study lacked long-term follow-up. Kouidi et al. (2022) reported 58% improvement in fatigue using combined resistance-flexibility training, though the specific contribution of flexbility exercises could not be isolated. A meta-analysis by Song et al. (2023) revealed 39% average fatigue reduction across studies, but noted high variability in BP outcomes ($I^2=82\%$). The current study advances this evidence by: (1) isolating pure flexibility exercises, (2) implementing a standardized 4-week protocol, and (3) using uniform fatigue and BP assessments. Unlike previous research, we specifically examine diastolic BP changes, which showed non-significant effects in prior studies (Kouidi $p=0.21$). Flexibility exercise enhances muscle strength while modulating inflammatory cytokines (Ju et al., 2018), addressing both fatigue - which impairs daily activities in 60-97% of patients - and hypertension prevalent in 80-90% of cases.

An increase in blood pressure or hypertension is common among patients undergoing hemodialysis or those with kidney damage. However, hypertension can also be a contributing factor to chronic kidney failure (Siregar, 2020). Blood pressure fluctuations can occur due to daily activities such as standing, working, and walking (Ministry of Health of the Republic of Indonesia, 2018). Exercise can improve overall circulation, lower blood pressure, and supply oxygen to muscles during hemodialysis (Wahida et al., 2023).

A preliminary study conducted by researchers at "X" Hospital in Serang Regency, using an interview method with ten hemodialysis patients with hypertension, revealed that most of them had never engaged in light physical exercise during dialysis. As a result, they frequently experienced fatigue and limitations in daily activities. Additionally, increased blood pressure during hemodialysis was commonly observed. Based on these field findings, the researcher aims to analyze and identify the effects of flexibility exercise on reducing fatigue scores and blood pressure in hemodialysis patients at "X" Hospital in Serang Regency.

METHOD

This study employed a quasi-experimental design with a pre-test and post-test control group approach to evaluate the effectiveness of the intervention. A total of 176 respondents undergoing hemodialysis therapy at Hospital "X" in Serang Regency constituted the study population. From this population, 56 eligible respondents were selected through purposive sampling and evenly divided into two groups: 28 in the intervention group and 28 in the control group. The purposive sampling technique ensured that the selected sample met predefined inclusion and exclusion criteria, thereby enhancing the representativeness of the study.

Eligible participants were randomly assigned to either the intervention group, which received the flexibility exercise intervention during hemodialysis, or the control group, which received standard care without any additional intervention. This random allocatoin minimized potential allocation bias and ensured group comparability at the baseline. Inclusion criteria included patients diagnosed with chronic kidney failure and undergoing hemodialysis for at least six months. Exclusion criteria included patients with severe cardiovascular disease or those who had been on dialysis for less than six months.

The research utilized several instruments to collect comprehensive

and accurate data. A blood pressure observation sheet was used to record systolic and diastolic blood pressure before and after the intervention. A demographic questionnaire was administered to capture participant characteristics that might influence study outcomes. Fatigue levels were assessed using the Fatigue Severity Scale (FSS), a validated and widely used instrument in clinical research involving chronic illness populations.

Additionally, the study implemented the operational standard for Flexibility Exercise as part of the intervention. This therapeutic exercise program was designed to address both physical and psychological challenges faced by patients undergoing hemodialysis. The intervention consisted of stretching and mobility exercises focused on improving joint flexibility and muscle range of motion. These exercises were performed during hemodialysis sessions, lasting 20 minutes per session, three times a week, for four weeks. Each session was supervised by a trained physiotherapist to ensure the proper execution of movements and patient safety. The exercises aimed to reduce fatigue, improve physical mobility, and enhance overall well-being during the dialysis process.

The fatigue measurement instrument used in this study was the Fatigue Severity Scale (FSS), developed by Krupp et al. (1989). The Indonesian version of this scale was translated, and its validity and reliability were confirmed by Butarbutar (2014) in a study conducted at Dr. Sardjito General Hospital in Yogyakarta. The Fatigue Severity Scale (FSS) questionnaire consists of nine items. Instrument validity was assessed using Pearson's correlation at a 5% significance level (two-tailed) with n = 32, resulting in an r-table value of 0.349. The r-count values for each item ranged from 0.572 to 0.813, all of which exceed the r-table value, indicating that the questionnaire is valid. Reliability testing using a one-shot method yielded a Cronbach's alpha of 0.880, confirming that the instrument is highly reliable.

Data collection for this study was conducted from August to September 2024. Pre-test measurements were taken at the beginning of the study, while post-test measurements were conducted at the end of the intervention period. The intervention followed a standardized Flexibility Exercise protocol, which included stretching and mobility exercises conducted during hemodialysis sessions over a four weeks. All sessions were supervised by trained personnel to ensure correct technique and patient safety. Fatigue levels were categorized as mild, moderate, or severe based on FSS scores. Blood pressure was measured both systolically and diastolically, and categorized into normal, mild hypertension, and severe hypertension. Ethical approval for this study was granted under number 111/KEPPKSTIKSC/VII/2024, valid from July 24, 2024, to July 24, 2025, ensuring compliance with ethical standards in health research.

Data analysis was conducted using various statistical methods to ensure the validity and reliability of the findings. The Wilcoxon signed-rank test was used to assess differences between pre-test and post-test scores within both the intervention and control groups, particularly for data that did not follow a normal distribution. The Chi-square test was applied to examine the relationships between categorical variables, such as demographic characteristics and fatigue levels. In addition, multivariate logistic regression analysis using the forward stepwise method was performed to identify factors influencing changes in participants' conditions after the intervention, while accounting for the simultaneous effects of multiple independent variables.

RESULT

Baseline sociodemographic characteristics of the 56 hemodialysis patients enrolled in this study are summarized in Table 1. The intervention and control groups were comparable in terms of sex and age categories ($p > 0.05$ for all variables), indicating that the randomization procedure successfully balanced the cohorts before the exercise intervention. As shown in Table 1, the majority of respondents were female (53.6%), in the pre-elderly age group (50.0%), had a basic level of education (82.1%), were employed (75.0%), and had undergone hemodialysis for less than five years (78.6%).

Table 1. Description of Hemodialysis Patient Characteristics by Group at Hospital 'X', Serang Regency

Characteristic	Intervention Group		Control Group	
	n	%	n	%
Gender				
Male	13	46,4	10	35.7
Female	15	53.6	18	64.3
Age				
Adult	8	28,6	6	21.4
Pre-Elderly	14	50.0	16	57.1
Elderly	6	21.4	6	21.4
Education				
Primary Education	23	82.1	14	50.0
Further Education	5	17,9	14	50.0
Occupation				
Working	21	75.0	11	39.3
Not Working	7	25	17	60.7
Duration of Hemodialysis				
Less than 5 Years	22	78.6	12	42.9
5 Years/ more	6	21.4	16	57.1
Total	28	100.0	28	100.0

Table 2 shows that prior to the intervention, both groups exhibited high fatigue levels. After four weeks of flexibility exercises, the intervention group experienced substantial improvement, with 26.8% reporting only mild fatigue. In contrast, 28.6% of the control group continued to report severe fatigue. Before the intervention,

the intervention group had predominantly severe systolic hypertension (39.3%) and mild diastolic hypertension (50.0%), while the control group similarly exhibited severe systolic hypertension (41.2%) and mild diastolic hypertension (48.2%). Post-intervention, the intervention group showed improvement, with 41.1% classified as having mild systolic hypertension and 50.0% maintaining mild diastolic hypertension. Conversely, the control group still exhibited severe systolic hypertension (32.1%) and mild diastolic hypertension (46.4%).

Table 2. Distribution of PreTest-PostTest Fatigue and Pretest-posttest Systolic and Diastolic Blood Pressure in Hemodialysis Patients in the Intervention and Control Groups at 'X' Hospital, Serang Regency

Categories *Fatigue*	Intervention Group		Control Group	
	Total	%	Total	%
Pre-Test				
Light	0	0	1	3.6
Medium	4	14.3	1	3.6
Heavy	24	85.7	26	92.9
Post-Test				
Light	15	26.8	7	12.5
Medium	8	14.3	5	8.9
Heavy	5	8.9	16	28.6
Total	28	100	28	100
Pretest Systolic Pressure				
Mild hypertension	6	10,7	5	8,9
Severe hypertension	22	39.3	23	41.1
Posttest Systolic Pressure				
Mild hypertension	23	41.1	10	17.9
Severe hypertension	5	8.9	18	32.1
Pretest Diastolic Pressure				
Mild hypertension	28	50	27	48.2
Severe hypertension	0	0	1	1.8
Posttest Diastolic Pressure				
Mild hypertension	28	50	26	46.4
Severe hypertension	0	0	2	3.6
Total	56	100	56	100

Table 3 presents the results of the Wilcoxon signed-rank test for changes in fatigue and blood pressure. The mean fatigue score showed a significant reduction of 50.97% with a p-value of 0.001 ($p<0.05$). In the control group, the mean fatigue score decreased by 11.85% with a p-value of 0.117 ($p>0.05$). These results indicate significant effects of flexibility exercise on fatigue reduction. For systolic blood pressure, the intervention group showed a significant decrease of 8.59% and 4.75%, respectively, with a systolic p-value of 0.001 ($p<0.05$) and a diastolic p-value of 0.599 ($p>0.05$). In the control group, the mean systolic and diastolic blood pressure scores decreased by 2.84% and 2.21%, respectively, with p-values of 0.085 ($p>0.05$) and 0.225 ($p>0.05$). These findings indicate that flexibility exercise was effective in reducing fatigue and systolic blood pressure, while no significant changes were observed in the control group.

Table 3. Analysis of Differences in Fatigue Scores Before and After Intervention Based on Hemodialysis Patient Groups at 'X' Hospital, Serang Regency, 2024

Group	Average fatigue score		P-*Value*
	Pre-Test	Post-Test	
Intervention	56.61	27.75	0.001
Control	55.5	48.93	0.117
Intervention			
Systolic	162.25	148.32	0.001
Diastolic	79.79	76	0.599
Control			
Systolic	63.14	64.93	0.085
Dyastolic	85.57	83.68	0.225

Table 4. Bivariate associations (χ^2 test) between flexibility exercise, demographic factors, and fatigue reduction in hemodialysis patients, Hospital 'X', Serang Regency, 2024 (n = 100)

Variable	Fatigue Decreased n (%)	No Decrease n (%)	p-value
Flexibility exercise (Yes)	50 (71.4)	20 (28.6)	0.016
Gender (Male)	34 (73.9)	12 (26.1)	0.020
Education (Basic)	24 (64.9)	13 (35.1)	0.046
Occupation (Working)	30 (75.0)	10 (25.0)	0.001
Duration of HD < 5 yrs	26 (76.5)	8 (23.5)	0.001
Age group (Adult vs. older)	18 (64.3)	10 (35.7)	0.726

Pearson's χ^2 revealed significant associations between fatigue reduction and flexibility exercise ($p = 0.016$), male gender ($p = 0.020$), basic educational level ($p = 0.046$), being employed ($p = 0.001$), and shorter dialysis duration < 5 years ($p = 0.001$) (Table 4). Age group showed no significant relationship ($p = 0.726$). These bivariate findings informed the subsequent multivariate logistic-regression model presented in Table 5.

Table 5. Binary Logistic Regression Analysis of the Effect of Flexibility Exercise, Gender, Education, Occupation, and Duration of Hemodialysis on Fatigue Reduction

		B	S.E.	Wald	Sig.	ERs Xp(B)
Step 1[a]	*Fleksibilty Exercise*	.643	.729	.778	.378	1.903
	Gender	.950	.758	1.574	.210	2.587
	Education	.401	.823	.238	.626	1.494
	Occupation	.241	.900	.071	.789	1.272
	Duration of Hemodialysis	1.937	.896	4.672	.031	6.939
	Constant	-6.31	1.762	12.831	.001	.002
Step 2[a]	*Fleksibilty Exercise*	.659	.725	.827	.363	1.933
	Gender	.993	.738	1.813	.178	2.699
	Education	.435	.810	.288	.592	1.545
	Duration of Hemodialysis	2.089	.699	8.926	.003	8.081
	Constant	-6.31	1.764	12.799	.001	.002
Step 3[a]	*Fleksibilty Exercise*	.805	.675	1.422	.233	2.237
	Gender	1.154	.686	2.832	.092	3.171
	Duration of Hemodialysis	2.069	.693	8.923	.003	7.918
	Constant	-6.19	1.761	12.352	.001	.002
Step 4[a]	Gender	1.150	.677	2.884	.089	3.158
	Duration of Hemodialysis	2.298	.669	11.800	.001	9.954
	Constant	-5.29	1.511	12.247	.001	.005

Table 5 shows the results of the multivariate logistic regression analysis. Duration of hemodialysis emerged as the strongest predictor of fatigue reduction. Patients who had undergone hemodialysis for less than five years were 9.95 times more likely to experience a reduction in fatigue compared to those undergoing hemodialysis for more than five years Although flexibility exercise initially showed potential in earlier steps of the regression model, it was excluded in the final step (Step 4), suggesting that other variables, particularly duration of hemodialysis, had a stronger effect. These findings highlight the importance of considering treatment duration when designing interventions to reduce fatigue in hemodialysis patients.

Table 6. Analysis of the Effect of Flexibility Exercises, Occupation, and Hemodialysis Duration on the Reduction of Systolic Blood Pressure at "X" Hospital, Serang Regency, 2024

		B	S.E.	Wald	Sig.	Exp (B)
Step 1[a]	*Flexibility Exercise*	1.389	.629	4.877	.027	4.012
	Occupation	1.088	.879	1.534	.216	2.968
	Duration of Haemodialysis	.006	.900	.000	.995	1.006
	Constant	-3.367	1.178	8.166	.004	.034
Step 2[a]	*Flexibility Exercise*	1.390	.618	5.065	.024	4.015
	Occupation	1.092	.635	2.951	.086	2.979
	Constant	-3.366	1.158	8.455	.004	.035

Table 6 presents the logistic regression results analyzing factors associated with systolic blood pressure reduction. Flexibility exercise was found to be a significant predictor, with patients in the intervention group being four times more likely to experience a reduction in systolic blood pressure compared to the control group. Although occupation and duration of hemodialysis were also included in the model, their effects were not statistically significant. Gender and education were excluded from the final model due to a lack of significance. Multivariate logistic regression analysis was conducted to examine the factors influencing systolic blood pressure reduction among hemodialysis patients at 'X' Hospital in Serang Regency. The independent variables analyzed included flexibility exercise, gender, education, occupation, and duration of hemodialysis. A stepwise logistic regression method was used to

identify the most significant predictors, focusing on the contribution of each factor to changes in systolic blood pressure. Flexibility exercise emerged as a significant predictor, with patients who participated in the program being four times more likely to experience a reduction in systolic blood pressure compared to those who did not.

DISCUSSION

This study identified several interrelated physical and psychological factors contributing to the high levels of fatigue experienced by hemodialysis patients in both the intervention and control groups. Malnutrition exacerbated patients' physical conditions, which were already compromised by the accumulation of uremic toxins and anemia caused by impaired kidney function, reducing overall energy capacity. Additionally, repeated dialysis result in physical discomfort and anxiety due to the prolonged and repetitive nature of treatment (Simanjuntak et al., 2024). Depression is also a common psychological condition among hemodialysis patients. Interventions such as logotherapy have been shown to help patients find meaning and alleviate psychological distress (Handayani, 2023). Santoso et al. (2022) found that low hemoglobin levels, toxin buildup, and chronic sleep disturbances were linked to moderate to severe fatigue in approximately 70% of patients undergoing hemodialysis. Furthermore, comorbid conditions like diabetes and hypertension were associated with higher levels of fatigue. Fatigue perception also varies by gender. Lerma et al. (2021) reported that male patients generally experienced and reported lower fatigue levels than females. This difference may be due to physiological and psychosocial factors, including hormonal variations, coping mechanisms, and gender differences in expressing physical exhaustion. The study also highlighted the greater psychological burden experienced by female patients, which may intensify the subjective experience of fatigue. Mata et al. (2021) further emphasized that gender disparities in kidney failure outcomes extend beyond symptoms like fatigue. Their binational cohort study found that women with kidney failure had higher excess mortality rates despite demonstrating healthier behaviors, suggesting a need for gender-sensitive approaches in nephrology and rehabilitation planning.

Following the flexibility exercise intervention, the intervention group predominantly experienced mild fatigue, while the control group continued to report severe fatigue. According to Sulistini et al. (2012), significant differences exist in fatigue levels between patients with low physical activity and those who engage in routine exercise. O'Sullivan and McCarthy (2009) found that exercise during dialysis sessions improves muscle blood flow and reduces the transport of metabolic waste into the dialyzer, thereby improving patient outcomes. Exercise also strengthens muscles, enhances agility, and reduces fatigue (Sakitri et al., 2017). Wahyuni, Djamaludin, and Chrisanto (2020) demonstrated that physical exercise significantly reduces fatigue in patients with chronic kidney disease undergoing hemodialysis. These findings support the use of structured physical activity as a non-pharmacological intervention to improve patients' physical and emotional well-being.

Bansal et al. (2023) emphasized the clinical importance of managing systolic hypertension due to its strong link with cardiac complications. Therefore, systolic hypertension should be the primary focus in blood pressure management for patients undergoing hemodialysis. A study by Defibriola et al. (2023) found that 27 patients (52.9%) experienced severe systolic hypertension, while research by Berlin et al. (2019) reported that 37 patients (50%) had severe systolic hypertension during dialysis procedures. Proper hypertension management in patients with kidney failure is crucial to prevent further complications. Although no consensus exists on the ideal blood pressure target for dialysis patients, many recommendations align with general population standards.

According to Whelton et al. (2017), individuals can reduce high blood pressure by engaging in at least 150 minutes of exercise per week. This is supported by Fancourt, Steptoe, and Cadar (2021), who reported that regular physical activity significantly decreases both systolic and diastolic blood pressure, while also lowering cardiovascular risk. In this study, flexibility exercises were more effective than no intervention in reducing fatigue among hemodialysis patients. These findings are supported by Sriulina et al. (2024) who found that pranayama yoga therapy and educational programs significantly lowered fatigue scores. Similarly, Handayani (2023) confirmed that flexibility exercises reduce chronic fatigue, underscoring their value in dialysis care. In contrast, the control group in this study showed only minimal improvement in fatigue levels, consistent with findings by Cohen et al. (2021), who noted that patients without targeted interventions reported less improvement. This highlights that structured interventions, like flexibility exercise, are a crucial component in managing fatigue among hemodialysis patients.

Manfredini et al. (2021) conducted a multicenter randomized clinical trial showing that structured intradialytic exercise programs significantly reduced fatigue and improved physical performance in patients undergoing long-term hemodialysis. These findings highlight the clinical importance of integrating low-intensity physical activity into routine dialysis care to support better treatment outcomes. Similarly, Wahida et al. (2022), through a systematic review and meta-analysis, found that intradialytic exercise effectively alleviated fatigue symptoms in patients with chronic kidney disease, further supporting its role as a beneficial adjunct to standard care. In addition, Song et al. (2023) confirmed that intradialytic exercise not only improves physical function and reduces fatigue but also enhances overall quality of life. Taken together, these studies strengthen the evidence base for incorporating structured exercise programs as a routine component of hemodialysis management.

The statistical test results indicated no significant difference in systolic blood pressure within the control group, as no meaningful change was observed. In contrast, the intervention group experienced a measurable reduction in systolic blood pressure

following the flexibility exercise intervention. Blood pressure in hemodialysis patients is typically assessed before, during, and after dialysis, with systolic readings commonly varying by approximately ±10 mmHg relative to intradialytic measurements (Ulya et al., 2020). According to Whelton et al. (2017), engaging in at least 150 minutes of physical activity per week can help reduce elevated blood pressure to within the normal range. Flexibility exercises, as a form of light physical activity, can contribute to blood pressure regulation. Systolic blood pressure, which reflects the force exerted by the heart when pumping blood throughout the body, tends to be more responsive to physiological changes than diastolic pressure, which occurs when the heart is at rest between beats. Stern et al. (2014) found that regular physical exercise reduces peripheral vascular resistance and arterial stiffness—two key factors in the pathophysiology of hypertension among dialysis patients. These findings support the role of structured physical activity in managing blood pressure and lowering cardiovascular risk in this population.

Suparti and Nurjanah (2018) reported that psychosocial support-based interventions can enhance the quality of life and alleviate fatigue symptoms commonly experienced by patients undergoing hemodialysis. Among the various non-pharmacological strategies to improve patient well-being, flexibility exercise has been recognized as a beneficial approach (Roy, 1984). In addition, Lerma et al. (2021) observed gender-based differences in the perception and experience of fatigue, with male patients generally reporting lower fatigue levels. This difference may be attributed to variations in how individuals of different genders cope with and respond to health-related stressors. Meanwhile, Rohimah (2020) found no significant association between age and fatigue score reduction in patients with chronic kidney disease receiving hemodialysis. The progression of the disease itself appears to be independent of age; instead, variations in anxiety levels across age groups may influence fatigue perception.

Hemodialysis patients with a basic level of education demonstrated a more substantial reduction in fatigue scores. Individuals with lower educational attainment may be more inclined to accept health interventions without skepticism or critical questioning, potentially enhancing adherence and outcomes. This observation is consistent with the findings of Sriulina et al. (2024), who reported a significant association between education level and fatigue reduction. Furthermore, employment status was also significantly related to fatigue outcomes, with employed patients experiencing greater reductions in fatigue. This supports the results of Taneo et al. (2024), who emphasized that engaging in work-related activities may enhance patients' motivation and provide a sense of purpose, thereby helping them manage fatigue more effectively. In addition, patients who had been undergoing hemodialysis for less than five years showed more pronounced fatigue reduction compared to those with longer treatment histories. Duration of therapy appears to be a critical factor, as supported by Simanjuntak et al. (2024), who found that prolonged hemodialysis contributes to elevated anxiety levels, which may in turn exacerbate fatigue, with a significance level of 0.026. Similarly, Lockridge Jr. et al. (2020) reported that patients who are newly initiated into hemodialysis tend to be more responsive to interventions, possibly due to their higher adaptability and motivation in the early phases of treatment.

Research by Ren et al. (2022) demonstrated that educational interventions combined with lifestyle management can significantly improve health outcomes among hemodialysis patients. Engagement in work-related activities was also found to contribute positively to health maintenance, particularly in supporting blood pressure regulation. Effective blood pressure control is essential, as it reduces the risk of cardiovascular complications and contributes to a better quality of life. These findings are reinforced by studies conducted by Bull et al. (2020) and Fancourt et al. (2021), both of which underscore the role of physical activity in maintaining optimal blood pressure levels. Moreover, a significant association was identified between systolic blood pressure reduction and the duration of hemodialysis. Patients who had recently commenced hemodialysis treatment (i.e., less than five years) experienced a more substantial decrease in systolic blood pressure compared to those with longer treatment durations. These findings suggest that patients in the early phase of dialysis may be more receptive to adopting healthier behaviors, including participation in physical exercise. This pattern aligns with the observations of Lockridge Jr. et al. (2020), who reported that newly initiated hemodialysis patients tend to respond more positively to treatment interventions and display greater motivation in managing their condition.

Patients who participated in the flexibility exercise intervention were found to be four times more likely to experience a reduction in systolic blood pressure compared to those in the control group. This finding is in line with the study by Schoenthaler et al. (2020), which reported that hemodialysis patients who received educational interventions combined with individualized antihypertensive therapy achieved greater blood pressure control than those who underwent standard treatment alone. However, statistical analysis indicated that flexibility exercise, along with gender, age, education level, occupation, and duration of hemodialysis, did not have a significant effect on diastolic blood pressure reduction. These findings suggest that the intervention, while beneficial for systolic blood pressure, may not yet exert a measurable influence on diastolic pressure within the duration of this study. Clinically, this observation is consistent with the work of Henrique et al. (2023), who emphasized that interventions involving health education or lifestyle modifications typically require extended implementation to yield significant changes in blood pressure, particularly among patients with complex chronic conditions such as those receiving hemodialysis.

CONCLUSION

The demographic profile of hemodialysis patients in both the intervention and control groups revealed that the majority had a basic education level, were in the pre-elderly age category, and were female. In the intervention group, most patients were employed and had been undergoing hemodialysis for less than five years, while in

the control group, the majority were unemployed and had been on hemodialysis for five years or more. Severe fatigue was prevalent in both groups at baseline, with 85.7% in the intervention group and 92.9% in the control group reporting high fatigue levels.

Statistical analysis showed a significant association between fatigue reduction and several variables: participation in flexibility exercise ($p = 0.016$), gender ($p = 0.020$), education level ($p = 0.046$), employment status ($p = 0.001$), and duration of hemodialysis ($p = 0.001$). After adjusting for gender, patients who had undergone hemodialysis for less than five years were 9.954 times more likely to experience a reduction in fatigue than those with longer treatment duration. Furthermore, a significant association was found between the reduction in systolic blood pressure and flexibility exercise ($p = 0.003$), employment status ($p = 0.010$), and duration of hemodialysis ($p = 0.035$). After controlling for employment status, patients who received the flexibility exercise intervention were four times more likely to experience a reduction in systolic blood pressure compared to those in the control group.

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Original Research

Parental Experiences in Caring for Children with Thalassemia Major in Tangerang: A Phenomenology Study

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A B S T R A C T

Thalassemia major can lead to significant physical, psychological, and social challenges that reduce a child's quality of life and increase the burden on the family. Parents play a crucial role in the care of children with thalassemia major; however, they often face significant challenges. This study aimed to explore the lived experiences of parents whose children have been diagnosed with thalassemia major at a private hospital in Tangerang. This research employed a descriptive phenomenological qualitative design conducted between October and November 2024. Participants were selected through purposive sampling and included 10 parents of children with thalassemia major receiving care at a private hospital in Tangerang. Data were collected through in-depth interviews guided by seven open-ended questions. All interviews were audio-recorded and transcribed verbatim. Data analysis was conducted using Colaizzi's 1978 method. The study's findings the analysis revealed four major themes: 1) Psychological upheaval, 2) Burdens of caring, 3) Affirmative attitudes, and 4) Psychosocial support for the child. Conclusion this study highlights the significant experiences of parents caring for children with thalassemia major. Recommendation is, understanding parents' experiences can help nurses and healthcare providers offer more comprehensive support and develop holistic interventions that assist parents in adapting more effectively and improving their overall quality of life.

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INTRODUCTION

According to the Centers for Disease Control and Prevention (CDC), thalassemia is an inherited blood disorder that leads to the body generating inadequate levels of hemoglobin (CDC, 2024). It is one of the most common chronic genetic disorders, affecting populations in more than 60 countries worldwide, with an estimated 100,000 babies born each year with the disease (Nabavian et al., 2022). Thalassemia is particularly prevalent in tropical regions, including the Mediterranean, the Middle East, and Southeast Asia, where the incidence can reach up to 10% (Ali et al., 2021). Indonesia is part of the global "thalassemia belt," a region with a high prevalence of thalassemia carriers.

It is estimated that between 3% and 10% of the Indonesian population are carriers of the thalassemia gene (Kemenkes, 2023).

The number of thalassemia cases in Indonesia showed an increasing trend from 4,896 cases in 2012 to 8,761 cases in 2018. By 2019, the number had risen to 10,500, and approximately 1,500 new cases are diagnosed each year (Wahidiyat et al., 2022). Based on data from the Indonesian Thalassemia Foundation in June 2021, there were 10,973 cases of people with thalassemia in Indonesia (Kemenkes, 2022). In Indonesia, the highest prevalence of thalassemia was found in West Java Province, with around 3,300 children affected, followed by DKI Jakarta with 2,200 children affected (Sabono et al., 2020).

Individuals with thalassemia require ongoing medical treatment, primarily through regular blood transfusions to compensate for the reduced production of red blood cells and desferal injections to manage the iron overload that results from repeated blood transfusions (Wahidiyat et al., 2022). Despite treatment, children with beta-thalassemia major often experience reduced quality of life (Sharma et al., 2017). Therefore, as primary caregivers, parents play a crucial role in providing care and support.

However, caring for a child with thalassemia often presents parents with numerous challenges. These include emotional and social stress (Nabavian et al., 2022). Previous studies have documented the significant pressure faced by parents as they attempt to manage their child's medical care (Biswas et al., 2018; Mashayekhi et al., 2016). Parents frequently experience intense psychological stress, including feelings of frustration, sadness, helplessness, and hopelessness (Nabavian et al., 2022a). The study found that 82% of parents of people with thalassemia felt anxious about the future, while 66% of them stated that their lives had lost their joy (Abu Shosha & Al Kalaldeh, 2018). Therefore, understanding parents' experiences in caring for a child with thalassemia is essential for nurses to deliver comprehensive and holistic care that addresses the needs of both the patient and their family. Given the limited research on this subject in Indonesia, this study aimed to explore the issue more thoroughly.

METHOD

This study used a descriptive qualitative method with a phenomenological approach to explore the experiences of parents caring for children with thalassemia major. Phenomenology is a research approach that seeks to understand the essence of a phenomenon by examining it through the lens of individuals who have personally experienced it. The goal of phenomenology is to ascertain the significance of this experience, both in terms of what was experienced and how it was experienced (Teherani et al., 2015). The participants in this study were parents of children diagnosed with thalassemia major who were receiving care in the One Day Care (ODC) unit at a private hospital in Tangerang. A purposive sampling was employed to recruit participants based on the following inclusion criteria: (1) biological parents (either father or mother) of a child with thalassemia major, (2) physically and mentally healthy, and (3) able to communicate in Indonesian. The participant recruitment process began after obtaining ethical approval and official permission from the hospital. The researchers initially coordinated with the head of the ODC unit, explaining the study's objectives and data collection procedures. Following this, the second and third researchers approached eligible parents, provided detailed information about the study, and invited them to participate. Those who expressed interest and consented were personally contacted to arrange a suitable time and location for the interview.

This study was conducted from October to November 2024. Ten parents of children with thalassemia major were recruited, scheduled, and interviewed in a private room within the hospital, away from noise and distractions, as agreed upon by both parties. To ensure the validity and clarity of the interview guide, a pilot interview was conducted with one participant prior to the data collection process. Based on the pilot, some questions were revised for better clarity and logical flow. Since the pilot's purpose was to test the interview tool, the data from this interview was not included in the main analysis. Data was collected through semi-structured, in-depth interviews using seven guiding questions (Table 1). Field notes were taken to capture the researchers' observations, and all interviews were audio-recorded. Before the interview, the researchers introduced themselves and provided a detailed explanation of the study, including its objectives, confidentiality, and potential benefits and risks to participants. Those who agreed to participate completed a demographic questionnaire, including age, gender, educational background, ethnicity, and number of children with thalassemia, followed by signing the informed consent form. Meanwhile, those who chose not to participate were not interviewed. All participants approached by the researchers agreed to participate in this study.

Each interview lasted approximately 20 to 25 minutes and was audio-recorded. Each interview was conducted by the second and third researchers during the data collection phase. The third researcher served as the main interviewer during the interviews, and the second researcher recorded non-verbal clues and asked questions that had not been addressed. Ten participants in all were enlisted, and as the interviews yielded no new information, data collection was stopped after saturation was achieved. Data collection and analysis were done at the same time. After each interview, the data was examined by first, second, and third researchers to look for any new trends in the transcript and see whether the fresh data had any new information. The researcher team decided that data saturation had been achieved when the interviews yielded no new information.

Table 1. Interview Questions

No	Questions
1	When was your child diagnosed with thalassemia major? What came to your mind when you first heard that your child was diagnosed with thalassemia major?

2	How do you feel when your child is undergoing treatment?
3	What challenges do you face in this regard?
4	What are your concerns about your child's condition?
5	What is your experience of having a child with thalassemia major?
6	Has having a child with thalassemia majorly affected your life?
7	How do you deal with your child's emotional instability when they have to follow routine medication such as blood transfusions and taking desferal medication?

Data Analysis

All recorded interviews were transcribed verbatim in Indonesian. To ensure transcript accuracy, the first, second, and third researchers independently listened to the recordings multiple times and compared them against the transcripts for consistency and completeness. Data analysis was carried out by the first, second, and third researchers using the steps of the phenomenological analysis method, according to Colaizzi 1978, cited in Edward & Welch (2011). The steps include thoroughly reading data transcripts, marking relevant statements, interpreting the meaning of statements, clustering meanings into sub-themes and themes, developing phenomenological descriptions, and condensing the complex information into a concise, clear, and meaningful statement that sums it up. The analysis resulted in four main themes that were elaborated into 13 sub-themes.

This research applied four criteria to maintain the rigor of the analysis, namely credibility, dependability, confirmability, and transferability (Polit & Beck, 2012). Credibility was maintained by determining the location of the interviews with the respondents so that they felt safe and comfortable. Dependability was achieved by using the same interview guide and explaining the data collection and analysis process in detail. Using field notes and recordings that were available to the entire team, as well as collaborative data evaluation and consensus among the researchers, confirmability was guaranteed. Confirmability was ensured by collaborative data evaluation and consensus among the researchers, as well as the use of field notes and recordings that were accessible to the entire team. To ensure the transferability of this study, participants' data and background information were presented, therefore, other researchers were able to evaluate the results' applicability and extrapolate them to similar populations.

Ethical Consideration

This study has been approved by the ethical committee of the Faculty of Nursing, Universitas Pelita Harapan, with number No.014/KEP-FON/VIII/2024. All participants have been informed that their involvement is voluntary without any coercion from any party, as evidenced by the signed informed consent. To maintain confidentiality, each participant was assigned a unique code to replace their real name. All data were securely stored on password-protected devices, accessible only to the research team, and used solely for research purposes.

RESULT

As seen in table 2, a total of 10 participants, all of whom were parents of children with thalassemia major, participated in this study. Most of the participants were female comprising 70 % of the participants. In terms of age distribution, 40% of the participants were within the age ranges of 36–40 and 46–50 years. Majority of participants completed their education at university level as much as 60 %. Regarding ethnicity, 30% of the participants were of Sundanese or Tionghoa backgrounds. Additionally, 80% of participants had at least one child diagnosed with thalassemia major.

After examining the data obtained from the interviews, the researchers discovered four main themes about parental experiences caring for children with thalassemia major: 1) psychological upheaval, 2) burdens of caring, 3) affirmative attitudes, and 4) psychosocial support for the child. As seen in table 3, these four themes were further developed into thirteen subthemes.

Table 2. Participants' sociodemographic characteristics (n=10)

Characteristics	Frequency (n)	Percentage (%)
Age		
30-40	4	40
41-45	1	10
46-50	4	40
50	1	10
Gender		
Female	7	70
Male	3	30
Education Level		
University level	6	60
Senior high school	2	20
Junior High School	1	10
Elementary School	1	10
Ethnicity		
Jawa	2	20
Sundanese	3	30
Tionghoa	3	30
Betawi	1	10
Palembang	1	10
Number of children with Thalassemia Major		
1	8	80
>1	2	20

Table 3. Themes and Sub-themes of Parental Experience of Caring for Children with Thalassemia Major

Theme	Sub-theme
Psychological upheaval	Uncontrollable feelings
	Uncertainty of Children's Future
Burdens Of Caring	Giving up on professional or personal roles
	Family conflict
	Financial hardship
	Limitations in social lives.
Affirmative Attitudes	Gratitude
	Acceptance
	Spousal connection
	Communion with God
Psychosocial support for the child	Communication technique
	Fostering self-confidence
	Parental fairness

Theme 1. Psychological Upheaval

Upon receiving the diagnosis of thalassemia major from the doctor, the parents reported experiencing intense psychological upheaval. Two subthemes emerged from their responses: 1) uncontrollable feelings, and 2) uncertainty about children's future.

Sub Theme 1.1 Uncontrollable feelings

Uncontrollable feeling is an important sub-theme that refers to the feelings that parents felt when their child was first diagnosed by a doctor with major thalassemia. Most parents revealed that they experienced various kinds of emotional turmoil due to the treatment and actions that their child would undergo.

"When I first found out about the diagnosis...it was like the world collapsed... I was hopeless..." (Participant 1).

"… As a new parent, I was still in denial and struggling to accept the diagnosis..." (Participant 6).

" As a mother, I felt heartbroken and overwhelmed…I couldn't hold back my tears… It was an emotional mix…it was so difficult to bear" (Participant 9).

Parents expressed that, upon first hearing the diagnosis that their child had thalassemia major, they were overwhelmed with shock, confused, and in denial because they had no prior understanding of what thalassemia was.

" …I didn't know what thalassemia was ... I read about it ... it turns out it's hereditary ... I was shocked at that time ... I was confused …" (Participant 7)

" … At first, I didn't understand...I didn't accept it...I couldn't believe it...how could my child be like this?" (Participant 8)

Sub-theme 1.2 Uncertainty of children's future

Many parents shared worries about the uncertainty surrounding their children's future. Parents stated concerns that their children might have to halt their education and miss the chance to attend university. One parent was especially anxious about the child's development, fearing it wasn't progressing typically compared to other children. There were also concerns about inadequate blood supply, the potential loss of their children, and fears about their children's life expectancy.

" …because of illness... prevented from entering... a big company... he (patient) wanted to go to a public university outside the city" (Participant 2)

" …I'm afraid he (the patient) is weak... can't play like other children... growth problems... his height is not normal... hair loss continues to be red" (Participant 6)

" …Worried about not getting the blood, sometimes the stock of blood is empty…" (Participant 4).

" ...very worried...about his future...can he live a long life? can he be healthy like everyone else?" (Participant 5).

Theme 2. Burdens of Caring

While caring for children with thalassemia major, parents reported facing challenges across multiple areas of life, which were categorized into four key sub-themes: (1) giving up on professional or personal roles, (2) family conflicts, (3) financial difficulties, and (4) limitations in social lives.

Sub-theme 2.1 Giving up on professional roles.

Three out of ten parents said they decided to quit their jobs so they could care for their children.

"…I resigned because I'm a single parent...I'm the only one who is relied on… "(Participant 10)

"…In the past I worked, but having a child like this...I stopped…" (Participant 7)

"...I resigned…because I knew my child... was positive for thalassemia major.... very dilemma…I can't be a working mother…because the best helper is the mother" (Participant 6).

Sub-theme 2.2 Family conflicts

Two parents also shared that caring for children with thalassemia major also brought them into conflict with their partners because they blamed each other and even asked their partners to remarry someone else.

"...At first, we (the parents) stayed quiet…there was tension between us. Since it's a hereditary condition, he (the husband) said... "it's from your side of the family" (referring to the wife) (Participant 4).

"…In the early days of our marriage, it was quite difficult...almost like something was constantly weighing on us. There was even talk from my husband about wanting to remarry someone who doesn't carry thalassemia… If we didn't have strong faith, things could've fallen apart… our marriage might not have survived (Participant 6).

Sub-theme 2.3 Financial hardship

Some parents also complained that the money spent on medical

expenses and transportation was quite expensive.

"…The financial aspect is a concern... it makes us a bit anxious. The treatment is costly due to lifelong blood transfusions, expensive medications". (Participant 4)

"…The financial burden was significant... we used to spend around seven to eight million rupiah each month. We had to travel back and forth to the hospital". (Participant 5).

Sub-theme 2.4 Limitations in social lives

Parents shared that when their children were first diagnosed with thalassemia major, they felt unprepared and chose to withdraw, often keeping their child's condition hidden from others.

"…I distanced myself from friends…I don't want to be asked about my child's condition" (Participant 1).

"I still keep it a secret... only close relatives know that my child has thalassemia. My child feels ashamed about it" (Participant 7).

Theme 3. Affirmative Attitudes

Despite the burden of care felt by parents, they showed affirmative attitudes that they felt because of caring for children with thalassemia major. This theme includes four sub-themes consisting of: 1) Gratitude, 2) Acceptance, 3) Communion with God, and 4) Spousal connection.

Sub-theme 3.1 Gratitude

Parents stated that taking care of children with thalassemia major made their gratitude increase because it turned out that there are still other people who are more difficult than they are.

"…I've learned to be grateful... it has allowed me to better understand the struggles that others face." (Participant 9)

"…Grateful that my child's condition is like this...there are still many other children who are in worse condition than him (the patient)." (Participant 4).

"...I've become more thankful, as I've come to realize that many others are facing even greater challenges than we are…" (Participant 1).

Sub-theme 3.2 Acceptance

Parents of children with thalassemia major experienced a journey from fear and anxiety to acceptance. Although parents initially felt out of control, they now focus on their child's health and happiness by living life with a positive attitude.

"Over time...Eventually, we accepted it and now we feel at peace" (Participant 4).

"For our family, it doesn't feel like a burden at all because we've accepted it. We just live our lives and keep moving forward."(Participant 6).

"Lately, I've just been choosing to stay positive. I try to enjoy things and not stress. As long as my child (the patient) is healthy and growing well, that's what matters. I've come to accept everything wholeheartedly" (Participant 8).

Sub-theme 3.3 Communion with God

Two parents expressed that caring for children with thalassemia major made them feel grateful because they believe God entrusted and chose them to care for this child. It also led them to pray more often.

"…I fully surrender to Your will, O Allah. Thank You for blessing me with the trust of raising my child…" (Participant 8).

"…This is a test from Allah… our children are merely entrusted to us… which is why, as parents, we need to pray even more…" (Participant 4).

Sub-theme 3.4 Spousal Connection

Several mothers shared that facing their child's illness has brought them closer to their partners, strengthening their bond and mutual support in the healing journey.

"...My husband and I feel that this experience has made our relationship stronger and more united. We know we must keep supporting each other and face everything together." (Participant 9).

"…Working alongside my husband, staying motivated, so that we can achieve our dreams and see our child (the patient) heal." (Participant 8).

Theme 4. Psychosocial Support for The Child

Parents shared various strategies they use to help their children cope emotionally with the effects of treatment. The support given by parents to children consists of psychosocial and spiritual support, described in three sub-themes: 1) communication techniques, 2) fostering self-confidence, and 3) parental fairness.

Sub-theme. 4.1 Communication technique

Effective communication between parents and children with thalassemia is expressed by parents as an important form of support. Parents stated that when communicating with their child, the strategy used is to give the child space to share, provide understanding, and allow the patient to make decisions.

"…For me, the most important thing is the support from parents...being close to your child and maintaining good communication." (Participant 9).

"...I keep quiet for a bit... Let them talk when they're ready... Nowadays, they're more open about their school... starting to share more with me" (Participant 3).

"I simply say... It's your choice... You (the patient) know yourself best, you understand your condition… we just try to be understanding... It's all about how we approach them (Participant 4).

"…just remind to stay consistent with the transfusions… Let the child make their own choices." (Participant 2).

Sub-theme 4.2 Fostering self-confidence

Building self-confidence in children with thalassemia is a crucial aspect of parental support. Parents assisted their children by allowing them to participate in activities while also managing how long they can engage in them, helping the child feel more assured in their daily life. This is proven in the following statement.

"I... always nurture his (the patient's) self-confidence. Whatever activity he wants to do, I allow it, but... I limit the duration. (Participant 9).

Sub-theme 4.3 Parental fairness

Being fair to all the children in the family is important for creating a harmonious environment. By treating the children with major thalassemia, the same way as their siblings, parents show that all

children have equal value, without any discrimination.

> *"I have a better understanding of his condition. I treat him just like his siblings, without making any difference between them..." (Participant 5).*

DISCUSSION

Using a phenomenological approach, this study offers a unique and in-depth understanding of parents' lived experiences in caring for children with thalassemia major. Four themes were identified: 1) psychological upheaval, 2) burdens of caring, 3) affirmative attitudes, and 4) psychosocial support for the child.

Psychological upheaval was commonly experienced by parents following early diagnosis, the initiation of lifelong medical treatment, limited access to information, and uncertainty about their child's future. These findings align with Abu Shosha & Al Kalaldeh (2018), who reported that mothers of children with thalassemia often face psychological distress, especially regarding concerns about their children's education, career, and marriage prospects (Nabavian et al., 2021). Pouraboli et al. (2017) further highlighted that persistent feelings of anxiety, fear, and despair regarding their child's future are significant sources of emotional turmoil. These emotions can severely affect mental health and strain family relationships (Behdani et al., 2015). Hood et al. (2024) also emphasized that parents who struggle to accept their child's diagnosis often suffer from poor mental well-being, which can impact their daily functioning. Therefore, holistic interventions are needed to support parents' mental health and equip them with adaptive coping strategies (Punaglom et al., 2019).

This study shows that parents of children with thalassemia face various burdens, such as job loss, family conflict, financial difficulties, and social limitations. Caring for a child often forces parents to take leave or stop working, which can trigger a loss of identity and purpose (Abu Shosha et al., 2022; Nabavian et al., 2022; Suryani & Murniati, 2020). Financial difficulties are a recurring issue in low-income households, given the costs associated with long-term treatment and hospitalizations (Biswas et al., 2018; Nabavian et al., 2022; Shahraki-Vahed et al., 2017). These difficulties can lead to family conflict and reduced quality of life (Biswas et al., 2018), often triggered by differences in views and values (Madmoli et al., 2017; Pouraboli et al., 2017). Some parents also withdraw from social settings due to shame and fear of criticism. In line with a study in Iran conducted by Nabavian et al. (2022) where counseling was suggested as a form of support to ease the burden on families.

Despite these challenges, many parents demonstrated affirmative attitudes, such as gratitude, acceptance, strengthened marital relationships, and spiritual growth. Gratitude serves as a powerful coping mechanism, enabling individuals to find meaning and maintain psychological well-being amidst adversity by appreciating small and positive aspects of life (Edward & Welch, 2011; Gray et al., 2017). Acceptance of their child's condition was also associated with greater emotional stability, particularly when parents received encouragement from peers facing similar situations (Karakul et al., 2022). Spirituality, through practices such as prayer and religious reflection, was a key source of comfort and strength, echoing previous studies on the role of faith in promoting resilience among caregivers (Sujana et al., 2017; Andriyani et al., 2022). Furthermore, strong spousal relationships, characterized by open communication and mutual support, were found to be essential in promoting emotional well-being and facilitating effective coping with the challenges of caregiving (Ginanjar et al., 2021).

Children with thalassemia also face psychological challenges due to invasive medical procedures and long-term treatment demands. Their psychological well-being largely depends on their ability to adapt to this condition (Elzaree et al., 2018). Effective communication emerged as an essential component of parental support (Stein et al., 2019). Parents mentioned the importance of giving space, time, and explaining the condition honestly while allowing the child to be involved in decision-making. This is in line with Ayoub (2024) findings that effective communication includes empathy, age-appropriate language, and support for the independence of adolescent patients. Other psychosocial support includes encouraging children to actively participate in daily activities to build confidence and coping skills (Elzaree et al., 2018; Mashayekhi et al., 2016). Fair treatment of sick and healthy children in the family is also considered important, although there has not been much explicit research on this. However, the study by Leeman et al. (2016) emphasized that family dynamics, including communication and conflict resolution, influence children's psychological health.

This research has some limitations. First, the small sample size limited the diversity of parental experiences captured, potentially affecting the representativeness of the findings. Second, the unique contextual and cultural background of each family means that the findings may not be generalizable to broader populations. Third, the data relied on self-reported experiences, which may be influenced by subjective emotions such as fear, hope, or expectation, making them difficult to quantify objectively.

CONCLUSION

This study explored the lived experiences of parents caring for a child with thalassemia major. Although caring for children with this condition is a challenging experience and can cause difficulties in their lives, many parents remain positive and affirmative in their role. However, comprehensive support and a holistic approach are essential to help families adapt more effectively and enhance their overall quality of life. The findings of this study have important implications for nursing practice and hospital-based care. Nurses should be equipped with effective communication skills to ensure that parents and children with thalassemia receive clear, accurate information regarding diagnosis, treatment, and long-term care. It is also essential for nurses to be attuned to the emotional well-being of

both parents and patients, offering psychosocial support or referrals to mental health services as needed. Furthermore, hospitals can collaborate with spiritual departments, counselors, or psychologists to provide holistic support to patients and families, especially during the initial diagnosis and treatment process.

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Original Research

Electrical Muscle Stimulation in Swim Training: A Performance and Safety Evaluation in Novice Swimmers

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A B S T R A C T

Electrical Muscle Stimulation (EMS) activates muscle fibers by applying electrical currents via electrodes to targeted muscles and is widely used by competitive athletes. Despite its broad application, the specific effects of EMS on swimmers remain underexplored. This study evaluates the effectiveness of the EMS Butterfly in enhancing speed and performance among novice swimmers compared to conventional training. A single-group pre-post experimental design was conducted with 21 beginner swimmers (treatment group: 14; control group: 7). The treatment group received EMS for 15 minutes before regular training, twice weekly for one month. Speed was assessed by timing a 50-meter freestyle swim using a calibrated digital stopwatch. Statistical analysis included paired t-tests and Shapiro-Wilk for normality. All participants were matched for ability and fitness and supervised by coaches and sports nurses. The treatment group demonstrated a mean time reduction of 14.0 seconds (95% CI: 3.63, 21.85), which was statistically significant ($p < 0.05$), whereas the control group improved by 3.7 seconds (95% CI: -7.87, 15.29; $p > 0.05$). The difference between groups was statistically significant. These findings indicate that the EMS Butterfly is effective for improving novice swimmers' performance, supporting its integration into training programs. Further research is recommended to evaluate long-term effects across performance levels.

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INTRODUCTION

Swimming is one of the aquatic sports that integrates muscular strength, cardiovascular capacity, breathing technique, and neuromuscular coordination in a comprehensive manner. Beyond its recreational value, swimming also has a competitive dimension that demands speed, power, and movement efficiency (Setiawan et al., 2018). In this context, speed is a primary indicator of athletic performance, particularly in short-distance events such as the 50-meter freestyle. Speed is strongly influenced by muscle strength, especially in the legs and arms, which play a crucial role during the propulsion and pulling phases of swimming (Matitaputty, 2024; Syam & Bismar, 2020).

An effective swimming training program generally includes physical training, technique, tactics, and psychological aspects (Evenetus et

al., 2019). However, achieving significant performance improvements in a short period can be challenging with conventional training methods alone. One limitation lies in the difficulty of efficiently recruiting fast-twitch muscle fibers, which are essential for explosive movements. To address this, technology-based methods such as Electrical Muscle Stimulation (EMS) are increasingly being explored. EMS is a device that induces muscle contractions through external electrical currents delivered via electrodes. These currents directly stimulate motor units, including fast-twitch fibers, even at low intensity (Kaçoğlu & Kale, 2015; Micke et al., 2018).

Previous studies have demonstrated EMS effectiveness in increasing muscle strength and contraction torque. For instance, Nishikawa et al. (2021) found significant gains in quadriceps strength, while Choi & Shin (2021) reported improvements in abdominal muscle cross-sectional area and lumbopelvic control. These studies indicate that EMS can be used for both muscle strengthening and rehabilitation purposes. However, research on the use of EMS in aquatic sports, particularly swimming, remains limited. The unique characteristics of water resistance and the complex coordination required in swimming differ significantly from land-based sports, thus warranting specific investigation into EMS effectiveness in this context. In practice, EMS has been shown to simultaneously and efficiently recruit a larger number of motor units, thereby enhancing neuromuscular adaptation without increasing the risk of injury from mechanical overload. Wirtz et al. (2016) found that athletes trained with EMS experienced greater improvements in muscle strength and sprint performance compared to the control group. This indicates that EMS can be utilized as a complementary training modality to accelerate strength and speed adaptation.

Furthermore, EMS may contribute to injury prevention by reducing muscle fatigue (Seo et al., 2011), improving blood circulation (Katagiri et al., 2024), and supporting the recovery process (Iskandar et al., 2025). Therefore, EMS-based interventions have the potential to not only enhance athletic performance but also support the overall health and fitness of athletes. In this regard, the role of healthcare professionals such as sports nurses is highly strategic. Sports nurses are responsible not only for monitoring the physiological condition of athletes but also for supervising technology-based interventions such as EMS. With their clinical expertise, nurses can ensure that EMS is applied safely and effectively, tailored to each athlete's individual profile, and carried out with minimal risk of musculoskeletal injury(Plumb, 2024).

Although EMS has been applied in various land-based sports such as volleyball (Widyatama, 2011), basketball (Maffiuletti et al., 2000), football (Wahyudi et al., 2018), and badminton (Lin et al., 2025) empirical studies specifically examining its effectiveness in swimming remain scarce. Therefore, there is a significant gap in the literature that needs to be addressed, particularly regarding whether EMS can provide additional benefits for novice swimmers in improving speed and preventing muscle injuries.

This study aimed to address that gap by evaluating the effectiveness of the EMS Butterfly device in improving swimming performance among novice swimmers, using 50-meter freestyle speed as the primary outcome. A quasi-experimental design with pre- and post-tests was employed, involving two groups matched by age and training level. In addition to examining the impact of EMS on speed, this study also emphasized the importance of healthcare supervision, particularly by sports nurses, in the implementation of training technologies to ensure the safety of the intervention and maintain athletes' muscular health. We hypothesized that EMS Butterfly, when applied with clinical oversight, would result in significantly greater performance improvements compared to conventional training alone.

METHOD

Research Design

This study employed a quantitative approach using a quasi-experimental design with a pre-test and post-test involving two groups: the intervention group and the control group. This design was chosen to directly evaluate the changes in swimming performance following the Electrical Muscle Stimulation (EMS) Butterfly intervention. It allowed the researchers to assess the effectiveness of EMS while controlling for external variables that might influence outcomes. The intervention process was carried out in a real training environment and under the supervision of healthcare professionals, particularly sports nurses, to ensure the safety of the stimulation procedure.

Participants

The study population consisted of novice swimmers aged 19–21 years who were undergoing training at Universitas Pendidikan Indonesia. Participants were selected purposively based on the following criteria:

(1) having basic experience in freestyle swimming;
(2) having no history of active injury; and
(3) being willing to participate in all research procedures and providing written informed consent.

A total of 21 participants were divided into two groups:

1. Intervention group (n=14): participated in conventional training with the addition of the EMS Butterfly intervention.
2. Control group (n=7): underwent conventional training only, without EMS.

The unequal group ratio resulted from the drop-out rate, which was more pronounced in the control group. Despite this imbalance, both groups were matched at baseline for age, swimming experience, and physical condition to ensure comparability.

EMS Butterfly Intervention Protocol

The intervention group received treatment using the EMS Butterfly device, an electrical stimulation tool equipped with butterfly-shaped

electrodes designed to be attached to the lower leg muscles. Each EMS session lasted for 15 minutes and was conducted prior to routine training, with a frequency of twice per week for four consecutive weeks. The stimulation parameters were set as follows:

(1) Frequency: 80 Hz
(2) Pulse duration: 400 microseconds
(3) Intensity: Adjusted individually based on the athlete's comfort level, typically ranging between 35-55 mA

These parameters were selected based on prior literature supporting the efficacy of submaximal stimulation protocols for activating fast-twitch muscle fibers and promoting neuromuscular adaptation (Maffiuletti et al., 2000; Micke et al., 2018). The EMS sessions were conducted under the supervision of a certified sports nurse and a professional coach. The nurse ensured correct electrode placement, adjusted stimulation intensity safely, and monitored any adverse effects such as discomfort or skin irritation. This protocol was standardized to ensure reproducibility and to demonstrate the validity and consistency of the EMS application as a research tool.

Performance Measurement

Athlete performance was measured through a 50-meter freestyle swimming speed test, recorded before (pre-test) and after (post-test) the four-week intervention. Time was measured using a digital handheld stopwatch (Seiko S141 model) operated by a certified swimming coach with experience in competitive event timing. To enhance measurement reliability, two independent observers simultaneously recorded the times, and the average of both readings was used in the analysis.

Despite the use of experienced personnel and a calibrated digital stopwatch, the measurement procedure was still subject to potential human error due to manual triggering. Variations of up to 0.2–0.3 seconds may occur in reaction time during stopwatch activation and deactivation. This was recognized as a limitation of the study, although every effort was made to standardize testing conditions and minimize bias across both groups.

During the intervention period, participants were not permitted to engage in additional training outside the predetermined program to maintain the validity of the intervention. The assessment was conducted by a professional swimming coach who was not directly involved in administering the treatment, in order to ensure the objectivity of the measurement.

Data Analysis

The collected data were analyzed using SPSS software version 27. Descriptive statistics were used to present the mean and standard deviation (SD) of the swimming time for each group. The Shapiro-Wilk test assessed data normality (with a p-value > 0.05). A paired sample t-test was used to determine significant changes between pre-test and post-test results within each group. The level of statistical significance was set at $\alpha = 0.05$.

In addition to quantitative, field notes from the sports nurse and coach were recorded qualitatively to support a holistic interpretation of the results. These observations focused on athletes' physical responses, comfort, adherence to the protocol, and any reported side effects. All observations were systematically recorded in a structured observation logbook, which included date, session details, and free-text narrative comments. The data were not subjected to formal qualitative coding or thematic analysis, but were instead used illustratively to support and contextualize the quantitative findings, particularly in discussing perceived comfort, fatigue, and readiness to train post-EMS intervention.

Ethical Considerations

Ethical approval for this study was granted by the Research Ethics Committee of Universitas Pendidikan Indonesia under reference number No. 11/UN40.K/PT.01.01/2024. All participants signed a written informed consent form after receiving a comprehensive explanation regarding the purpose, benefits, potential risks, and their rights as research subjects. All participant data were kept confidential and used solely for scientific purposes. Throughout the implementation, the sports nurse was also responsible for monitoring the ethical aspects and clinical safety of the EMS intervention.

RESULT

This study aimed to evaluate the effectiveness of Electrical Muscle Stimulation (EMS) Butterfly in enhancing swimming performance among novice athletes. Performance was assessed based on the 50-meter freestyle swimming time, measured before (pre-test) and after (post-test) a four-week intervention period. The intervention group underwent conventional training with the addition of EMS Butterfly, while the control group participated in conventional training only, without EMS.

The demographic characteristics of the study respondents are presented in Table 1. The majority of participant were male (57.14%) compared to female (42.86%). In terms of age distribution, the majority of respondents were 19 years old (61.90%), followed by those aged 20 years (33.33%), while only a small proportion were 17 years old (4.76%) and none were 18 years old.

Tabel 1. Distribution of demographic characteristics of respondents based on gender and age

Category	Frequency (n)	Percentage (%)
Gender		
Male	12	57.14%
Female	9	42.86%
Age		
17	1	4.76%
18	0	0%
19	13	61.90%
20	7	33.33%

Descriptive Statistics

Descriptive statistical analysis revealed that the intervention group demonstrated a notable reduction in average swimming time, decreasing from 61.78 seconds (pre-test) to 47.78 seconds (post-test) following the intervention period. In contrast, the control group showed only a slight decrease from 66.71 seconds to 63.00 seconds. The greater reduction in swimming time observed in the intervention group indicates a more significant improvement in performance compared to the control group.

Table 2. Descriptive Statistics of 50-meter Freestyle Swimming Speed (Pre-test and Post-test)

Group	n	Phase	Mean (seconds)	SD
Intervention	14	Pre-test	61.78	18.27
Intervention	14	Post-test	47.78	16.37
Control	7	Pre-test	66.71	24.57
Control	7	Post-test	63.00	17.72

Normality Test

The normality of the data was assessed using the Shapiro-Wilk test for both pre-test and post-test scores in the intervention and control groups, as presented in Table 3. The results showed that the p-values for all tests were above 0.05, indicating that the data in each group were normally distributed. Accordingly, the use of parametric statistical tests for further analysis was deemed appropriate.

Table 3. Results of Normality Test (Shapiro-Wilk)

Group	n	Phase	W (Shapiro-Wilk)	p-value
Intervention	14	Pre-test	0.917	0.202
Intervention	14	Post-test	0.930	0.306
Control	7	Pre-test	0.948	0.712
Control	7	Post-test	0.967	0.877

Paired Sample t-Test

The next analysis used a paired sample t-test to examine performance changes between the pre-test and post-test within each group, as shown in Table 4. In the intervention group, there was a statistically significant difference between the pre-test and post-test times, with a p-value of 0.002. In contrast, the control group showed no statistically significant difference between pre- and post-test time, with a p-value of 0.463. These findings suggest that the EMS Butterfly intervention significantly enhanced swimming performance, whereas conventional training alone did not result in a meaningful change over the same period.

Table 4. Results of Paired Sample t-Test on Swimming Performance

Group	n	Pre-test Mean ± SD (sec)	Post-test Mean ± SD (sec)	Range	Mean Difference (sec)	t-value	p-value
Intervention	14	61.78 ± 18.27	47.78 ± 16.37	26-98	14.00	3.85	0.002
Control	7	66.71 ± 24.57	63.00 ± 17.72	29-97	3.71	0.785	0.463

Between-Group Comparison

The intervention group demonstrated a mean reduction of 14.00 seconds in 50-meter freestyle time, while the control group showed a smaller decrease of only 3.71 seconds. Although both groups improved, the magnitude of change was markedly greater in the intervention group.

To verify that this difference extended beyond descriptive statistics, within-group analysis revealed a statistically significant improvement in the intervention group ($p = 0.002$), as determined by the paired sample t-test. In contrast, the control group did not show a significant change ($p = 0.463$). These findings demonstrate that the improvement observed in the intervention group was not only larger in magnitude but also statistically supported, reinforcing the effectiveness of EMS as a performance-enhancing tool.

Additional Observational Findings

In addition to quantitative data, qualitative observations were recorded throughout the intervention period by the supervising sports nurse using a structured observation log. This log documented session dates, athlete responses, physical signs, and narrative comments. Observations were systematically recorded after each EMS session using a standardized form that included comfort levels, perceived muscle response, and adherence to the intervention protocol.

Among 14 athletes in the intervention group, 10 participants (71.4%) reported reduced muscle soreness and increased sense of comfort following training. Additionally, 8 participants (57.1%) stated that they felt "lighter" and more confident in performing swimming movements after EMS sessions. These subjective perceptions were consistently recorded after each session and triangulated by the nurse and coach to ensure reliability. These findings indicate that EMS may contribute not only to measurable performance improvements but also to enhanced subjective recovery and psychological readiness, supporting its potential as a comprehensive training aid for novice swimmers.

DISCUSSION

This study examined the effectiveness of Electrical Muscle Stimulation (EMS) Butterfly in enhancing 50-meter freestyle performance among novice swimmers, while also exploring its implications for injury prevention and recovery. The results demonstrated a statistically significant improvement in performance within the intervention group (mean time reduction of 14 seconds, $p = 0.002$), whereas the control group, which followed conventional training only, did not show meaningful changes ($p > 0.05$). These findings support the hypothesis that EMS, as an innovative training modality, can significantly improve swimming performance in novice athletes.

EMS works by stimulating fast-twitch muscle fibers via externally applied electrical currents, promoting neuromuscular activation that may be difficult to achieve through traditional training alone (Kaçoğlu & Kale, 2015; Micke et al., 2018). In the context of swimming, EMS provides a significant contribution to muscle strength and movement efficiency, particularly during the start phase, leg push-off, and arm pull, which require high levels of muscular strength and coordination. EMS enables the recruitment of muscles that are difficult to target through conventional training, providing additional stimuli that accelerate neuromuscular adaptation. Previous research by Wirtz et al. (2016) found that EMS enhances muscle strength and sprint speed in land-based sports. This effect is transferable to aquatic disciplines, where optimal propulsion from both the upper and lower limbs is essential.

The results of this study are also consistent with Nishikawa et al. (2021), which highlighted increased quadriceps torque with EMS application, relevant for leg propulsion in swimming. In this study, athletes in the intervention group reported a feeling of "lightness" in their legs and muscles that felt more prepared for continued training. This indicates that EMS is not only a tool for improving performance but also for accelerating the muscle adaptation process to intensive training.

Existing literature also confirms that health-based interventions led by medical professionals play a crucial role in preventing injuries in athletes. Montenegro & Gutierres (2024) emphasized the critical role of sports nurses in guiding athletes through recovery protocols, managing muscle fatigue, and implementing safe technological tools such as EMS. With this medical support, athletes can gain optimal benefits from EMS without the risk of injury that could hinder their progress.

The role of sports nurses in EMS-based training systems is highly important, particularly in preventing injuries that may arise from the use of new technologies such as EMS. Novice athletes, in particular, are more susceptible to muscle strains during early training phases, especially when introduced to high-intensity loads or new modalities (Barry et al., 2024; Howarth et al., 2023). Therefore, sports nurses serve a dual function as health supervisors and medical companions, ensuring that all interventions are carried out in accordance with safe procedures. Sports nurses are responsible not only for monitoring athletes' physiological responses to EMS but also for identifying signs of excessive fatigue or muscle injury. This study showed that the intervention group, which was supervised by sports nurses, reported a reduction in post-training muscle fatigue complaints, a result not observed in the control group. These findings suggest that close clinical supervision, including guidance on proper recovery, can help minimize the risk of injury associated with overtraining or improper EMS use. The effectiveness of the EMS Butterfly is enhanced through collaboration between coaches and sports nurses. Sports nurses play a critical role not only in medical monitoring but also in educating athletes on the appropriate use of EMS and managing their physical condition throughout the training period. This role is essential as EMS, despite its potential to improve performance, requires a proper understanding and application to prevent injuries or adverse effects.

For example, trained sports nurses can provide guidance on EMS duration, appropriate intensity levels, and recommended rest periods following stimulation. They also assist athletes in monitoring physiological responses, including signs of excessive fatigue, skin irritation, or other adverse effects. With this medical support, athletes can obtain the maximum benefits of EMS without compromising their safety, especially during the early stages of training, when the body is still adapting.

Overall, this study demonstrates that the EMS Butterfly is not only effective in enhancing swimming performance but also in optimizing muscle recovery and reducing injury risk. With the strategic role of sports nurses in supervision and education, EMS can become an integral part of training programs for novice athletes, programs that prioritize not only performance enhancement but also athlete safety and well-being.

CONCLUSION

This study demonstrated that Electrical Muscle Stimulation (EMS) Butterfly effectively enhances swimming speed in novice athletes, with the intervention group showing a significantly greater time reduction in the 50-meter freestyle compared to the control group. Beyond improving performance, EMS also contributed to injury risk reduction and faster muscle recovery. The role of sports nurses is essential in ensuring the safe application of EMS, monitoring athletes' physiological responses, and providing education on post-training recovery. Collaboration between coaches and sports nurses is crucial to maximizing performance gains while maintaining athlete safety throughout the training program. While these findings are promising, further research involving larger sample sizes and extended intervention periods is recommended to assess the long-term efficacy and broader performance implications of EMS.

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Literature Review

Implementation of Virtual Reality Simulation in Psychiatric Nursing Education: A Literature Review

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A R T I C L E I N F O

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A B S T R A C T

Schizophrenia is one of the mental health diagnoses commonly addressed in psychiatric nursing education. This field of study provides essential knowledge about mental disorders and equips students with skills to manage various challenging behaviors. The anxiety experienced by psychiatric nursing students is common but often subsides after initial patient interactions. This literature review aims to explore the effectiveness of virtual reality (VR)-based simulations in enhancing nursing students' competencies in caring for individuals with mental health disorders. The review includes journal articles published between 2015 and 2024, sourced from Wiley Online, ScienceDirect, and Google Scholar. Article selection followed the PRISMA protocol, including identification, screening, and eligibility phases, resulting in 10 articles for analysis. VR simulations offer immersive, realistic environments that allow students to safely practice therapeutic communication, perform mental health assessments, and strengthen critical thinking. Research findings demonstrate that VR simulations significantly improve students' knowledge, skills, and empathy in psychiatric nursing. Despite their advantages, VR-based learning also presents challenges, such as technical issues and resource limitations. Nevertheless, the evidence supports VR as a promising educational tool for enhancing psychiatric nursing competencies and promoting equitable, high-quality mental health care among future nurses.

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INTRODUCTION

One of the key medical diagnoses addressed in psychiatric nursing education is schizophrenia. Schizophrenia was considered dangerous and uncontrollable, which also caused wild behaviors (Videback, 2020). According to Mansouri & Darvishpour (2024), the progression from fear of schizophrenia to disinterest in psychiatric nursing and heightened anxiety about interacting with patients with mental illness presents a significant concern in nursing education. This apprehension can diminish their interest in pursuing psychiatric nursing careers and heighten anxiety when interacting with patients experiencing mental health disorders. Given the

complexity of this disease and the concerns of student nurses, adequate training and clinical exposure are essential. A lack of preparation may compromise the quality of care and negatively impact both patients and nursing students (Lee, Y., et al., 2020). To address these issues, it is essential to provide comprehensive education that demystifies mental illnesses and offers positive clinical experiences.

Psychiatric nursing education includes theoretical knowledge of mental disorders and skills training to manage a range of challenging behaviors (Halter, 2014). Anxiety among psychiatric nursing students is common, but it typically subsides after initial contact with patients (Videbeck, 2020). Therefore, educators must ensure that students' first experiences in clinical practice are positive. Simulation-based education can serve as a safe and effective tool in this regard, offering students the opportunity to apply theoretical knowledge before engaging in real clinical settings. This can also improve students' skills in caring for patients with mental disorders. In accordance with the National League for Nursing Board of Governors (2015), simulation provides a learning opportunity for students to integrate theory with practice while making real-time clinical decisions in an environment that does not pose a risk to patients.

One of the techniques of simulation is Virtual Reality (VR). In health professions education, VR is defined as a technology that enables users to explore and interact with computer-generated environments, offering immersive experiences that enhance learning outcomes (Kyaw et al., 2019). Virtual Reality (VR) technology has the potential to transform the field of education by offering students a more immersive and engaging learning experience (Al-Ansi et al., 2023). Nursing students report several positive aspects of VR and recommend the use of this technology in various health care settings and contexts (Saab et al., 2022). VR can be used for simulation-based education, allowing students to practice clinical skills in a controlled environment. Since the 1960s, VR has encompassed a variety of technologies, including the Sensorama Simulator (Heilig 1962), online virtual worlds (e.g. Second Life), massively multiplayer online role-playing games (MMORPGs, such as World of Warcraft), surgery simulators, rooms where all walls are covered in displays (Cave Automatic Virtual Environments, CAVE), as well as a wealth of different Head-Mounted Displays (HMDs) (Jensen & Konradsen, 2018).

VR simulation is increasingly recognized as an effective alternative to traditional nursing simulations (Lee, Y., et al., 2020). It allows nursing students to engage with interactive scenarios in which they can apply theoretical knowledge while interacting with virtual patients. These experiences not only improve clinical skills but also help reduce the stigma often associated with mental illness among nursing students. As Brown (2015) notes, VR case scenarios are student-driven, enabling learners to make clinical decisions within a simulated environment. The affective components included in the design of this virtual patient simulation help improve the simulation experience and real students' engagement. his educational approach supports the development of critical thinking, decision-making, communication, and empathy. Therefore, this literature review aims to explore the effectiveness of VR-based simulations in enhancing the skills of nursing students in caring for patients with mental health disorders.

METHOD

This study employed a literature review approach guided by the PICO framework (Population or Patient, Intervention, Comparison, Outcome). For Population: students, Intervention: virtual reality, Comparison: no comparison, and Outcome: improved communication skills, increased empathy and enhanced knowledge of mental health disorder. Literature sources were obtained from three main databases: Wiley Online, ScienceDirect, and Google Scholar. The search was conducted using the following keywords: (("simulation", "virtual reality" OR "virtual world") AND ("psychiatric nursing education")).

Table 1. Framework Research Question PICO

P	I	C	O
Psychiatric nursing students	Virtual Reality	No comparison	Improved communication skills, Increased Empathy, and Enhanced knowledge of Mental Health disorders

This literature review specifically focuses on the use of virtual reality simulation in psychiatric nursing education. The literature search was carried out between November 2024 and December 2024. A total of ten articles were selected for analysis based on predefined inclusion and exclusion criteria. The selection of literature sources is determined based on inclusion and exclusion criteria. Inclusion criteria are literature published in the last ten years that discusses virtual reality simulation in education, especially psychiatric nursing education, using quantitative and qualitative research designs, full text in Indonesian and English. Exclusion criteria are focused on medical students rather than nursing students, do not include full text, and have inappropriate titles. To manage references and avoid duplication, all selected articles were imported into Mendeley Desktop, where duplicates were automatically identified and removed

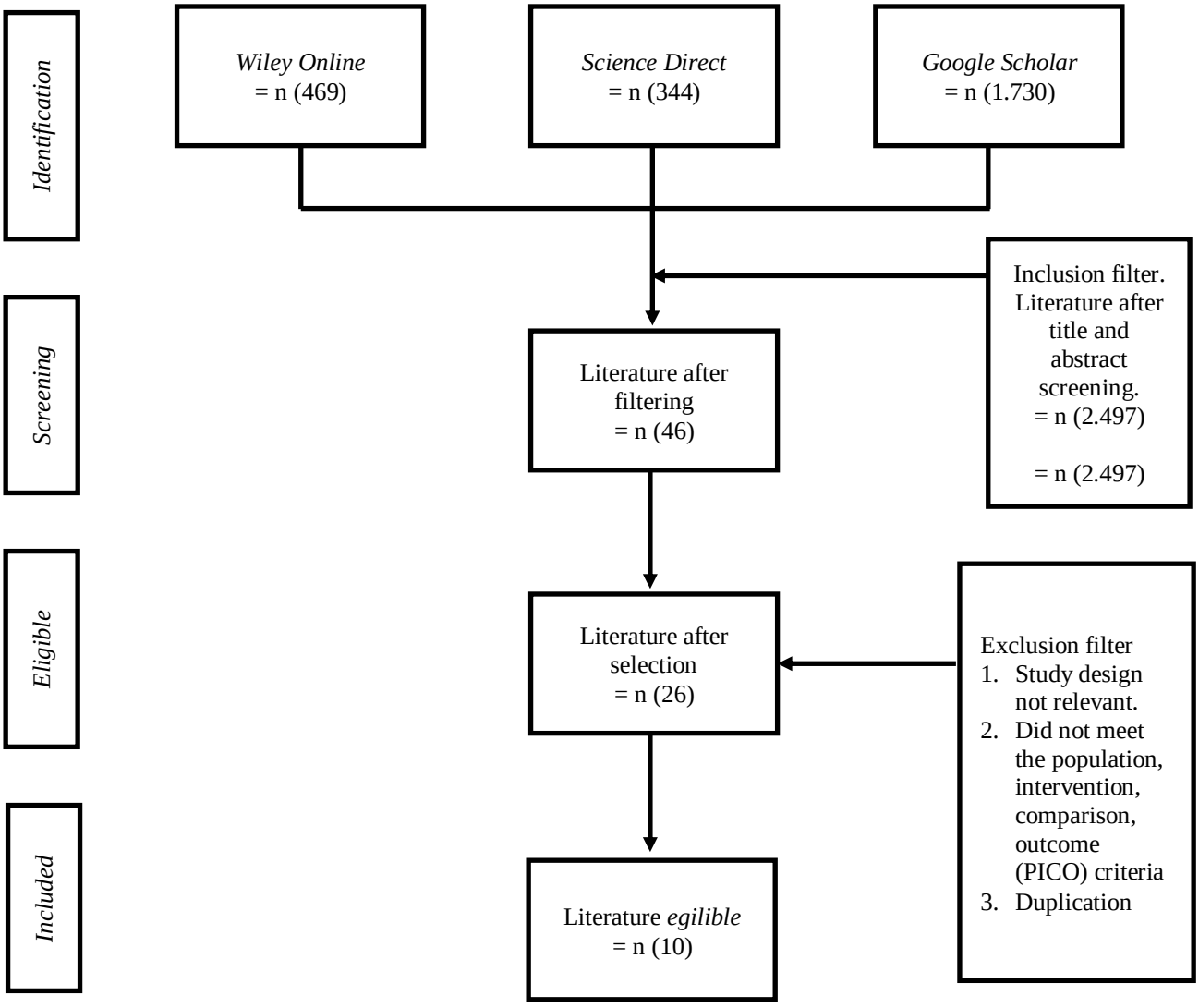

Fig 1. PRISMA Flow Diagram

RESULT

Table 2. Results of literature characteristics

No	Title	Participants (n)	Author, Year & Country	Competency	Research Design	Results
1	Usability of mental illness simulation involving scenarios with patients with schizophrenia via immersive virtual reality: A mixed methods study	Nursing students (n=60)	Lee et al., 2020 & Korea	Therapeutic Relationship and Skills	A mixed-methods study	A useful learning strategy that can be an effective alternative to previously used nursing simulations. Students find this form of education interesting and useful.
2	Virtual patient simulation in psychiatric care A pilot study of digital support for collaborate learning	Volunteering students (n=24)	Sunnqvist et al., 2016 & Sweden	Nursing skills and Therapeutic relationship	Quasi-experimental	Help students overcome their fears and gain important components for building a therapeutic relationship.
3	Supporting student mental health nurses in clinical placement through virtual in-practice support (VIPS): Innovation uptake and the 'VIPS' project	Involved two academic institutions working with the same mental health care service. Student nurses in their final year. (n=NA)	Hardy et al., 2016 & United Kingdome	Maximise student learning	An evaluation of the use of video conferencing sessions created for students to conduct online (i.e., virtual) group tutorials is presented.	Some students reported experiencing issues with sound quality and, in particular, audio feedback that interfered with their participation in discussions.
4	Nursing students' views of using virtual reality in healthcare: A qualitative study	Nursing students (n= 26)	Saab et al., 2022 & Ireland	Positive Experience	Qualitative Study	Nursing students reported several positive aspects and recommended the use of this technology in a variety of healthcare settings and contexts.
5	Nursing students' perceptions of interaction in a multiplayer virtual reality simulation: A qualitative descriptive study	Nursing students (n = 24)	Piispanen et al., 2024 & Finland	Essential skills in nursing practice.	Qualitative Study	Provides nursing students with the opportunity to practice nurse-to-nurse interactions and interactions related to nurse collaboration, which are essential skills in nursing practice. Several students stated that the simulation would have been difficult to complete successfully without the opportunity to seek guidance from the simulation facilitator during the simulation session.
6	Expanding virtual reality simulation with reflective learning to improve mental health nursing skills of undergraduate nursing students	Nursing students (n=59)	Sun Kyung Kim, Mihyun Lee, Youngho Lee, Younghye Go & Mi Hyeon Park., 2024	Communication competency	Mix Method Design	After the simulation, communication competency scores increased in both groups. Overall scores for deep learning and satisfaction were higher in the intervention group compared to the control group.

7	Positioning virtual reality as means of clinical experience in mental health nursing education: A quasi-experimental study	Nursing students (n=68)	Lee, M., et al., 2024	Comprehensive understanding	Quasi-experimental, pre- and post-test	The findings of this study demonstrate the potential to optimize mental health nursing simulation.
8	The Effects of Virtual Simulation on Undergraduate Nursing Students' Beliefs about Prognosis and Outcomes for People with Mental Disorders	Nursing students (n=299)	Liu, W., 2021 & United States (Amerika Serikat)	Nursing students' optimistic beliefs	Prospective cohort design	Nursing students gained better insight into the prognosis of people with depression after receiving virtual simulation.
9	Assessing the Effectiveness of a Virtual Reality- Based Simulation Program for Mental Health Nursing Practicum	Nursing students (n=54)	Kim et al., 2023 & Korea	Educational and Therapeutic Nursing	Quasi-experimental research	Effective in providing knowledge about mental disorders and improving learning flow and learning satisfaction.
10	Virtual reality simulation for nursing education: effectiveness and feasibility	Nursing students (n=675)	Kiegaldie & Shaw, 2023 & Australia	Educational and Therapeutic Nursing	A mixed-methods quasi-experimental design study	Students highly appreciated the interprofessional team's communication and collaboration skills, as well as the opportunity to practice essential tasks such as documenting handovers and conducting patient assessments

Analysis of the impact of using virtual reality (VR) in psychiatric nursing education was obtained through a review process of ten selected journal articles. From this process, two major themes emerged, namely the **positive impact** and the **negative impact** of the VR application. These themes were identified by analyzing the key concepts discussed in each article. Recurring patterns across the literature allowed these concepts to be classified into distinct thematic categories.

Positive Impact

The use of simulation in nursing education provides an approach to nursing science that is taught and learned. Simulations facilitate the conceptual understanding of nursing principles for both educators and students. They also serve as preparatory tools, helping students gain confidence before entering clinical practice, especially to increase knowledge and experience in providing nursing care for mental disorders. The integration of simulation into psychiatric nursing education is considered an innovative strategy for teaching the complex skills required to provide holistic care for individuals with mental illness. The application of simulation techniques to psychiatric nursing education can also help identify bias, stigma, anxiety, and fear, and areas that require further skill development among students (Brown, 2015).

Negative Impacts

One of the negative impacts is that students find it difficult to complete the simulation without guidance from the facilitator. Piispanen et al. (2024) noted that several students expressed difficulty in navigating the simulation sessions successfully without the ability to seek support during the experience. To mitigate these challenges, it is crucial to implement structured guidelines for VR usage within psychiatric nursing curricula. Providing regular breaks and limiting the duration of VR sessions can help reduce the physical discomfort that may arise from extended use. Moreover, integrating debriefing sessions post-VR simulations allows students to reflect on their experiences, addressing any psychological distress and reinforcing the application of empathetic communication in real-world scenarios. By adopting these strategies, educational institutions can enhance the effectiveness of VR as a teaching tool while safeguarding the well-being and professional development of psychiatric nursing students.

DISCUSSION

Positive Impact: Improve Skills

VR-based simulations have been shown to increase students' knowledge, which serves as a foundational step in preparing for clinical interactions with patients. As Formosa et al. (2018) explained that VR simulations effectively provide content-based understanding for students. Similarly, Neale (2019) noted that simulation training fosters realistic learning environments and is particularly beneficial for teaching communication, which is an essential skill in psychiatric nursing. Research has shown that various skills and attitudes can be taught or targeted through simulation. Brown (2015) found that some nursing students who had participated in these simulation exercises provided positive feedback, recognizing its effectiveness in improving their ability to assess mental disorders and communicate with patients. Students also expressed increased self-awareness and attention characteristics, which are key elements in delivering quality psychiatric nursing care. VR simulation helps improve content-based knowledge and communication skills needed in psychiatric nursing. This approach creates a realistic, effective learning environment to develop the ability to assess mental disorders, increase self-awareness, attention, and support the practice of psychiatric nursing care.

Moreover, VR simulation is considered an ethical and safe strategy in mental health education. Kim et al. (2023) emphasized that VR-based programs are effective in delivering knowledge about mental health disorders and enhancing learning flow and satisfaction. Students can also interact with VPs, which can improve students' nurse-patient interaction skills (Piispanen et al., 2024). Saab et al. (2022) also found that students perceive VR positively and recommend its use across healthcare education settings. Thus, VR-based simulations in mental health nursing education are considered safe, ethical, and effective in improving knowledge about mental disorders, learning flow, and learning satisfaction. Students can interact with VPs to hone their nurse-patient interaction skills and recommend the use of this technology in various health care settings.

Compared to traditional simulation-based education (SBE), VR offers a more immersive and scalable experience. These simulations are highly scalable, accommodating a larger number of students simultaneously and supporting further research. Additionally, VR technology allows remote access, offering greater flexibility for students who may have limited access to physical simulation labs. This remote accessibility saves time and eliminates travel requirements, unlike SBE, which typically necessitates in-person attendance at a designated location (Kiegaldie & Shaw, 2023). While both VR and traditional simulation-based education (SBE) provide valuable hands-on learning experiences, VR offers greater flexibility by allowing students to access realistic training scenarios remotely, whereas SBE typically requires physical presence in a designated lab. While SBE remains valuable for hands-on training, VR's accessibility and scalability offer a flexible alternative that enhances student engagement and learning efficiency.

Positive Impact: Enhanced Knowledge and Increased Empathy

VR simulation has proven to be an effective tool in helping students master mental health nursing material. Students can learn communication with patients, empathy, assess signs and symptoms, and also establish nursing diagnoses. Lee et al. (2024) found that students trained with VR had the ability in symptom management, violence risk management and nurse-patient interactions. Nursing students also gained better insight into the prognosis of depression sufferers and had improved communication skills after receiving

virtual simulation. Interactions related to nurse collaboration are important skills in nursing practice (Wei Liu, 2021; Kim et al., 2024; Piispanen et al., 2024). This particular finding suggests that the acquisition of empathy for individuals diagnosed with schizophrenia or other psychotic disorders. Formosa et al. (2018) emphasized its role as a valuable training tool for mental health professionals, while Saab et al. (2022) recommended its use specifically for enhancing empathy in nursing education.

Sunnqvist et al. (2016) noted that simulations involving virtual patients or simulated voices effectively reduce students' fear and improve their therapeutic communication techniques. In line with this, Brown (2015) found that VR helps identify stigma, anxiety, and skill gaps among students. By creating a psychologically safe and realistic space, VR enables students to practice without the pressure of real-life consequences, enhancing confidence, empathy, and clinical reasoning in mental health scenarios.

Based on the literature reviewed, the implementation of VR in mental health nursing faculties in Indonesia is recommended. VR has been shown to improve student competencies and reduce anxiety surrounding psychiatric care. The Second Life virtual simulation platform, for instance, offers a safe, accessible, and engaging environment for learning. Lee et al., (2020) reported that participants found VR simulations easy to use, interesting, and fun. When students enjoy learning and experience reduced stigma and anxiety, better clinical outcomes can be expected. Other findings suggest that this method has significant implications for educators working in mental health who want to teach core competencies in a safe, practical, and cost-effective way, as well as for students who want to work with individuals with mental health disorders (Formosa et al., 2018).

Negative Impact and Solutions

Despite its benefits, the implementation of VR in nursing education presents certain limitations. Some students reported frustration, often stemming from unfamiliarity with the technology. Hardy et al., (2016) added some issues experienced by the students such as poor sound quality and disruptive audio feedback that become barriers to effective participation. Additionally, students expressed difficulty completing simulations without real-time guidance from facilitators (Piispanen et al., 2024). In other words, the implementation of VR in education also presents certain drawbacks that must be taken into account. These include student frustration caused by limited technological proficiency, issues with sound quality, and audio interference that disrupts discussions. Additionally, some students reported difficulty completing the simulations without support from a facilitator during the session.

Despite advancements in Virtual Reality (VR) technology, its application in psychiatric nursing education still presents critical research gaps. For instance, while VR has demonstrated potential in simulating complex mental health scenarios, there is limited exploration of its long-term impact on students' clinical reasoning and empathy skills. Furthermore, inconsistencies in findings regarding its effectiveness in improving emotional preparedness and real-world application skills complicate its integration into standardized curricula. These challenges necessitate a detailed review to evaluate existing evidence and identify areas requiring further investigation. One potential solution is the adoption of a hybrid learning model that combines VR simulations with traditional hands-on clinical training. By combining VR with real-world clinical experiences, students can develop critical skills without over-reliance on immersive technology. Additionally, implementing adaptive VR environments that allow students to control their exposure levels based on individual comfort and learning progress can help reduce physical and psychological strain. Finally, providing mental health support, such as counseling services and peer discussion groups, can help students process their VR experiences and prevent potential emotional distress.

Scenario Application

In this simulation, students are presented with video-based scenarios to be analyzed and acted out through roleplay. The three short example movies include (1) an angry man at the office, (2) a self-presentation to a small group in a work setting, and (3) mindfulness on the beach with biofeedback. Students can move their heads to naturally direct their gaze, with the virtual environment adjusting accordingly based on real-time orientation data. Real-life executions such as speaking and expressing emotions to the avatar are encouraged as responses during conversation skills training and throughout emotional expression exercises. Certain sections of the simulation also offer multiple-choice response options, allowing participants to browse a list of possible answers and make selections using an input button (Ose et al., 2019; Park et al., 2011).

Fig 2. A screenshot of our 360-degree video while filming a scenario of schizophrenia patients' symptoms (Lee, Y., et al., 2020).

Highlight Research Gaps

In Indonesia, the integration of VR into psychiatric nursing education remains in its early stages, with several key research gaps requiring attention. One important area for future research is the feasibility and effectiveness of VR-based training in Indonesian nursing institutions, particularly considering the disparities in technological infrastructure across regions. Although VR has shown promise in enhancing nursing education globally, further research is needed to evaluate its accessibility, relevance, and outcomes within

Indonesia's unique healthcare and educational contexts. Additionally, cultural and social factors that influence the acceptance and application of VR-based training must be examined to ensure simulations are aligned with local practices and student needs.

Another crucial research gap is the development of localized VR simulation content tailored to Indonesia's healthcare environment. Future studies should focus on designing VR scenarios that reflect the country's mental health challenges, including community-based psychiatric care and region-specific patient cases. Moreover, research should assess the cost-effectiveness and sustainability of VR implementation in Indonesian nursing schools, considering financial constraints and the need for faculty training. By addressing these gaps, researchers and educators can optimize VR's role in psychiatric nursing education and contribute to improving mental health care across Indonesia.

CONCLUSION

The application of virtual reality simulation is an important method in psychiatric nursing education. The use of simulation in mental health nursing education is also an innovative way to teach nursing students. The use of this method can improve knowledge, communication skills, nursing care skills in critical thinking, therapeutic relationships between students as nurses and patients, and reduce stigma and fear of students in dealing with patients with mental disorders. In addition, this method is very safe, practical, and ethical to apply to mental health nursing education is also an interesting and fun method that can be applied.

Based on the findings of this literature review, the use of VR simulations is highly recommended for integration into psychiatric nursing education in Indonesia. However, challenges remain, particularly related to technological barriers and limited familiarity with VR tools. These issues can be addressed through the development of simulation training programs and the preparation of trained facilitators. With adequate resources and support, VR-based education can be effectively implemented, minimizing potential drawbacks while maximizing its educational impact. This review serves as a foundation for future development and adaptation of VR in Indonesian nursing curricula, contributing to more effective and empathetic mental health care education.

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Original Research

The Relationship between Family Support and Self-Care Behavior among Individuals with Hypertension in Tangerang

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A B S T R A C T

Uncontrolled hypertension can lead to severe complications and is a significant contributor to mortality. The family serves as a key functional component in supporting individuals with hypertension, playing a critical role in improving self-care behaviors. The purpose of this study is to examine the relationship between family support and self-care behaviors among individuals with hypertension in a community health center in Tangerang**.** The method this study was a cross-sectional design was employed involving 88 respondents selected through accidental sampling. Data were analyzed using the Pearson chi-square test. The finding revealed that 52 respondents (59.1%) had moderate self-care behavior, and 74 respondents (84.1%) had good family support. The Pearson chi-square test revealed no significant association between family support and self-care behavior ($p > 0.05$). There was no significant association between family support and self-care behavior among individuals with hypertension. These results suggest that healthcare providers should continue to educate and involve families while also empowering individuals to take an active role in managing their condition. Future intervention study encourages additional strategies alongside family support that effectively promote self-care behaviors.

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INTRODUCTION

Hypertension is one of the most common cardiovascular diseases and a major contributor to premature mortality worldwide (Mills et al., 2020). Hypertension, commonly referred to as elevated blood pressure, is described as a systolic pressure of ≥130 mmHg and/or diastolic pressure >80 mmHg, imposing excessive stress on vascular walls (American Heart Association, 2024; Iqbal & Jamal, 2023). Approximately 1.3 billion of the population aged 30 and older have hypertension, with most cases found in low- and middle-income countries (WHO, 2023a). However, only one-third of individuals are acquainted with their hypertension diagnosis (Schutte et al., 2021).

Despite being a common condition, uncontrolled hypertension can

lead to severe cardiovascular and renal complications (WHO, 2023b). According to the 2023 Indonesian Health Survey, hypertension is the fourth leading risk factor for mortality in the country, accounting for approximately 10.2% of all deaths. The national prevalence of hypertension among individuals aged ≥18 years was 30.8%, based on blood pressure measurements. In Banten Province, the prevalence was reported at 28.5% (Ministry of Health Republic of Indonesia, 2023). Notably, Tangerang province, as one of the districts in Banten, had a higher number of hypertension prevalence in 2023, with 729,628 reported cases (Banten Provincial Health Services, 2023).

Hypertension can substantially diminish quality of life and contribute to increased healthcare expenditures (Sarfika et al., 2023). Therefore, comprehensive management is essential, requiring both pharmacological treatment and lifestyle modifications, which encompass various self-care behaviors involving medication adherence, body weight control, dietary regulation, reduction of alcohol consumption, smoking cessation, regular physical activity, and reducing stress (Irwan et al., 2022; Jeemon & Chacko, 2020; Konlan & Shin, 2023). Orem's Self-Care Theory (1991) defines self-care as deliberate actions undertaken independently by individuals to maintain health, continuous personal development, and their well-being (Alligood, 2018). While individuals with hypertension are expected to take an active role in their self-care, many find it challenging to implement and sustain these critical lifestyle changes (Motlagh et al., 2016).

Self-care behaviors can substantially reduce blood pressure, but they require long-term commitment and adequate support systems (Muhe et al., 2025), particularly from family. In Orem's Self-Care Theory, family support is considered a basic conditioning factor that influences an individual's self-care agency and behavior (Alligood, 2018). It is essential in managing patient self-care by promoting medication adherence, offering emotional and spiritual encouragement, source information, and assisting with daily health routines such as medication reminders, meal preparation, and exercise participation, all of which boost therapeutic motivation and contribute to improved health outcomes and help prevent complications (Manangkot et al., 2020; Proboningsih et al., 2025). Previous studies have shown that family support significantly influences healthy behavior in managing blood pressure and adhering to medical regimens. The greater the family support, the higher the individual's adherence to self-care practices (Jeemon & Chacko, 2020; Olalemi et al., 2020; Susanto et al., 2024).

A scoping review by Irwan et al.(2022) on hypertension self-care management in Southeast Asia, emphasized the crucial role of family support. However, empirical evidence specifically examining the association between family support and self-care behavior among individuals with hypertension remains limited. The unique family structure in this region, predominantly extended families, as is also common in Indonesia, offers a distinct social context that may significantly influence the success of hypertension management. The review also highlighted that insufficient family support is a major barrier to successful engagement in self-care behaviors. Given these gaps, further research is urgently needed to investigate the influence of family support on self-care practices. Therefore, this study aims to examine the relationship between family support and self-care behavior among individuals with hypertension at a Community Health Centre in Tangerang.

METHOD

This study employed a cross-sectional correlational design and was conducted at a Community Health Centre in Tangerang from March to April 2024. A total of 88 respondents were selected using accidental sampling. The inclusion criteria in this study were being literate, living with family, a history of hypertension for more than three months, and aged >18 years. Individuals with dementia were excluded. Approval for the study's ethical conduct was granted by the Research and Ethics Committee of the Faculty of Medicine at Universitas Pelita Harapan, which complies with ethical standards, with the ethical permission number is 085/K-LKJ/ETIK/II/2024.

Participants were informed about the study's purpose, and written informed consent was obtained from those who agreed to participate. Respondents who expressed willingness to participate were required to provide informed consent by signing a form containing the consent agreement. Confidentiality and privacy of the respondent's information were maintained throughout the study. Respondents were guaranteed that no identifiable data would be published, and participation in the study was completely voluntary, and respondents were free to withdraw at any time without any consequence. The researchers conducted data collection by distributing questionnaires, in which respondents were asked to complete instruments measuring self-care behavior and family support. Respondents were asked to complete both instruments, and the data were recorded systematically.

The measurement tool used in this study is a family support questionnaire consisting of 12 questions, with a calculated reliability coefficient (r count) of 0.446 (r table 0.308) and a Cronbach's alpha reliability value of 0.628. Meanwhile, data on self-care behavior were obtained using the Hypertension Self-Care Activity Level Effects (H-SCALE) instrument., which comprises items evaluating medication adherence (3 items) and weight management behaviors (10 items), physical activity (2 items), exposure to smoking (2 items), alcohol use (2 items), and healthy dietary regimen adherence (12 items) with coefficient r count were 0.539 (with r table 0.62) and Cronbach's alpha were 0.740. Data analysis included both univariate and bivariate analyses, with the Pearson Chi-square test used to assess the association between the two variables. A p-value of less than 0.05 was considered statistically significant.

RESULT

A total of 88 eligible individuals with hypertension who were living

with family completed the questionnaires. The majority of respondents were female (73.9%), with most respondents (40.9%) having attained a high school or vocational background. Nearly half of the respondents (47.7%) were retirees, and the vast majority (98.9%) were married. The largest age group was 40-65 years, comprising 57 respondents (64.8%), followed by those over 65, totaling 31 respondents (35.2%). In terms of hypertension duration, 67 respondents (76.1%) experienced hypertension for 1-10 years. Table 1 presents a detailed overview of the respondents' sociodemographic characteristics.

Table 1. Sociodemographic Characteristics (n=88)

Characteristics		Frequency (n)	Percentage (%)
Gender	Male	23	26.1
	Female	65	73.9
Education	Uneducated	6	6.8
	Elementary School	7	8.0
	Junior High School	7	8.0
	Senior High School/Vocational School Bachelor's	36	40.9
	Degree/Diploma	32	36.3
Marital status	Married	87	98.9
	Unmarried	1	1.1
Occupation	Unemployed	3	3.4
	Retired	42	47.7
	Housewife	32	36.4
	Labors	1	1.1
	Entrepreneur	5	5.7
	Civil Servant/Army/Police	5	5.7
Age group (years)	40-65	57	64.8
	>65	31	35.2
Duration of Hypertension (years)	1-10	67	76.1
	11-20	18	20.5
	21-30	3	3.4

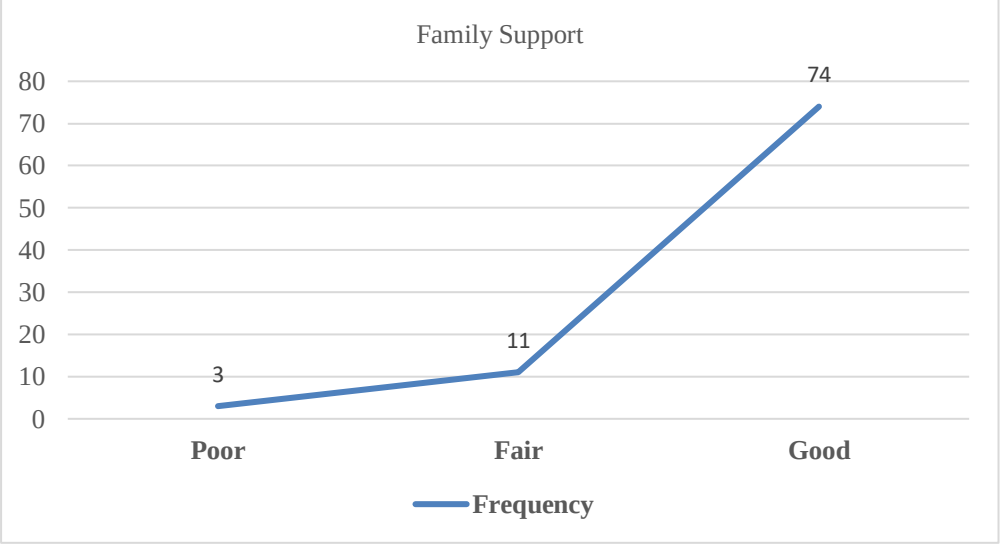

Figure 1. Family Support for Hypertension Individuals (n=88)

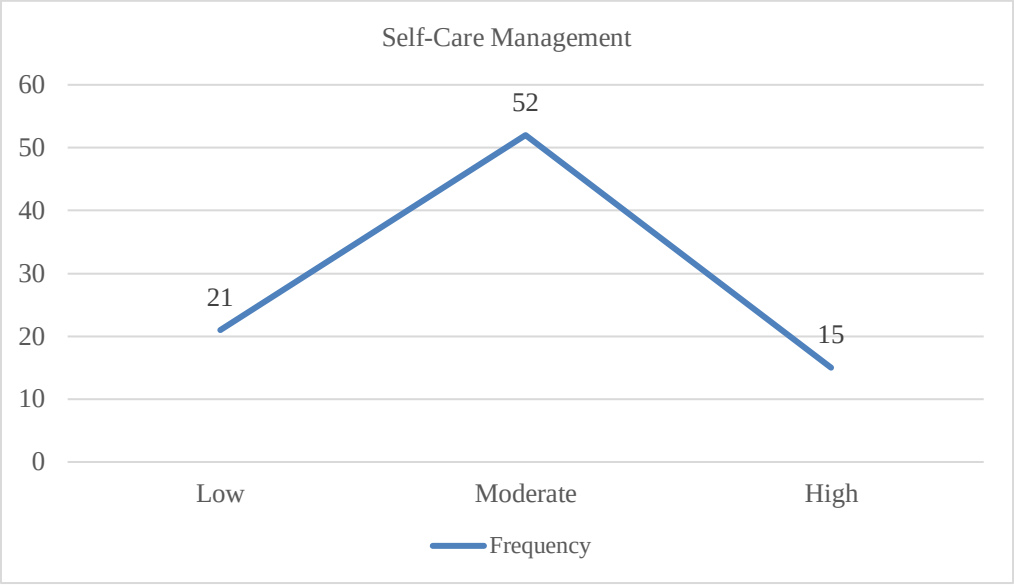

Figure 2. Self-Care Behavior in Individuals with Hypertension (n=88)

Figures 1 and 2 show that out of the 88 respondents in the study, the majority received a good level of family support (74 respondents, 84.1%), while 52 respondents (59.1%) demonstrated a moderate level of self-care behavior.

Table 2. Relationship between Family Support and Self-Care Behavior in Individuals with Hypertension (n=88)

Family support	Self-care behavior								p value
	Low		Moderate		High		Total		
	n	%	n	%	n	%	n	%	
Poor	2	2.3	1	1.1	0	0.0	3	3.4	
Fair	2	2.3	7	8.0	2	2.3	11	12.5	0.496
Good	17	19.3	44	50.0	13	14.8	74	84.1	

Table 2 presents the results of the Pearson Chi-square test conducted to examine the relationship between family support and self-care behavior among individuals with hypertension. The results indicated no statistically significant association, χ^2 (df = 4, n=88) = 3.385, p = 0.496, indicating no significant association between family support and self-care behavior.

DISCUSSION

This study aimed to examine the relationship between family support and self-care behavior in individuals with hypertension. Although a positive association between family support and self-care behavior was expected, the results showed otherwise. Respondents with good family support exhibited the highest proportions of low and moderate self-care behavior (19.3% and 50%, respectively). Additionally, the distribution of self-care behaviors did not differ significantly across the levels of family support, indicating no statistically significant relationship between the two variables.

The finding that most respondents received good family support is consistent with studies conducted in Ethiopia (Ademe et al., 2019; Geleta et al., 2025) and India (Jeemon & Chacko, 2020) that share a cultural tradition of rich family support networks. This is reflected in large extended families, where multiple generations often live together, with a strong emphasis on familial bonds and support systems that are known as family-centered societies (Thomas et al., 2017). As a key component of the broader social support system, families serve as support in motivating and sustaining health-promoting behaviors. They can enhance patient self-care by offering constructive support, such as emotional encouragement, informational guidance, and assistance with daily health-related activities, for instance, meal preparation and medication reminders (Luo et al., 2024). Medication adherence is a critical factor in achieving effective treatment outcomes among patients with hypertension. A systematic review by Shahin et al. (2021) identified family support as the most significant factor influencing medication adherence, emphasizing the value of family involvement in enhancing hypertension management.

Self-care behavior in individuals with hypertension plays a vital role in achieving blood pressure control, preventing associated complications, effective self-care that contributes to better clinical

outcomes, and a decreased risk of stroke and other cardiovascular diseases (Konlan & Shin, 2023). In this study, most respondents demonstrated moderate self-care behavior, indicating a partial yet inconsistent engagement in managing their condition. Moderate self-care behavior indicates that individuals with hypertension were making certain efforts to control their blood pressure to avoid complications. This finding suggested that while there is some awareness of the risks and severity of hypertension-related complications, the self-care practices may lack consistency, completeness, or optimal effectiveness (Karimi et al., 2024). In line with this, Sarfika et al. (2023) also found that individuals with hypertension often fall into the moderate self-care category.

Despite these findings, no significant association was found between family support and self-care behavior, which concurs with the study by Lee et al. (2010). This contrasts with prior research demonstrating that stronger family support is typically associated with better adherence to self-care behaviors and improved clinical outcomes (Bahari et al., 2019; Jeemon & Chacko, 2020; Susanto et al., 2024). Individuals with strong social support tend to exhibit higher levels of self-care behavior. A study conducted in Central Java found that family support and individuals' perception of their illness were significantly associated with self-care behaviors, with illness perception playing a more substantial role than family support in determining the level of self-care (Pahria et al., 2022). This was further supported by de Santana Silva et al. (2024), who emphasized illness perception as a critical determinant in hypertension management, suggesting a possible explanation for the lack of association observed in our study.

Self-care behaviors are influenced by various other factors, including educational level, marital status, access to health information, availability of facilities for physical activity, and individual self-care agency (Ademe et al., 2019; Motlagh et al., 2016). A cross-sectional study performed by Awoke et al. (2022) individuals with hypertension who had received formal education were 2.45 times more likely to engage in effective self-care practices compared to those without formal education. Spousal support also significantly contributes to lifestyle adherence, such as weight control and regular exercise, particularly in patients with higher BMI (Hosseinzadeh et al., 2019; Sarfika et al., 2023). This aligns with the respondents' characteristics in this study, the majority of whom are married and have received formal education. Few studies found that spouses can provide more psychological support than other family members (Shen et al., 2025) and patient with formal education tend to demonstrate greater resilience in the face of major setbacks, exhibit a stronger willingness to learn about their condition and prognosis, and actively engage in communication with their families to seek support (Kim et al., 2018).

Gender also plays a role in influencing self-care behavior among individuals with hypertension. Studies have shown that patients under the age of 50 tend to demonstrate better adherence to medication regimens compared to older individuals (Hosseinzadeh et al., 2019; Motlagh et al., 2016). This aligns with the findings of this study, where the majority of respondents were under the age of 65. Regarding the duration of hypertension, most respondents in this study had been living with the condition for 1–10 years, while only a few had experienced it for more than 20 years. This suggests that the majority were still in the earlier stages of the disease. However, previous research indicates that older age and a longer duration of living with hypertension are positively associated with improved self-care behaviors, as individuals have had more time to understand their condition and are more likely to engage in effective management practices. This may be attributed to increased exposure to health education and clinical experiences over time (Lee et al., 2010).

CONCLUSION

This cross-sectional study examined the relationship between family support and self-care behavior among individuals with hypertension. This study found that individuals with hypertension generally received good family support, reflecting the importance of family role in assisting individuals with hypertension. However, the absence of a significant relationship between family support and self-care behavior suggested that family involvement alone may not be sufficient to influence individuals' self-care practices. This highlights the need to explore additional strategies alongside family support to effectively promote self-care behavior. Healthcare providers are encouraged to support and educate families about hypertension, while also empowering individuals to enhance their self-care practices. Furthermore, future intervention studies are recommended to focus on strengthening family support, as well as improving patients' self-efficacy and motivation in managing hypertension.

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Original Research

Improving Stroke Prevention Behavior of The Elderly with Hypertension through The Family Empowerment Model

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A R T I C L E I N F O

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Knowledge
Stroke prevention

A B S T R A C T

The number of patients with hypertension is steadily increasing and poses a significant chronic health problem. Individuals with hypertension have an 87.5% risk of experiencing a stroke. The role of family caregivers is crucial in elderly care, particularly in stroke prevention. The family empowerment model is an approach designed to enhance self-efficacy, enabling individuals to make informed decisions regarding their health. This study aimed to examine the effect of a family empowerment model on stroke prevention behavior among the elderly with hypertension. This quasi-experimental study involved 132 families with hypertensive elderly, using multistage random sampling. A six-week intervention program consisting of education and skill-building activities was implemented. Stroke prevention behaviour was measured using the validated Elderly Stroke Prevention Behaviour Questionnaire (knowledge, attitude, and behaviour). Data were analysed using paired and independent t-tests. The Results show significant improvements were observed in the intervention group following the implementation of the family empowerment model ($p < 0.001$). Knowledge scores improved from 6.61 (SD = 1.86) to 9.15 (SD = 0.88), attitude scores improved from 17.11 (SD = 2.30) to 25.79 (SD = 3.30), and behaviour scores improved from 7.18 (SD = 2.20) to 9.02 (SD = 0.97). The eight-week empowerment model effectively improved stroke prevention behaviour among the elderly with hypertension. This model can be integrated into community-based programs to promote elderly self-care and reduce the risk of stroke. The Recommendations, empowering the elderly, are essential to enhance self-efficacy and overall quality of life.

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INTRODUCTION

Data from the World Stroke Organization indicates that the prevalence of stroke reaches 13.7 million new cases annually, with approximately 5.5 million deaths caused by stroke. Around 70% of strokes and 87% of stroke-related deaths and disabilities occur in low- and middle-income countries (Singh, 2021). According to the 2018 Basic Health Research (Riskesdas) data, the prevalence of

stroke is 10.9 per mille, meaning that 10.9 out of 1,000 Indonesian residents suffer from stroke (Ministry of Health, Republic of Indonesia, 2019).

One of the most common risk factors for stroke in the community is hypertension. Often referred to as a "silent killer," hypertension typically presents without clear symptoms and is frequently only diagnosed after complications such as stroke or heart attack occur (Ministry of Health, Republic of Indonesia, 2023). Research by Sofiana & Rahmawati (2019) found that found a significant correlation between hypertension and stroke, with hypertensive individuals having an 87.5% risk of experiencing a stroke. The role of families in the early detection of stroke symptoms is crucial to prevent more severe complications. A study by Sari, Murni, and Nurmala (2023) confirmed that family knowledge about stroke signs and symptoms is associated with the severity of stroke in patients.

Stroke can be prevented by modifying risk behaviors, including adopting a healthy lifestyle and managing underlying conditions (Owolabi, et al., 2022). Family support plays a vital role in shaping these preventive behaviors by educating and assisting elderly individuals in managing risk factors (Parellangi et al., 2023). This is supported by Hosseini et al. (2023), who found that lifestyle-based family empowerment programs were effective in reducing cardiovascular risk factors.

The family empowerment model is an approach designed to enhance a family's capacity to support elderly care, particularly in making health-related decisions. This, in turn, enhances self-confidence and self-efficacy, which positively impact the capabilities of the family and the quality of life of the elderly. Family empowerment involves enabling families to change their behavior (Caro et al., 2018). Its primary aim is to increase family knowledge related to health promotion, and it has been shown to improve the quality of life for stroke patients (Luthfa, Yusuf, Fitryasari, & Khasanah, 2025). A study by Boonyathee et al. (2021), which implemented a Social Support Family Caregiver Training Program (SSFCTP) over 12 weeks, demonstrated significant improvements in family knowledge, self-efficacy, and caregiving behaviors for elderly individuals with hypertension. Likewise, Izadi-Avanji (2020) revealed that family-focused empowerment models could improve the quality of life for stroke patients.

The family empowerment model developed in this study focuses specifically on improving family knowledge, attitudes, and behaviors related to stroke prevention. This approach empowers families to support elderly individuals in self-care, with the ultimate goal of reducing stroke risk and enhancing quality of life. Unlike previous studies that emphasized self-efficacy, caregiver burden, or patient compliance with medical checkups (e.g., blood pressure, cholesterol, or glucose monitoring), the model in this study emphasizes family capacity-building through targeted stroke prevention education, early symptom detection training, and facilitation of physical activity. Families are encouraged to actively support and empower the elderly by guiding them in physical exercises and the adoption of a healthy lifestyle to prevent stroke. The objective of this study is to examine the effect of a family empowerment model on family behavior, specifically, their knowledge, attitudes, and behaviors regarding stroke prevention among elderly individuals with hypertension.

METHOD

This study employed a quasi-experimental pre-posttest design with a control group to evaluate the influence of the family empowerment model on stroke prevention behavior among elderly individuals with hypertension. The research was conducted in East Jakarta from April to November 2024. A multistage random sampling method was used to select participants. Participants were then evenly allocated into intervention and control groups (66 participants in the intervention group and 66 participants in the control group). The total sample consisted of 132 families with elderly hypertensive members.

In the intervention group, the family empowerment model was implemented through eight sessions over eight weeks. Weekly home visits were conducted using a door-to-door approach, during which one intervention was delivered. The family then independently implements the intervention by empowering the elderly. Progress was monitored weekly using a standardized monitoring booklet, and the next intervention was provided during the following visit. This cycle continues until the eighth week. These interventions utilized modules on stroke prevention, early detection of stroke, and stroke prevention interventions (Physical exercises to prevent stroke). Meanwhile, the control group received the standard interventions provided by local primary healthcare centers (Puskesmas) through home visits, where actions were taken based on the specific issues identified within each family.

Data collection was conducted using a stroke prevention behavior questionnaire (knowledge, attitude, and behavior), which was developed by the researchers. Knowledge comprised 10 items with true/false answers (true=1 and false=0), attitude consisted of 10 items uses a four-point Likert scale with options ranging from strongly disagree (0) to strongly agree (3), and stroke prevention behavior comprised 10 items with responses categorized as performed (1) and not performed (0). All instruments underwent validity and reliability testing, yielding positive results. Instrument testing results demonstrated Knowledge (r-value > 0.386; Cronbach's alpha = 0.824), Attitude (r-value > 0.397; Cronbach's alpha = 0.856), and Behavior (r-value > 0.487; Cronbach's alpha = 0.847). Data were analyzed using dependent (paired) and independent t-tests to assess differences within and between groups. Prior to implementation, researchers obtained permission from the Health Office of DKI Jakarta, along with ethical clearance from the Ethics Committee of Poltekkes Kemenkes Jakarta III (No. LB.02.02/F.XIX.21/3765/2024).

RESULT

Table 1. Frequency Distribution of Family Characteristics

Variable	Intervention Group		Control Group	
	N	%	N	%
Age				
1. 20-44 years	53	80.3	60	90.9
2. 45-59 years	13	19.7	6	9.1
Gender				
1. Male	18	27.3	28	42.4
2. Female	48	72.7	38	57.6
Marital Status				
1.Married	61	92.4	54	81.8
2.Not Married	5	7.6	12	18.2
Education				
1. < High School	22	33.3	19	28.8
2. ≥High School	44	66.7	47	71.2
Occupation				
1. Working	41	62.1	39	59.1
2. Not Working	25	37.9	27	40.9
Income				
1. Less than adequate	31	47	40	60.6
2. Adequate	35	53	26	39.4
Family Tipe				
1. Nuclear Family	47	71.2	48	72.7
2. Extended Family	19	28.8	18	27.3

An analysis of family characteristics showed that the majority of participants in both groups were female and aged 20–44 years (adults). Most participants were married and had completed at least high school education. In both groups, most families reported being employed, although approximately half stated their income was insufficient. Additionally, the nuclear family structure was the most common in both the intervention and control groups.

Table 2. Analysis of Differences in Stroke Prevention Behaviors of Families Before and After Intervention with The Family Empowerment Model in the Intervention and Control Groups

Variable	Group	Mean	SD	Mean Difference	p-value
Knowledge	Intervention				
	Before	6.61	1.872	2.54	<0.001
	After	9.15	0.881		
	Control				
	Before	6.76	1.969	0.21	0.389
	After	6.97	1.856		
Attitude	Intervention				
	Before	17.11	2.301	8.86	<0.001
	After	25.79	3.279		
	Control				
	Before	17.42	2.184	0.44	0.117
	After	16.98	2.166		
Behavior	Intervention				
	Before	7.18	2.204	1.84	<0.001
	After	9.02	0.936		
	Control				
	Before	7.59	2.097	0.14	0.588
	After	7.45	2.171		

The dependent t-test revealed significant improvements in knowledge, attitude, and behavior within the intervention group, with all p-values <0.001. In the intervention group, significant differences were observed before and after the implementation of the family empowerment model. Knowledge scores improved from 6.61 (SD = 1.86) to 9.15 (SD = 0.88), attitude scores improved from 17.11 (SD = 2.30) to 25.79 (SD = 3.30), and behaviour scores improved from 7.18 (SD = 2.20) to 9.02 (SD = 0.97). Based on these

three variables, the largest mean difference is 8.86 points in the attitude variable, and the smallest is 1.84 points in the behavior variable, whereas in the control group, no significant differences were found.

Table 3. Analysis of Differences in Stroke Prevention Behaviors of Families After Intervention with the Family Empowerment Model in the Intervention and Control Groups

Variable	Group	Mean	SD	95% CI	p-value
Knowledge	Intervention	9.15	0.881	1.681-2.682	<0.001
	Control	6.97	1.856		
Attitude	Intervention	25.79	3.279	7.846-9.760	<0.001
	Control	16.98	2.166		
Behavior	Intervention	9.02	0.936	0.985-2.136	<0.001
	Control	7.45	2.171		

The independent t-test results reveal significant differences in family knowledge, attitude, and behavior between the intervention and control groups following the implementation of the family empowerment model, with p-value consistently <0.001. These results confirm that the family empowerment model was effective in improving families' knowledge, attitudes, and behaviors related to stroke prevention in the elderly.

DISCUSSION

Family Characteristics

The results of the study show that the majority of families were adults aged 20–44 years, predominantly female, married, employed, and came from nuclear families, although approximately half reported having insufficient income. These findings are consistent with those of Septianingrum (2024) and Zuraidah et al. (2024), who found that most caregivers were adult married women, reflecting prevailing cultural expectations in Indonesia. Adults in this age range tend to demonstrate emotional maturity, enabling them to provide effective care for elderly family members. This aligns with the qualitative research findings of Rahmawati (2022), which highlighted the emotional and spiritual dedication families bring to caregiving. Her study described how caregivers persevere through challenges with patience, sincerity, and faith, often turning to prayer and consistent religious practice as sources of strength and resilience when caring for elderly relatives.

Interestingly, this study identified a younger age group of caregivers compared to Boonyathee et al. (2021), who reported that caregivers were predominantly aged 50–59 years. This difference may be attributed to variations in family structures and caregiving dynamics. In the current study, most participants came from nuclear families, where adult children, often in their 30s or 40s, served as the primary caregivers for their aging parents. Conversely, the study by Boonyathee et al. (2021) appears to reflect a context of extended family structures, where elderly spouses or older adult children (aged 50–59) assume the caregiving role, possibly due to the very advanced age of the care recipients. These contextual differences highlight the importance of considering cultural and familial patterns when examining caregiving roles across populations.

Stroke Prevention Behavior

The study results revealed significant improvements in stroke prevention behaviors (knowledge, attitude, and actions) before and after implementing the family and elderly empowerment model. The mean increase in knowledge was 2.54 points, in attitude was 8.68 points, and in behavior was 1.84 points, with statistically meaningful differences observed between the intervention and control groups.

Enhancing knowledge and caregiving skills through structured educational programs, such as training sessions, has proven to be effective. This study demonstrated that providing education to families through training programs using stroke prevention modules, early stroke symptom detection, and stroke prevention interventions helped improve families' understanding and skills in caring for elderly individuals with hypertension. Families were actively involved in teaching healthy lifestyle behaviors and monitoring the elderly's health progress using structured monitoring books, thereby reinforcing the crucial role families play in elderly care. These results align with Bakri, Irwandy, & Linggi (2020), who reported that home-based stroke care education enhances family knowledge and caregiving ability.

Our findings also support previous evidence from Setiawati et al. (2022) and further extend the literature by demonstrating not just short-term awareness but also long-term behavioral changes. Through the empowerment process, caregivers were able to consistently apply stroke prevention behaviors at home, improving overall caregiving quality. his is consistent with Husnaniyah, Hidayatin, & Handayani (2021), who found that the majority of respondents engaged in positive stroke prevention behaviors after targeted interventions. Knowledge of hypertension management plays a pivotal role in preventing stroke among elderly individuals. Adequate and accurate knowledge enables caregivers to provide appropriate health services, recognize risk factors, and respond to potential complications. This finding is also supported by Safitri & Agustin (2020), who highlighted that strong caregiver knowledge and motivation are critical to effective stroke prevention in hypertensive patients.

In terms of behavioral changes, family attitudes towards stroke

prevention showed the most significant improvement. After participating in the intervention, families increasingly recognized that hypertension is a serious health risk that can lead to stroke They also developed a stronger belief that stroke is preventable and took proactive steps to meet the needs of elderly members, especially when they were unwell. This is supported by Dziesetuo et al. (2024), whose study showed improvements in family attitudes and awareness following stroke-related education.

Family Support

These findings emphasize the important role of family support in stroke prevention, which is further discussed below. Family support plays an important role in shaping stroke prevention behaviors, particularly through risk factor management and the provision of knowledge (Parellangi, et al., 2023). Research conducted by Ambarika and Anggraini (2022) found a significant relationship between family support and the occurrence of recurrent strokes. Emotional strength, love, and practical caregiving from family members serve as powerful motivators for elderly individuals to engage in preventive health behaviors. These findings are supported by Dongdong Li et al. (2025), whose study on the knowledge, attitudes, and practices of family members caring for stroke patients revealed significant positive correlations among all three variables: knowledge and attitude, knowledge and practice, and attitude and practice. Knowledge directly influences attitudes and practices, while attitudes directly affect practices.

The ability of families to guide the elderly in adopting healthy lifestyle habits, including regular physical activity and appropriate dietary practices, has a strong motivational impact. Although not all elderly individuals are able to implement them well, especially in managing their dietary patterns, after the 8-week intervention period, elderly individuals gradually managed to follow a hypertension diet, resulting in controlled blood pressure. Research by Hosseini, et al. (2023) revealed significant differences in blood pressure, physical activity, and dietary patterns between the intervention and control groups after implementing a family-centered empowerment program based on a lifestyle aimed at preventing risk factors for cardiovascular disease. Future studies should examine the specific factors that influence the effectiveness of family involvement in promoting healthy lifestyle behaviors among the elderly, particularly in dietary management, and assess the sustainability of such interventions over longer periods.

Elderly Empowerment

The involvement of elderly individuals in their own care through empowerment by their families enhances self-confidence, as they feel included in managing their diet and activities. This finding aligns with the study by Susanti, Manurung, and Pranata (2018), which demonstrated a strong positive relationship between family support and elderly self-esteem. Dewi and Wati (2022) also found correlation between family knowledge and patient self-efficacy, which plays a critical role in preventing stroke recurrence. Additionally, Pedersen, et al. (2020) reported that self-management interventions significantly improved self-efficacy, with a notable difference between intervention and control groups ($p = 0.003$).

Family participation in educating elderly individuals about healthy lifestyles and facilitating stroke-preventive physical exercises was shown to contribute meaningfully to their awareness and motivation to maintain health. The use of a monitoring book throughout the intervention enabled the research team to systematically track the engagement of older adults in implementing the recommended health behaviors aimed at stroke prevention. Future research is recommended to explore factors influencing long-term dietary adherence and sustained engagement in stroke prevention behaviors among hypertensive elderly.

This study is limited by a short intervention duration, which does not allow assessment of long-term effects; reliance on self-reported data that may be affected by subjective biases such as social desirability and recall errors; and a localized context that may restrict the generalizability of the findings to broader populations with different characteristics.

CONCLUSION

This study demonstrates that the family empowerment model effectively enhances stroke prevention behaviors among families caring for elderly individuals with hypertension. By strengthening family involvement, this intervention improves the quality of care provided to the elderly and promotes their engagement in self-care behaviors. Interventions involving education, training, and support for the elderly encourage a greater active role of the family in promoting a healthy lifestyle, including proper diet, increased physical activity, stress management, medication adherence, and regular blood pressure monitoring. Such sustained family support fosters a positive environment that enables elderly individuals to adopt and maintain healthy habits. As a result, their self-efficacy and quality of life improve, contributing directly to a reduced risk of stroke. The practical implications of this model highlight its value in strengthening the family's role within stroke prevention programs for the elderly. Further research is recommended to assess the long-term sustainability of these outcomes and to explore adaptations of the model for various cultural settings and other chronic diseases.

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Original Research

Navigating Survival: A Phenomenological Exploration of Families Caring for Schizophrenia Patients during Pandemic

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A R T I C L E I N F O

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A B S T R A C T

The role of the family in caring for individuals with schizophrenia is crucial, particularly in providing emotional support, monitoring treatment, and assisting with daily activities. This involvement inevitably leads to care burden, which can result in inadequate care during the pandemic. This study aimed to explore how families adapted to caring for a family member with schizophrenia during the pandemic. This qualitative study employed a phenomenological approach and was conducted in East Java, Indonesia. The participants included seven family members who provided care for individuals with schizophrenia within their households; none of the participants were related to each other. Data were collected through semi-structured, in-depth interviews and analyzed using interpretative phenomenological analysis (IPA). Four main themes were found by the thematic analysis, including: 1) Feeling an excessive burden of caring; 2) Hoping for the recovery of schizophrenia patient; 3) A sense of responsibility to continue caring for schizophrenia patient (core theme); 4) Trying to survive in caring for schizophrenia patient during the pandemic. The findings suggest that nurses can help alleviate family caregiving burdens through targeted interventions such as Community Mental Health Nursing and Psychosocial Mental Health Support, crucial strategies for maintaining family well-being and preventing patient relapse.

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INTRODUCTION

Schizophrenia is a heterogeneous global problem, having different impacts depending on age group, type, and management of incidents in each country (Crespo-Facorro et al., 2021). It is a chronic mental disorder characterized by distortions in thinking, perception, emotion, language, sense of self, and behavior, affecting approximately 24 million people worldwide, or 1 in every 300 individuals (0.32%). People living with schizophrenia often

experience significant functional impairments, making the role of the family vital in supporting their recovery, improving productivity, and preventing stigma and discrimination. (World Health Organization, 2022). The role of the family in caring for schizophrenia patients is importance, particularly in providing emotional support, monitoring treatment, and assisting with daily activities (Caqueo-Urízar, Rus-Calafell, Urzúa, Escudero, & Gutiérrez-Maldonado, 2015; Hu et al., 2025). This involvement inevitably leads to care burden, which can result in inadequate care (Ilmy, Noorhamdani, & Windarwati, 2020; Setiawati, Sawitri, & Lesmana, 2021). Numerous studies emphasize that families are not only the primary source of emotional and instrumental support for individuals with mental health conditions but also serve as the largest group of informal care providers in the community (Gutiérrez-Maldonado & Caqueo-Urízar, 2007; Stuart, Keliat, & Pasaribu, 2016). Moreover, patients and their families are classified as a group that is vulnerable to psychological problems during the current pandemic (Keliat et al., 2020).

One of the most pressing challenges for families of individuals with schizophrenia is the ability to maintain continuity of care and treatment adherence in times of crisis (Kalayci, Uzunaslan, & Uzunaslan, 2023). The difficulties encountered during such periods often require families to adapt, which in turn affects their functioning and the patient's recovery (Chien et al., 2006; Darban, Mehdipour- Rabori, Farokhzadian, Nouhi, & Sabzevari, 2021). The subjective experiences of both patients and their families are closely tied to how they adapt to challenges, which is shaped by the various social determinants of mental health they encounter. These determinants include factors such as income, employment status, socioeconomic background, education, food security, housing quality, social support networks, experiences of discrimination, childhood adversities, and the characteristics of the neighborhoods in which they live (Kirkbride et al., 2024). The pandemic directly disrupted many of these determinants, thereby indirectly impacting the quality of care provided by families.

Although the pandemic has ended, it significantly altered family dynamics, requiring families to profoundly adapt and strengthen their resilience in response to the changes they experienced (Gayatri & Irawaty, 2022). In Indonesia, the collectivist culture places a strong emphasis on the family's role in providing care for members who are ill, which exemplifies culturally sensitive patient-centered care. (Cipta et al., 2024). Families are therefore expected to be adaptable to varying and often sudden changes in circumstances, including the transition from wellness to illness and the recurrence of symptoms associated with relapse (Fitryasari, Yusuf, Nursalam, Tristiana, & Nihayati, 2018). Previous research has demonstrated that a comprehensive under-standing of schizophrenia, encompassing its prognosis and treatment, can enhance family management during the caregiving process. This knowledge can alleviate the burden of care, even amidst changing global conditions (Ilmy, Windarwati, Noorhamdani, & Wijaya, 2022).

This study aims to explore how families in East Java adapt to caring for a family member with schizophrenia during the COVID-19 pandemic. The results of this study are expected to provide insights into the needs and support required by families, as well as provide information for policymakers and mental health professionals in designing appropriate interventions for them. Additionally, by grounding research in the cultural context of East Java, this study contributes to the global understanding of schizophrenia care in times of crisis. These findings can help in developing more effective and culturally sensitive strategies to support families in their role as primary caregivers for individuals with schizophrenia, especially in crisis situations such as the COVID-19 pandemic.

METHOD

Study Design

This qualitative research uses a phenomenological approach to understand how different people perceive and interpret life experiences (Creswell, 2015). This study was conducted in the East Java Provincial Health Office's jurisdiction from November 2020 to February 2021. According to the 2018 National Health Research data, the prevalence of households with members diagnosed with schizophrenia/psychosis in East Java was 6.4 per thousand, which is lower than the national prevalence (Badan Litbangkes Kemenkes RI, 2018).

Study Participants

The study involved seven family members who served as caregivers to individuals diagnosed with schizophrenia (see Table 1). Inclusion criteria were: 1) Aged 26 – 65 years; 2) Family members who provide care for schizophrenia patients, reside in the same household, and share a familial relationship through blood ties; 3) Having a family member diagnosed with schizophrenia (F.20) exhibiting positive symptoms; 4) Healthy physically and mentally; and 5) Able to communicate well in two directions with researchers. Participants were selected using a snowball sampling technique, beginning with recommendations from the mental health program's nurse manager. Initial participants then referred other eligible caregivers who met the inclusion criteria. Prospective participants who meet the inclusion criteria may be excluded (exclusion) if they resign during the research process. Participant criteria were confirmed with data from the primary care facilities in the area where the prospective participant resided.

Table 1. Demographic Characteristics of Family Caregivers of Patients with Schizophrenia

Participant	Age	Sex	Marital Status	Relationship with Patient	Patient		
					Age	Sex	Duration of illness (year)
P1	65	Female	Married	Mother	34	Male	5
P2	61	Female	Widower	Mother	28	Female	3
P3	65	Male	Married	Father	39	Male	4
P4	58	Male	Married	Father	25	Male	3
P5	60	Female	Widower	Mother	32	Male	6
P6	59	Female	Married	Mother	28	Female	4
P7	63	Female	Married	Mother	27	Male	3

Data Collection

The first author conducted data collection using a semi-structured in-depth interview approach, serving as the main instrument in the study. The validity of the researchers (two researchers as interviewers) was supported by their educational background, mental health expertise, and familiarity with the research setting. Additionally, the reliability of the researcher was ensured through the use of detailed field notes and high-quality recording equipment (voice recorder in smartphone). Maintaining both validity and reliability is essential to minimize potential bias in research findings, as the data collection process involves formulating questions, actively listening, and observing participants' behaviors throughout the interviews.

Interviews were conducted in participants' neighborhoods in a setting made as conducive and comfortable as possible. The interviews was carried outwith interview guidelines and use Indonesian (participants are allowed to answer in Javanese if they have difficulty expressing themselves in Indonesian), which included a) The ability and process of families caring for schizophrenia patients before the pandemic; b) Family efforts in caring for patients during the pandemic, both to meet basic needs and treatment; c). The role of community leaders, cadres, and community leaders in caring for schizophrenia patients; d) social, economic, and emotional conditions felt by families during the pandemic; and e) Family expectations during caring for schizophrenia patients during the pandemic. The researcher met with the participants in two meetings, namely 1) The first meeting was to build relationships, explain the purpose of the study, and give informed consent; 2) The second meeting was in-depth interviews (one meeting without additional interviews), followed by giving appreciation to participants who have been willing and taken the time to be interviewed (recommendations for fulfilling the respect for persons aspect in research ethics). The interview lasted 30-40 minutes. Before interviewing family members, the interviewer asked for background information about the patients and their caregivers (age, gender, marital status, type and duration of illness). During the interview process, researchers utilized field notes to document events pertinent to the interview, based on observations (such as nonverbal movements, environmental influences, and facial expressions). Interviews were transcribed and analyzed on the same day.

Data Analysis

Data analysis employed Interpretative Phenomenological Analysis (IPA), a qualitative methodology designed to explore how individuals make sense of their experiences (Smith, Flowers, & Larkin, 2009). The interview transcripts were reviewed, coded, and organized into emergent themes aligned with the study's objectives. Initial coding was carried out by the primary researcher, followed by collaborative discussions among the research team to refine interpretive validity. Regarding translation, the original verbatim quotes were carefully translated into Indonesian by bilingual researchers proficient in both languages. To enhance the credibility of findings, *data source triangulation* was conducted by involving nurses from primary care facilities and relevant community stakeholders in validating and confirming the emerging themes. In this manuscript, selected participant quotes are presented to illustrate each theme and have been translated into English for clarity.

Ethical Clearance

This study has been declared ethically feasible by the Health Research Ethics Committee, Faculty of Medicine, Universitas Brawijaya, with the number 120/EC/KEPK-S2/06/2020. The researchers adhered to key ethical principles, including respect for human dignity, beneficence, non-maleficence, and justice throughout the study.

RESULT

Based on the results of data analysis conducted through in-depth interviews with families who provide care for schizophrenia patients, four distinct themes have been identified, namely: 1) Feeling an excessive burden in caring during the pandemic; 2) Hoping for the recovery of schizophrenia patients; 3) A sense of responsibility to continue caring for schizophrenia patients; and 4) Trying to survive in caring for schizophrenia patients during the pandemic. Each theme is described as follows:

Theme 1: Feeling an excessive burden of caring

This theme is compiled based on family statements regarding the burden felt to be increasing during the COVID-19 pandemic. This theme is compiled based on two conditions, namely feeling anxious during the pandemic and increasing financial burden during the

pandemic. In the context of anxiety, families experience anxiety due to various situations. The primary concern is the lack of understanding regarding the COVID-19 virus. Furthermore, the anxiety stems from the apprehension associated with the various signs and symptoms of COVID-19, which may result from infection.
"Sure thing, but I'm not sure what the corona virus is all about. It seems like no one here has gotten it. They just told me to be careful and take care of myself. Well, it's not really visible." (P3)
"Yes, actually I'm worried, there was an appeal from the village officials, like a runny nose, shortness of breath, fever, cough, shortness of breath due to corona. Yesterday I had a fever, sir. I was confused but fortunately now I'm healthy, sir, maybe I was tired yesterday" (P6)

The anxiety experienced by the family causes the family not to travel outside the home. The statement that shows this is as follows.
"During the pandemic like this, I'm worried about going anywhere, I'm afraid that I'll get infected and it will be a burden on my family later" (P4)
"Hopefully the corona pandemic can be finished soon, so that you are not afraid to go anywhere. Yes, hopefully you don't get infected, because if you get infected, it will add to the burden" (P5)

This can be interpreted as the family's desire for the COVID-19 pandemic to conclude swiftly, compounded by anxiety stemming from their apprehension of contracting the virus and exacerbating their existing burden. Furthermore, the family experienced anxiety related to the schizophrenia patient's condition during the COVID-19 pandemic, as elucidated in the following quote:
"We are worried that if corona is like this, we won't be able to survive. Everything is difficult. Moreover, my child needs treatment." (P4)
"Yes, I'm afraid that my child will suddenly relapse during a corona pandemic like this, who will help" (P3)

In addition to the psychological impact of anxiety, families are also experiencing the growing economic strain caused by the pandemic. Researchers interpret this subtheme as negative feelings resulting from the economic burden, primarily attributed to the implementation of restrictions that have led to a decrease in family income.

"The family income decreased, there was little work because of the pandemic. We had to borrow money from our neighbors to meet our daily needs" (P1)
"If it continues like this, we will definitely run out of money. Yes, expenses continue but there is no income. So where does the income come from? In a pandemic like this, we can't work" (P2)

Theme 2: Hoping for the recovery of schizophrenia patients
This theme is compiled based on several family statements in expressing family expectations for schizophrenia patients. Families want schizophrenia patients to recover as before even though it takes a long time. Shown by the following statements:
"Yes, my hope is that the child can recover and work again. If he recovers, it can improve the family's economy. I want to work again to help out my former employer. (P1)
"I hope my child gets better, sir. Yes, I totally get it if the condition is like this… I understand, sir, that mental illness can take a while to heal. (P5)

Families want schizophrenia patients to recover. When the patient recovers, the family has the hope of being able to live normally, as before having a family member with a mental disorder.

"I used to think it was wrong to have a child with a mental disorder, sir. I was really hurt when I found out that my son was the same age as his friends. I often felt jealous of the neighbors who seemed to have normal lives." (P6)
"Yes, I hope he can recover and work again. If he recovers like before, it can lift the family's economy. I will work again like before." (P7)

Theme 3: A sense of responsibility to continue caring for schizophrenia patients
This theme is formed based on family statements that lead to a sense of responsibility that the family has to continue caring for schizophrenia patients. Being responsible means being obliged to bear everything as a form of the role of the caregiver family. The family stated that they maintain a sense of patience in meeting basic daily needs. Shown by the following statements:
"Of course, the most important thing is to take care of him every day. His needs are met, because he's our precious child and we're his parents." (P3)
"Yes, I provide food and drinks every day.." (P1)
"But we do have to be patient, the hard part is that the child gets hungry easily. So the child keeps asking for food, until sometimes the food runs out. When he is hungry, he often screams. Especially during the pandemic, it was difficult for me to get my daily needs." (P5)
"Yes, if he wants to urinate or defecate, I will tell him to leave the room, rather than being careless. I unlocked it so I wouldn't do it in the room." (P7)

The family also considers that the treatment given is given every day. The statement shows the following:
"Yes, I gave him the medicine, he just had to wait patiently, if the medicine doesn't work, the child won't be able to sleep." (P2)
Families feel a sense of responsibility to safeguard schizophrenia patients and those in their vicinity. In this context, protection entails mitigating changes in patient behavior that may occasionally become uncontrollable.
"I tag along with him when he's out and about in front of the house. Sometimes, I can't help but worry about his little one, instead of him throwing a tantrum later. So, I guess I'll just have to keep an eye on him." (P2)
"So that it doesn't get worse, I put him in a room, so he doesn't wander everywhere and doesn't disturb the surrounding environment." (P4)
"I decided to talk to the neighbors, who might understand. Basically, I told everyone, especially those close to me, that my son was still mentally ill." (P3)

The family tries to adjust to the condition and treatment of schizophrenia patients. Adjusting is a family effort to successfully overcome the needs of conflict, tension, and frustration experienced. The family also states sincerity in carrying out treatment and forgives all mistakes that have been made. Shown by the following statements:
"Of course, sir. While I was taking care of him, I couldn't help but think about him. I forgave his mistakes as long as I was treating him with genuine care.

Yes, he's also family, sir. He deserves to be treated with sincerity." (P6)
"When I feel angry, I try to calm down because I don't want to let my emotions get the best of me and cause my child to act out." (P5)
The statement proves that the family adapts by not scolding and being patient in caring for them. The family realizes that scolding schizophrenia patients can reduce the mental health of schizophrenia patients.

Theme 4: Trying to survive in caring for schizophrenia patients during the pandemic

This theme is based on family statements regarding their efforts to survive in caring for schizophrenia patients during the COVID-19 pandemic. This theme is based on three situation, namely trying to maintain the health of family members during the pandemic, continuing to seek care and treatment for schizophrenia patients, and struggling to meet daily needs during the pandemic. First, families are trying to maintain the physical health of family members during the COVID-19 pandemic so that they do not get infected by the coronavirus, as evidenced by the following statements:

"For me, I try to be careful, because yesterday there was a socialization that it was mandatory to wear a mask when leaving the house. So, every time we leave the house we wear a mask. Rather than getting infected. Luckily, there was a distribution of masks yesterday, so we didn't buy them" (P3)

"*Well, basically the effort is to maintain health, me and my child... by eating and drinking enough, getting enough rest. So that we don't get sick easily, sir. Especially during this corona period. Even though it's a bit difficult for me, but it's my duty*" (P5)

Furthermore, the family endeavors to maintain psychological well-being by minimizing excessive stress levels.

"Yes, the same thing, the main thing is not to get stressed, it must be done... they say that if you are stressed, you will easily catch a virus. If the cadre spoke yesterday, if you are stressed, your immune system will easily drop like that" (P1)

Second, their experiences necessitate ongoing care and treatment for schizophrenia patients. Furthermore, families attempt to safeguard schizophrenia patients by instilling fear in them regarding the coronavirus. Furthermore, during the pandemic families have been actively involved in supervising and providing care for schizophrenia patients. These situations are evidenced by the following statements:
"Yes, I told the child that there was a corona virus. I scared him, that if he died from the corona virus, he could die" (P1*)*
"*Yes, whether I like it or not, I have to keep an eye on him at home, I'm afraid of relapsing. Because if I don't take my medication for 10 days, I'm not allowed to go anywhere. But luckily I can still get it from the puskesmas"* (P4)
"Alhamdulillah no, sir. Yesterday I told the posyandu cadre that we needed the medicine. Fortunately, the medicine was delivered by the nurse yesterday, so he didn't stop taking the medicine" (P3)

Third, families struggle to meet daily needs, both for the whole family and for schizophrenia patients. The family showed that the family was in debt and scavenged to get money to meet daily needs. In addition, the family received help from people around them. The help was received considering that the family had to survive during the COVID-19 pandemic.

"Yes, there is, yesterday the market was quiet because of corona, so I had no income, so I had to look for loans, so I had time to scavenge, to eat" (P2)
"Yes, what is surprising is that the neighbors still remember us. Yes, they helped us, we were given masks and food. Yes, everyone is feeling the hardship during this corona, so maybe it's a form of mutual assistance" (P3)
"Yes, Alhamdulüilah, I'm happy, I received the assistance yesterday, I was given basic necessities, yes money. Hopefully it can help, it's really hard during this pandemic" (P4).

The researchers concluded that the core theme of this phenomenon is "a sense of responsibility to continue caring for schizophrenia patients." This theme reflects how the family's sense of duty serves as the foundation for their ability to adapt while providing care during the COVID-19 pandemic. All participants expressed hope for the recovery of their family members with schizophrenia, highlighting the mental resilience of caregivers. Given that schizophrenia is a chronic condition that can persist for many years, families tend to develop a deeper understanding of the caregiving process and have long held hope for some degree of recovery.

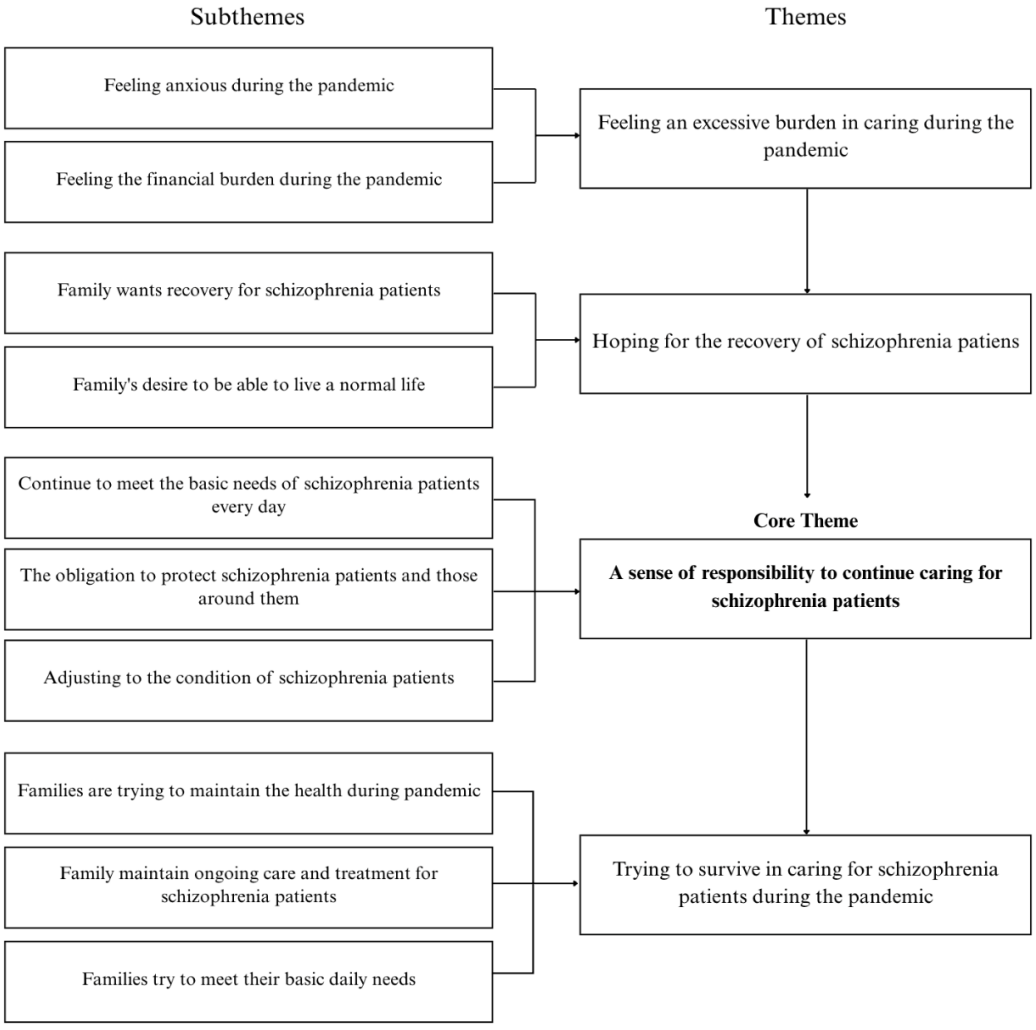

Figure 1. The development of themes and the connections between these themes in the phenomena

DISCUSSION

The primary theme identified in this study was "A sense of responsibility to continue caring for schizophrenia patients," which emerged as the most dominant theme across participant narratives. Through analyzing how families fulfilled their caregiving responsibilities during the pandemic, we found that this sense of responsibility encompassed providing for patients' basic needs, protecting both the patient and the family, and adapting to the specific challenges of caring for individuals with schizophrenia. This sense of duty often motivates caregivers to persist despite emotional and physical exhaustion, highlighting their resilience in managing complex care demands. Resilience, in this context, emerges as a multifaceted response to the burdens of caregiving, shaped by a variety of interrelated psychological, social, and environmental factors (Teahan et al., 2018). Families often develop coping strategies, such as seeking emotional support, relying on religious or cultural beliefs, and accessing community-based resources to manage their stress (Awad & Voruganti, 2008). The COVID-19 pandemic exacerbated these challenges by limiting access to mental health services and social support systems, thus increasing the reliance on family caregivers as the main source of care (Ali & Kumar, 2023). A thorough understanding of these dynamics is essential for healthcare professionals in designing interventions that effectively support both patients and their caregivers.

The unprecedented challenges posed by the pandemic have necessitated diverse strategies employed by families to ensure their survival and continued care for schizophrenia patients, maintaining the pre-pandemic level of support and assistance. In this study, families reported maintaining their physical and psychological health, continuing treatment despite limitations, and striving to meet daily needs under difficult economic conditions. This demonstrated their psychological resilience, a key factor in their ability to withstand sustained stress and adversity (Teahan et al., 2018). Resilience empowered them to manage emotional strain and physical fatigue, allowing them to continue caregiving despite limited resources and increased isolation (Geschke, Steinmetz, Fellgiebel, & Wuttke-Linnemann, 2024; Yates & Mantler, 2023). Moreover, social support and accessible mental health services were cited as critical to enhancing their adaptive capacity during the crisis (Bjorlykhaug, Karlsson, Hesook, & Kleppe, 2022; Snoubar & Zengin, 2022).

Based on these findings, we recommend the development of targeted interventions to foster psychological resilience among caregivers, regardless of professional background or sector.

Mental health nurses play a central role in building the capacity of families to care for individuals with schizophrenia. The implementation of Community Mental Health Nursing (CMHN) is a crucial component in enhancing the family's capacity to provide care for individuals with schizophrenia. Mental health nurses implement early detection activities, direct care, counseling, and education to address the challenges faced by families caring for schizophrenia. Related to family adjustments to the pandemic situations, two themes related to the experience of families caring for schizophrenia patients during the COVID-19 pandemic (feeling an excessive burden during the pandemic and trying to survive in caring for schizophrenia patients during the pandemic) have proven that families feel an additional burden that can lead to a relapse in schizophrenia patients. The findings of this study can serve as a foundation for mental health nurses to provide Psychosocial Mental Health Support (PMHS) to families caring for schizophrenia patients, such as providing counseling and establishing mutual support groups (Lohrasbi, Alavi, Akbari, & Maghsoudi, 2023). This activity seeks to enhance both physical and mental resilience within the community, making it of paramount importance for nurses at the primary care mental health service to provide PMHS and reduced demands on secondary care services (Kenwright, Fairclough, McDonald, & Pickford, 2024; Thongsalab, Yunibhand, & Uthis, 2023).

This study has limitations. It focuses exclusively on the perspectives of parents caring for children with schizophrenia, which frames caregiving within a traditional parent-child dynamic. While this viewpoint captures an important caregiving context, it does not reflect the broader diversity of caregiving relationships, such as those involving spouses, siblings, or adult children. These alternative dynamics could influence role shifts and familial relationships in different ways (Kaakinen, Coehlo, Steele, & Robinson, 2018). Future research should therefore consider a wider range of caregiver roles to better understand how family structures and responsibilities impact caregiving experiences.

CONCLUSION

Based on the findings of this study, a sense of responsibility to continue caring for schizophrenia patients emerged as the core phenomenon enabling families to navigate the caregiving experience during the pandemic. Researchers have discovered that families in Indonesia cultivate a culture of responsible care, regardless of the health status of their sick relatives. Clearly defined expectations and intentions in providing care for schizophrenia patients contribute to more effective family management and help mitigate the perceived burden of caregiving.

It is crucial for nurse to provide comprehensive education regarding the disease and appropriate care guidelines, particularly when families are responsible for the patient's care within their home environment. In addition, the establishment of support groups can facilitate the exchange of experiences among families, empowering them to cope with the psychological stressors associated with caregiving and ultimately improving the overall quality of care. The findings obtained can serve as a foundation for conducting further research on the adaptation of families in caring for schizophrenia patients, both quantitatively and qualitatively. Moreover, the Health Office is encouraged to offer comprehensive community-based mental health training to nurses at primary care facilities, ensuring that schizophrenia cases are appropriately identified and managed across the province.

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CONFLICT OF INTEREST

There is no conflict of interest

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Original Research

A Cross-Sectional Study on Knowledge and Attitudes about Sexual Harassment among Nursing Students

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A B S T R A C T

Sexual harassment against women is a growing problem that remains unresolved globally. Sexual harassment can cause trauma and even depression in victims. It can lead to psychological trauma and even depression in victims. Based on an initial survey of 20 female nursing students, 85% reported experiencing sexual harassment through words, stares, and whistles. Nurses are one of the health workers who are vulnerable to sexual harassment. The purpose of this study is to investigate the relationship between knowledge and attitudes of nursing students toward sexual harassment. This study employs univariate and bivariate analysis, using a quantitative correlational approach with a cross-sectional design, and the statistical test used is the chi-square test. The sample in this study consists of 199 first-year nursing students selected using purposive sampling. The study was conducted from January to March 2024. The results showed that 147 (73.9%) nursing students had good knowledge and 108 (54.3%) had a positive attitude toward sexual harassment, with a p-value of 0.014, indicating a significant relationship between knowledge and attitude toward sexual harassment. Good knowledge shapes students' attitudes toward sexual harassment. Students must continue to improve their knowledge about sexual harassment. Further research is encouraged to explore factors related to attitudes toward sexual harassment.

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INTRODUCTION

Cases of violence against women have increased each year and have become a problem in various countries. According to the World Health Organization (WHO), one in three women worldwide experiences physical or sexual violence (WHO, 2024). Data from the Online Information System for the Protection of Women and Children indicates that sexual harassment is 80% more likely to occur in women than in men (Komnas perempuan, 2021).

The National Commission on Violence against Women divides sexual violence into 15 types, one of which is sexual harassment (Tempo, 2022). Sexual harassment refers to unwelcome behavior with sexual undertones, often carried out unilaterally, and is typically unexpected and non-consensual (Dewi, 2019). In the United States, 81% of 1,182 women surveyed in 2019 reported experiencing sexual harassment, with verbal harassment being the most common (76%), followed by unwanted sexual touching (49%), cyber harassment

(40%), and physical harassment (27%) (UCSD Center, 2019). Similarly, Japan recorded a rise in indecent acts from 4,700 cases in 2022 to 6,100 cases in 2023 (McEvoy, 2024). Across Asia and the Pacific, 75% of women have experienced some form of sexual harassment, often due to limited access to justice and weak support systems (Women in News, 2021). In Denmark, 49% of women reported having experienced sexual harassment, while in Africa, the figure was 56%. Many victims in these regions choose not to report the incidents due to fear of workplace repercussions and the authorities' slow response. In Southeast Asia, 45% of women experienced verbal harassment, and 24% experienced physical harassment. In Arab countries, 52% of women reported experiencing sexual harassment (Women in News, 2021). Sexual harassment is a morally and culturally offensive act driven by uncontrolled desires (Paradiaz & Soponyono, 2022).

In Indonesia, the 2020 Annual Report from Komnas Perempuan noted that sexual harassment ranked among the top three reported forms of sexual violence, accounting for 181 out of 1,731 cases (Komnas perempuan, 2021). The number of reported cases continues to rise, including in Malang, where cases increased from 87 to 103 within a year (Redaksi, 2022). In Jakarta, 58% of 25,213 respondents reported verbal sexual harassment (Priherdityo et al., 2016). A 2021 survey found that 91.6% of women had experienced sexual harassment, with 61.5% being touched inappropriately and 37.6% being coerced into sexual activity. Victims often experience negative psychological effects such as depression, decreased appetite, becoming introverted, difficulty sleeping, and inability to focus (Novrianza & Santoso, 2022), decreased performance ability, experiencing psychological reactions such as somatic symptom disorder, and feeling hesitant to speak up to report events that have occurred (Trihastuti & Nuqul, 2020).

The provinces of Riau Islands, West Java, and DKI Jakarta have the highest number of reported sexual harassment cases in Indonesia. Cases of sexual harassment in Banten in the last three years have increased; in 2020 there were 472 cases, in 2021 there were 829 cases, in 2022 there were 1,131 cases, and in 2023 there were 1,980 cases (Mardiana, 2023). In Serang City, 47.9% of women reported experiencing verbal sexual harassment, such as catcalling and inappropriate flirting (BNN, 2022). In Tangerang City, there were 24 cases of sexual harassment in 2021 (Opendata Kabupaten Tangerang, 2020). These issues persist due in part to the public's limited knowledge about sexual harassment.

A study by Putri (2022) showed that 42% of respondents with good knowledge had still experienced sexual harassment, while 57.9% of those with poor knowledge were more vulnerable to it. Yusuf et al. (2023) found that 74.51% of respondents reported incidents of sexual harassment, 3.57% confronted the perpetrator, 18.8% verbally reprimanded the perpetrator, and 3.09% chose to remain silent. Sexual harassment can occur in various settings, including hospitals, health centers, clinics, and other healthcare environments. Nurses are particularly vulnerable. Based on an initial survey of 20 first-year nursing students at a private university in Tangerang, 85% reported having experienced verbal sexual harassment in the form of inappropriate comments, stares, and whistles, while 15% had not. In light of these findings, this study aims to examine the relationship between nursing students' knowledge and attitudes regarding sexual harassment.

METHOD

This study employed a quantitative research method with a cross-sectional design aimed at examining the relationship between nursing students' knowledge and attitudes toward sexual harassment. The sample consisted of 199 first-year nursing students at Pelita Harapan University. The sample size was determined using the Slovin formula, and participants were selected through purposive sampling. The inclusion criteria were students aged 18–21 years, Indonesian citizens, while the exclusion criteria included male respondents and those who did not complete the questionnaire.

The study utilized a questionnaire adapted from Minarsih (2018) originally developed to assess the relationship between knowledge and attitudes toward sexual harassment among female adolescents at SMAN 8 Aceh Barat Daya. This instrument had been previously tested for validity and reliability. The knowledge questionnaire consisted of 20 items, with an item validity coefficient of $r \geq 0.632$ and a Cronbach's alpha of 0.997. Knowledge was assessed using a Guttman scale with two response options: True and False. The attitude questionnaire also contained 20 items, with $r \geq 0.632$ and Cronbach's alpha of 0.993. Attitudes were measured using a four-point Likert scale with the options: Strongly Agree, Agree, Disagree, and Strongly Disagree.

Data analysis consisted of both univariate and bivariate analyses. Univariate analysis was used to describe the levels of knowledge and attitudes, presented in frequency and percentage. Knowledge levels were categorized as good, moderate, or poor, while attitudes were classified as either positive or negative. Bivariate analysis was conducted using the Pearson chi-square test to determine the relationship between knowledge and attitude regarding sexual harassment.

The study was conducted at the Faculty of Nursing of a private university in Tangerang, Indonesia, from February to April 2024. Data collection was carried out via an online questionnaire using Google Forms. This study received ethical approval from the Research Ethics Committee of the Faculty of Nursing and complied with ethical standards for human subject research as outlined in approval number KEP FON No. 039/KEPFON/I/2022. The ethical principles followed in this study include beneficence and non-maleficence, fidelity and responsibility, integrity, justice, and respect for participants' rights and dignity. All participants provided informed consent by selecting the statement "I accept to participate in the study" on the online consent form.

RESULT

Table 1. Characteristics of respondents (n=199)

Category	Frequency (n)	Percentage (%)
Age		
18-21	199	100
History of sexual harassment		
Yes	53	26.6
No	146	73.4
Father's education		
No formal education	3	1.5
Elementary school graduate	17	8.5
Junior high school graduate	24	12.1
High school graduate	100	50.3
College Graduate	55	27.6
Mother's education		
No formal education	2	1.0
Elementary school graduate	20	10.1
Junior high school graduate	25	12.6
High school graduate	94	47.2
College Graduate	58	29.1
Get information on sexual harassment		
Ever	183	92.0
Never	16	8.0
Previous Education		
Non-Health senior secondary school	178	89.4
Health senior secondary school	21	10.6

Out of the 199 participants, all (100%) were aged 18–21 years. A total of 178 participants (89.4%) had graduated from a non-health senior secondary school. Regarding parental education, 100 participants (50.3%) reported that their fathers and 94 participants (47.2%) reported that their mothers had graduated from senior high school. The majority, 149 participants (73.4%), reported never having experienced sexual harassment (Table 1).

Table 2. Level of knowledge about sexual harassment (n=199)

Category	Frequency(n)	Percentage (%)
Good	147	73.9
Moderate	51	25.6
Poor	1	0.5

Based on Table 2, 147 respondents (73.9%) demonstrated good knowledge about sexual harassment, 51 respondents (25.6%) had moderate knowledge, and only 1 respondent (0.5%) had poor knowledge.

Table 3. Attitudes of sexual harassment (n=199)

Category	Frequency (n)	Percentage (%)
Positive	108	54.3
Negative	91	45.7

As shown in Table 3, 108 respondents (54.3%) had a positive attitude toward sexual harassment, while 91 respondents (45.7%) had a negative attitude.

Table 4. Relationship between knowledge and attitude about sexual harassment (n=199)

Knowledge	Attitudes of sexual harassment						P-value
	Positive		Negative		Total		
	f	%	f	%	f	%	
Good	85	57.8	62	42.2	147	100	
Moderate	22	43.1	29	56.9	51	100	0.014
Poor	1	100	0	0	1	100	

Table 4 showed a p-value of 0.014, indicating a statistically significant relationship between knowledge and attitudes toward sexual harassment among female nursing students.

DISCUSSION

This study found that participants aged 18–21 fall within the late adolescent category, which is generally characterized by higher

intellectual capacity, critical thinking skills, responsible behavior, and increased awareness, factors that contribute to more informed attitudes toward sexual harassment (Hulukati & Djibran, 2018). This contrasts with the findings of Aufa (2021) , who observed that victims of sexual harassment were often children and adolescent girls under the age of 18. Similarly, Kaltsum et al. (2023) noted that while age influences cognitive and behavioral responses, individuals' experiences vary widely. Adolescents under 18 often lack a comprehensive understanding of sexual behavior and therefore require greater supervision and education (Amalia et al., 2018).

The majority of respondents in this study had graduated from non-health senior secondary schools. This aligns with the findings of Delfina et al. (2021), who reported that 73.4% of their participants had a high school education. The level of education can affect the way a person behaves and affect the process of obtaining information. However, Bonsaksen et al. (2024), found that participants with lower education levels (e.g., junior high school) had a limited understanding of their experiences, often resulting in emotional distress such as depression, loneliness, and low self-esteem.

Most of the respondents' parents had completed high school, a finding consistent with Handayani & Puspita Sari (2020), who emphasized the importance of parental education in providing sex education. Educated parents tend to adopt more protective and communicative parenting styles, monitoring activities, offering guidance, and discussing social relationships. In contrast, Suhariyanti & Margowati (2018) found that lower parental education levels were associated with reduced assertiveness in children. Parents often view discussing sexual issues with children as taboo, resulting in adolescents seeking information from peers or the media, which may lead to misinformation (Mertia et al., 2022).

This study also revealed that most respondents had received information about sexual harassment, supporting Rihardini's (2016) findings that 88.06% of adolescents had accessed sex-related information appropriate to their psychological needs. Chang et al. (2020) similarly reported that 77.3% of their participants were exposed to educational content about harassment, culture, gender, and healthcare, resulting in heightened awareness. Sayani (2023) found that lack of exposure to such information increased the likelihood of experiencing sexual harassment. In this study, 93.7% of participants reported that social media was their primary source of information. Research by Pohan et al. (2023) noted a strong link between social media use and attitude formation, while Adiyanto (2020) successfully used Instagram live sessions to educate students. However, Masae et al. (2019) cautioned that social media use does not automatically lead to accurate knowledge or positive attitudes.

A total of 147 respondents (73.9%) in this study demonstrated good knowledge of sexual harassment. This research is in line with the results of research conducted by Rusyidi et al. (2019), who found that students could effectively identify various forms of sexual harassment. Students have good knowledge due to age and education level. Knowledge levels were influenced by age and education; older and more educated students were more likely to internalize and retain such information (Bondestam & Lundqvist, 2020). Delfina et al. (2021), reported that late adolescents (aged 16–18) had better understanding compared to early adolescents. In line with research by Amalia et al. (2018) stated that individuals under 18 require targeted education and guidance. Wafa et al. (2023) emphasized the importance of schools in reinforcing respectful relationships and implementing anti-harassment policies.

Supiana et al. (2022) highlighted that reliable information sources, such as health professionals, print media, and television—contributed to higher knowledge levels. Conversely, Yusuf et al. (2023) identified that insufficient knowledge resulted from limited exposure and inadequate sex education.(Supiana et al., 2022). Chang et al. (2020) recommended comprehensive education on the causes and responses to harassment. In general, higher knowledge levels correlate with reduced risk of harassment (Person, 2021). In this study, knowledge was shaped by educational background, parental influence, and information sources.

This study also found that 57.8% of respondents held positive attitudes toward sexual harassment. This is in line with research conducted by Rismawanti (2021), where as many as 51% have a positive attitude because the information they get from various media such as the internet and magazines can strengthen a person's knowledge and attitude towards sexual harassment and the relatively young age, which makes them quick and easy to receive information. The same applies to research conducted by Wulandari et al. (2023), 58.9% of respondents have a good attitude because they have been exposed to information about sexual harassment from social media. Chang et al. (2020) found that 99.07% of women had a positive attitude towards sexual harassment because they were aware that women were more vulnerable to sexual harassment.

However, these results differ from Person (2021), who found that 60.8% of respondents had negative attitudes and were unsure how to respond to harassment. Mahmudah et al. (2016) also reported that many respondents held negative attitudes, increasing their vulnerability. Ashari (2021) emphasized the importance of assertive responses to harassment and the need for support from both families and schools (Minarsih, 2018). In this study, attitude was influenced by knowledge level, parental education, and access to information, factors that helped shape respondents' positive perspectives.

The study also showed a significant relationship between knowledge and attitude, with a p-value of 0.014. This finding is consistent with Person (2021), who stated that individuals with positive attitudes are typically those with good knowledge. Wulandari et al. (2023) also demonstrated a strong correlation ($p = 0.000$), reporting a 67.0% increase in positive attitudes after educational interventions.

However, this study contrasts with Yusuf et al. (2023), in which 74.28% of respondents had sufficient knowledge and 96.91% had a positive attitude toward sexual harassment. This sufficient knowledge was due to the respondents' lack of information and knowledge about sex education during childhood. Positive attitudes were evident in terms of reporting incidents of sexual harassment, but these positive attitudes were not always applied due to feelings of fear. Sepriyanti et al. (2022) also reported a discrepancy between knowledge and attitude: 50.0% of respondents had poor knowledge, yet 58.3% held positive attitudes. This gap was attributed to inadequate reproductive health education and weak parental relationships.

In conclusion, this study supports the notion that higher knowledge levels are generally associated with more positive attitudes among nursing students toward sexual harassment. A person's knowledge is shaped by education, cultural context, experience, and access to information (Ayu, 2022). However, knowledge alone does not guarantee a positive attitude, as personal experiences also play a role. In this study, most respondents obtained their information from the internet and social media, reinforcing the need for accurate, accessible, and age-appropriate content. Ultimately, good knowledge is a key factor in fostering positive attitudes toward preventing and addressing sexual harassment.

CONCLUSION

This study, conducted among 199 respondents, found that 73.9% of participants had good knowledge and 54.3% displayed a positive attitude toward sexual harassment. These findings suggest that good knowledge plays an important role in shaping a more informed and responsive attitude toward issues of sexual harassment. The better one's knowledge about sexual violence, the more positive their attitude towards this issue. The results highlight the need for continued efforts to improve students' knowledge, particularly among nursing students, who are expected to demonstrate sensitivity and awareness in handling such issues in their future professional roles. Further research is encouraged to explore factors related to attitudes toward sexual harassment. This study also acknowledges certain limitations. Notably, the questionnaire lacked explicit instructions encouraging respondents to complete it independently and honestly, without external assistance. This may have affected the authenticity of some responses. Future studies should address this by providing clear and detailed instructions to enhance data reliability.

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Original Research

Factors Influencing Mosquito Nest Eradication in Dengue Hemorrhagic Fever Prevention

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A R T I C L E I N F O

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A B S T R A C T

Dengue hemorrhagic fever (DHF) poses a significant public health risk in Indonesia. Despite government efforts to control disease vectors, the rising population density and mobility in Tangerang Regency have contributed to the rapid spread of DHF. This highlights the urgent need to eradicate mosquito nests for outbreak management and prevention. This study aims to identify risk factors associated with mosquito nest eradication in the Tangerang Regency. A cross-sectional design was used, with 400 participants selected through convenience sampling. Data were analyzed using logistic regression. The results of the multivariate analysis revealed age (p-value = 0.012), knowledge (p-value = 0.001), and support from healthcare workers (p-value = 0.003) as variables linked to mosquito nest eradication. Knowledge was the most dominant variable (OR = 5.857); individuals with low knowledge levels were 5.8 times less likely to engage in mosquito nest eradication compared to those with high knowledge after being controlled for age and support from health workers. These findings underscore the urgency of addressing these risk factors. Nurses can play a key role by providing health education to the community, emphasizing the importance of regularly draining and cleaning water containers, covering water storage, and reusing or recycling waste to reduce mosquito breeding sites.

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INTRODUCTION

Dengue hemorrhagic fever (DHF) is a severe viral illness transmitted by the Aedes aegypti mosquito, characterized by a sudden onset of high fever, weakness, rash, bleeding, and, in severe cases, shock (WHO, 2024; Wild et al., 2019). Globally, the incidence of DHF has increased significantly over the past few decades, with reported cases rising from 505,430 in 2000 to 5.2 million in 2019 (WHO, 2024). In Indonesia, DHF remains a significant public health issue. The number of persons infected and the geographical spread has grown along with increased mobility and population density. Indonesia ranks second among the 30 DHF-endemic countries in terms of total cases (Ministry of Health RI, 2018; Sanyaolu, 2017). Tangerang District experienced a notable surge in DHF cases in

2016, with 1,253 cases and 22 deaths, a significant increase from the 373 cases reported in 2015 (Ministry of Health RI, 2018). This surge underscores the urgent need for more effective vector control measures.

The government has faced significant challenges in eradicating mosquito nests through epidemiological investigations, fumigation, case finding, and treating victims throughout Tangerang Regency. A community-based strategy has been implemented by forming *juru pemantau jentik* (*jumantik*) or larval monitoring cadres. These specialized groups conduct periodic larval checks to monitor mosquito breeding sites (Ministry of Health RI, 2016). The local government has also taken active steps and actively engages in socialization efforts, especially training community members to become *jumantik* at home. However, the goal of controlling dengue outbreak is limited due to the increasing population density and mobility of residents within the region. This challenge is exacerbated by the expanding transportation network, contributing to the broader spread of the dengue virus. Moreover, the efficacy of mosquito nest eradication activities is hindered by inadequate behavioral factors and insufficient population involvement (Rau et al., 2019).

Despite the widespread nature of DHF, it can be controlled through implementing vector control strategies such as mosquito nest eradication. However, this strategy requires a community-wide effort to ensure its success. A study conducted in Airmadidi Village, North Minahasa, highlighted the significance of knowledge and practice in mosquito nest eradication (Torondek et al., 2019). Additionally, another study in South Birobuli Village identified a correlation between knowledge, attitudes, the availability of health facilities, and the active involvement of health workers in community-based prevention in eradicating mosquito nests (Rau et al., 2019). Ultimately, the effectiveness of these programs depends on the community's knowledge, awareness, and attitudes toward DHF prevention (Hossain et al., 2021). Tangerang represents a densely populated and rapidly developing area in Indonesia that continues to experience periodic surges in DHF cases. Despite government efforts to promote community-based prevention, such as the implementation of jumantik programs, the recurrence of outbreaks suggests potential gaps in behavioral, environmental, or systemic factors. Understanding what influences community actions in mosquito nest eradication in this region is crucial for refining public health strategies, tailoring health education campaigns, and strengthening community engagement. Therefore, this study explores the factors influencing mosquito nest eradication in the context of DHF prevention in the Tangerang Regency.

METHOD

This is a cross-sectional study. A total of 400 respondents were selected using convenience sampling in Tangerang Regency. This method was chosen due to limited access to a complete sampling frame and the need to conduct the survey online during public health restrictions. Inclusion criteria include residents of Tangerang Regency over 17 who provide consent to participate. A web-based survey was designed by the researchers and disseminated among a professional network of research members specializing in the study area. The survey was developed using Google Forms and distributed digitally via messaging applications (e.g., WhatsApp). Participants accessed the survey via a secure link and completed it voluntarily after reading an informed consent form. Participants were asked to complete a five-part questionnaire consisting of (1) Participants' characteristics including initials, gender, age, highest education level, and occupation; (2) Knowledge about DHF and its prevention, with 20 items, was measured on a scale indicating poor, moderate, and good knowledge; (3) Attitudes toward preventing DHF, with 14 items, were measured on a scale of negative and positive attitudes; (4) Support from healthcare workers in preventing DHF, with two items, is measured by the presence or absence of support; (5) Community actions in mosquito nest eradication, with six items, measured by yes or no responses (Dewi, 2015). The researchers conducted a validity and reliability test with a separate group of 30 respondents who were not part of the final sample, and the results showed that the questionnaire was valid and reliable (Cronbach's Alpha $\geq$ 0.7). Data were analyzed using logistic regression to determine the variables most closely associated with mosquito nest eradication. This research was approved by the Research Ethics Committee of the Faculty of Nursing, Universitas Pelita Harapan (No. 055/RCTC-EC/R/I/2021).

RESULT

A total of 400 participants were recruited for the study. The majority were aged 40 years or younger (53.3%), female (59.5%), and had attained a higher level of education (56.0%). Most respondents demonstrated good knowledge (68.3%) and held a positive attitude (56.7%) toward mosquito nest eradication. Additionally, the majority were employed (61.5%) and reported receiving support from healthcare workers (65.8%) in efforts to eradicate mosquito nests (Table 1).

Table 1. Participant characteristics (n = 400)

Characteristics	Total	Percentage (%)
Age		
≤ 40 years old	213	53.3
>40 years old	187	46.8
Gender		
Male	162	40.5
Female	238	59.5
Educational Level		
Low	176	44.0
High	224	56.0
Knowledge		
Inadequate	35	8.8
Adequate sufficiently	92	23.0
Adequate	273	68.3
Attitude		
Negative	173	43.2
Positive	227	56.7
Working		
Not working	154	38.5
Working	246	61.5
Support from health workers		
No	137	34.3
Yes	263	65.8

Chi-square analysis demonstrates a relationship between age and mosquito nest eradication (p-value = 0.044) and knowledge and mosquito nest eradication (p-value = 0.000). Participants with lower levels of knowledge were 4.3 times less likely to engage in mosquito nest eradication. Similarly, attitude (p = 0.003) and support from health workers (p = 0.001) were also significantly associated with mosquito nest eradication. Those with a negative attitude or lacking support from health workers were 1.9 and 5.1 times less likely, respectively, to perform mosquito nest eradication. No significant associations were found between gender, education level, or occupation and mosquito nest eradication (p-value = 0.747; 0.056; 0.448) (Table 2).

Table 2. Chi-Square analysis (n = 400)

Variable	Mosquito Nest Eradication				Total		p-value	OR
	No		Yes					
	n	%	n	%	N	%		
Age								
≤ 40 years old	81	20,3	132	33,0	213	53,3	0.044	0,645
>40 years old	53	13,3	134	33,5	187	46,8		(0,423-0,982)
Gender								
Male	56	14,0	106	26,5	162	40,5	0.747	1.084
Female	78	19,5	160	40,0	238	59,5		(0,711-1.653)
Educational Level	68	17,0	108	27,0	176	44,0	0.056	1,507
Low	66	16,5	158	39,5	224	56,0		(0.993-2.289)
High								
Knowledge								
Inadequate	28	7,0	7	1,8	35	8,8		4,367
Adequate sufficiently	51	12,8	41	10,3	92	23,0	0.001	(3,010-6,336)
Adequate	55	13,8	218	54,5	273	68,3		
Attitude								
Negative	73	18,3	102	25,5	175	43,8	0.003	1.924
Positive	61	15,3	164	41,0	225	56,3		(1.264-2.929)
Working								
Not working	48	12,0	106	26,5	154	38,5	0.448	0,842
Working	86	21,5	160	40,0	246	61,5		(0,548-1.295)

Support of health workers								
No	79	19,8	58	14,5	137	34,3	0.001	5.151
Yes	55	13,8	208	52,0	263	65,8		(3.282-8.085)

The interaction test between knowledge and support produced a p-value greater than 0.05, indicating no significant interaction. Consequently, interaction variables were removed from the model (Table 3).

Table 3. Interaction analysis (n = 400)

Variable	P-value	OR
Age	0.014	2.716
Knowledge	0.009	11.196
Support from health workers	0.114	7.167
Knowledge* Support from health workers	0.451	0.637

Multivariate analysis revealed three significant variables related to mosquito nest eradication, namely age, knowledge, and support from health workers. Among these, knowledge emerged as the most influential factor (OR = 5.857). After controlling for age and support from health workers, individuals with low levels of knowledge were 5.8 times less likely to engage in mosquito nest eradication compared to those with high knowledge levels (Table 4).

Table 4. Logistic regression analysis (n = 400)

Variable	P value	OR
Age	0.012	2.783
Knowledge	0.001	5.857
Support from health workers	0.003	1.439

DISCUSSION

This study identified several variables significantly associated with mosquito nest eradication practices, including age, knowledge, attitude, and support from health workers. For instance, a study in Vietnam revealed that older individuals have experienced dengue infections, demonstrate high levels of knowledge, and practice protective behaviors such as sleeping under a mosquito nest. Moreover, older adults may have developed partial immunity due to prior exposure to the virus. In contrast, younger adults are typically more mobile, increasing their exposure risk (Nguyen-Tien et al., 2021). Similarly, research in Indonesia found that people over 40 exhibited better dengue prevention practices than younger individuals (Rakhmani et al., 2018). In this study, many adults aged 18–39 spend long hours commuting to Jakarta's industrial zones and are rarely home during weekday inspections, when indoor larvae are most visible. Future strategies could include scheduling inspections on weekends or evenings and sending digital reminders to increase the participation of this age group.

Another variable associated with protective behaviors is having relevant knowledge. Low knowledge levels were associated with a 4.3 times higher likelihood of not practicing mosquito nest eradication compared to individuals with higher knowledge levels. This finding is consistent with previous studies that link knowledge with improved dengue prevention behavior (Wharton-Smith et al., 2019; WHO, 2024). People with a better understanding of dengue transmission are more likely to take action. While knowledge of dengue prevention is beneficial, it does not guarantee the adoption of preventive measures (Jeelani et al., 2021).

In addition to knowledge, attitude is key in determining a person's behavior. Over half of the participants in this study displayed a positive attitude toward mosquito nest eradication, aligning with research from Bangladesh, where 61.3% of respondents viewed dengue as a serious threat and supported preventive actions (Hossain et al., 2021). In contrast, negative attitudes or lack of awareness have been shown to hinder community participation, as demonstrated by poor waste management or indifference toward health-related responsibilities.

Interestingly, education level did not show a significant association with mosquito nest eradication in this study, despite 56% of participants having attained higher education. This differs from a study in the Soroti District, Uganda where education was the most important factor influencing the use of mosquito nest (Akello et al., 2022). Likewise, a study in Kinshasa also found that women with secondary school or higher education were 3.4 times more likely to own and 2.8 times more likely to use a mosquito nest than women with lower levels of education (Ndjinga & Minakawa, 2010). In Tangerang, the widespread use of smartphones allows public health information to spread quickly through neighbourhood chat groups. This may help reduce knowledge gaps between people with different education levels. As a result, education may no longer be a strong factor in influencing behavior.

Similarly, no significant association was found between gender and mosquito nest eradication practices. Gender affects how individuals experience and access healthcare services (Wharton-Smith et al., 2019), and can be a significant factor in determining disease exposure and vulnerability. For example, prevailing societal gender norms may place women in charge of household chores, including collecting and storing water (Wharton-Smith et al., 2019). In some instances, women may even demonstrate better mosquito nest eradication practices than men, even though prevention should be a shared responsibility regardless of gender (Wong et al., 2015). Despite the lack of statistical significance, 40% of women in this study reported participating in eradication efforts, indicating meaningful engagement.

This study also found no statistically significant association between employment and mosquito nest eradication despite 60% of participants reporting being employed. Employed individuals are generally aware of the importance of maintaining their health to remain productive in their work roles (Heryanto & Meliyanti, 2021). Many respondents reported that they still engage in mosquito nest eradication during their free time, either before or after work. These findings are consistent with a previous study that found that working is not related to mosquito nest eradication (Istiqomah et al., 2017). In contrast, the involvement of health workers emerged as a critical factor influencing community behavior in dengue prevention. Health workers contribute to behavior change through motivation, coordination, and the implementation of public health policies (Marha et al., 2020). In the community, they play a key role in educating and empowering residents to adopt preventive practices against dengue fever (Veras-Estévez & Chapman, 2017). One of the campaigns carried out by health workers is eradicating mosquito nests and combating Aedes aegypti (de Oliveira et al., 2016). Consistent with the findings of this study, support from health workers showed a significant association with mosquito nest eradication. Prior studies have also confirmed the positive impact of health worker involvement. Previous studies also reported an association between support from health workers and mosquito nest eradication. For instance, Rau et al. (2019) emphasized that encouragement and support from health workers can enhance community knowledge and attitudes, ultimately leading to improved mosquito control behaviors. Health workers are responsible for conducting home visits and counseling the community so that they understand and carry out dengue control, performing larva checks, mobilizing and supervising mosquito nest eradication, and reporting on the results of larvae inspections (Torondek et al., 2019). Their active role highlights the importance of strengthening health system involvement at the community level to enhance the effectiveness of dengue prevention strategies.

CONCLUSION

This study concludes that knowledge is the most influential factor associated with mosquito nest eradication, with attitude and perceived support from healthcare workers also showing significant associations. These findings highlight the pivotal role of healthcare workers in dengue prevention efforts, particularly through routine health education aimed at increasing public awareness of dengue transmission, prevention strategies, and the importance of eradicating mosquito breeding sites. To improve mosquito nest eradication efforts, future programs should focus on younger, working-age groups by using weekend or evening outreach, mobile app reminders, and workplace-based activities. Strengthening the involvement of healthcare workers through interactive communication strategies, and integrating digital literacy components into public health campaigns and future research, may further increase the effectiveness of community-based dengue prevention programs.

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Original Research

The Relationship between Self-Compassion and Medication Adherence among Patients with Hypertension in Jakarta Community Health Center

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A R T I C L E I N F O

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A B S T R A C T

Hypertension is a chronic condition that requires consistent medication adherence to prevent serious complications. However, many hypertension sufferers experience difficulty taking medication regularly as advised. Although medication adherence is critical in hypertension, little is known about the role of self-compassion. This study aims to analyze the relationship between self-compassion and medication adherence in hypertension patients undergoing treatment at a Health Center in Jakarta. A quantitative, cross-sectional design was employed, and data were analyzed using the chi-square test. A total of 100 respondents were selected through purposive sampling. The instruments used were the Self-Compassion Scale (SCS) and the Morisky Medication Adherence Scale-8 (MMAS-8). The results showed a significant relationship between self-compassion and medication adherence in hypertension patients (p-value < 0.001). Although 61% of participants demonstrated high self-compassion, only 39.3% reported high medication adherence. These findings suggest the importance of incorporating psychological components, such as self-compassion, into educational and behavioral interventions to improve treatment adherence and reduce the risk of hypertension-related complications.

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INTRODUCTION

Hypertension, often referred to as the "silent killer," is a major global health concern due to its asymptomatic nature and potential to cause life-threatening complications such as stroke, kidney failure, and heart disease (Imanda, Darliana & Ahyana, 2021; Fatmawati *et al.*, 2023). According to the WHO (2023), an estimated 1.28 billion adults aged 30–79 worldwide are affected by hypertension. In Indonesia, the prevalence of hypertension is alarmingly high, with over 63 million cases reported in 2021 and a significant mortality rate of 427,218 deaths attributed to the condition (Kementerian Kesehatan RI, 2024). Beyond individual health implications, hypertension contributes significantly to the national healthcare burden.

Although most patients have been diagnosed, 13.3% still do not take medication at all, and 32.3% do not take it regularly (P2PM, 2022). In DKI Jakarta, the prevalence of hypertension reached 33.43% based on blood pressure measurements and 10.17% based on physician diagnoses in individuals over 18 years old (Kementerian Kesehatan RI, 2018). In 2023, the Jakarta Provincial Health Office recorded 888,632 hypertension cases (Kementerian Kesehatan RI, 2024).

Medication adherence in hypertension patients is often a challenge because treatment is long-term and does not show immediate effects felt by the patient. This condition may result in treatment fatigue, decreased motivation, and a sense of hopelessness, especially when patients do not experience significant symptoms. On the other hand, psychological burdens like stress, anxiety, and a lack of intrinsic motivation also influence health behaviors, including treatment adherence. Many patients feel emotionally exhausted from constantly taking medication and adhering to various lifestyle restrictions. Adherence to treatment is a key factor in control of blood pressure and preventing complications (Moningkey *et al*., 2023). However, many hypertension patients experience saturation with long-term medication use, which lowers adherence levels (Massa & Manafe, 2021). To measure patient adherence, the Morisky Medication Adherence Scale-8 (MMAS-8) instrument is often used because it has been proven to be valid and reliable (Dewayani, Faizah, & Kresnamurti, 2023).

In recent years, psychologically based self-compassion approaches have been increasingly used as supportive interventions in managing chronic diseases. Self-compassion involves treating oneself with kindness, understanding, and acceptance during times of difficulty or failure. Research suggests that individuals with high self-compassion are better equipped to regulate emotions, stay motivated, and cope with health-related stressors, ultimately supporting improved adherence to treatment (Sirois, Molnar, & Hirsch, 2015). This suggests that integrating psychological approaches into medical treatment has significant potential to enhance the effectiveness of long-term therapy. Besides physical factors, psychological aspects also influence medication adherence. One important psychological factor is self-compassion, which is the attitude of accepting and understanding oneself with kindness when facing difficulties (Sutawardana, Putri & Widayati, 2020). Individuals with high levels of self-compassion tend to be able to manage emotions and adapt better to their health conditions, thereby increasing adherence to therapy (Andala *et al*., 2024).

Although self-compassion has been associated with improved treatment adherence in chronic conditions such as diabetes (Sutawardana et al., 2020), cancer (Khalili et al., 2021), chronic kidney disease (Damayanti et al., 2021), and schizophrenia (Dong et al., 2022), its role in hypertension management remains underexplored, particularly in the Indonesian context. To date, limited research has specifically examined the relationship between self-compassion and medication adherence among individuals with hypertension. Given the chronic nature of hypertension and the psychological burden often associated with long-term treatment, investigating this relationship is crucial. Understanding how self-compassion influences adherence could provide valuable insights for the development of psychological interventions aimed at supporting patients in maintaining consistent treatment behaviors and improving health outcomes.

METHOD

This study employed a quantitative approach with a cross-sectional design to identify the relationship between **self-compassion** and medication adherence in hypertension patients. This design was chosen because it allows researchers to quickly identify relationships between variables at a single point in time. Data collection was conducted from August to December 2024 at a Community Health Center in Jakarta. The sampling technique employed was purposive sampling, involving a total of 100 respondents who met the specified inclusion criteria. The inclusion criteria were hypertension patients over 19 years old, undergoing treatment for at least one month, diagnosed with hypertension and/or hypertension with other co-morbidities, and willing to be respondents. The exclusion criteria included patients with cognitive or communication disorders. The sample size was determined based on a non-probability sampling approach using purposive sampling, which selects subjects based on specific objectives.

The instrument used to measure self-compassion was the *Self-Compassion Scale (SCS),* which has been adapted into Indonesian as the *Skala Welas Diri (SWD).* To measure medication adherence, the *Morisky Medication Adherence Scale-8 (MMAS-8)* was used. The SWD consists of six subscales: "self-kindness, self-judgment, common humanity, isolation, mindfulness, and overidentification." This instrument includes 26 statements, divided into 13 positive (favorable) and 13 negative (unfavorable) statements. Positive statements characterize the subscales of self-kindness, common humanity, and mindfulness, whereas negative statements represent self-judgment, isolation, and overidentification. The questionnaire was completed using a 5-point likert scale, with scores ranging from 1, indicating "almost never," 2, "never," 3, "rarely," 4, "sometimes," and 5, "almost always." The self-compassion results were categorized into two levels: high and low self-compassion. The second questionnaire, the MMAS-8, has 8 questions. Questions 1 to 7 use a likert scale, while question 8 requires a "yes" or "no" answer. The results of this questionnaire determine the level of adherence as high, moderate, or low. Both instruments underwent validity and reliability testing on 30 patients with hypertension in another health center with similar characteristics. The test results showed that both the SCS and MMAS-8 instruments are valid and reliable, with *Cronbach's Alpha value* > 0.61.

Data analysis consisted of univariate and bivariate procedures. Univariate analysis was conducted to describe respondent characteristics and the distribution of self-compassion scores and

medication adherence levels. Bivariate analysis was performed using the chi-square test to assess the association between self-compassion and medication adherence. Data processing was carried out using statistical software. This research received ethical approval from the Research Ethics Committee of Universitas Pembangunan Nasional "Veteran" Jakarta, based on recommendation letter number: 475/XI/2024/KEP.

RESULT

Self-compassion is an attitude of understanding and kindness towards oneself when undergoing treatment, with adherence to medication intake as advised by the doctor, to maintain quality of life. Meanwhile, medication adherence refers to a patient's ability to follow the medication instructions as prescribed by their doctor.

Respondent Characteristics

The frequency distribution analysis of respondent characteristics is presented in Table 1, which includes age, gender, education level, occupation, financial status, marital status, duration of hypertension, and the number of hypertension medications being taken.

Table 1. Respondent Characteristics (n = 100)

Characteristics	n	%
Age		
Young Adult (19 - 40 years)	17	17%
Middle-Aged Adult (41 - 65 years)	82	82%
Older Adult (≥ 65 years)	1	1
Gender		
Male	46	46%
Female	54	54%
Education Level		
Primary School	5	5%
Junior High School	6	6%
Senior High School	79	79%
Diploma / Bachelor's Degree	10	10%
Occupation		
Civil Servant / Military / Police	2	2%
Private Employee	38	38%
Entrepreneur	21	21%
Unemployed	39	39%
Duration of Hypertension		
Less than 5 years	77	77%
5 to 9 years	15	15%
More than 10 years	8	8%
Number of Hypertension Medication Consumed		
One Type of Medication	90	90%
More than One Type of Medication	10	10%

Most respondents were middle-aged adults (82%), female (54%), and had a senior high school education (79%). The majority were private employees (38%), 77% of respondents were newly diagnosed with hypertension (<5 years), and 90% consumed only one type of hypertension medication.

Self-Compassion and Medication Adherence in Hypertension Patients

Regarding self-compassion, most respondents (61%) exhibited a high level of self-compassion, while the remaining 39% had low self-compassion. For medication adherence, 40% of respondents showed low adherence, 33% had moderate adherence, and only 27% demonstrated high adherence, as presented in Table 2.

Table 2. Self-Compassion and Medication Adherence in Hypertension Patients

Self-Compassion Level	High Adherence (n)	Moderate Adherence (n)	Low Adherence (n)	Total (n)	*p-value*
High	24 (39.3%)	23 (37.7%)	14 (23%)	61 (61%)	< 0.001
Low	3 (7.7%)	10 (25.6%)	26 (66.7%)	39 (39%)	
Total	27 (27%)	33 (33%)	40 (40%)	100 (100%)	

The analysis results indicate a significant relationship between self-compassion levels and medication adherence ($p < 0.001$). Respondents with high self-compassion generally exhibited better adherence, falling into both the high and moderate adherence categories. Conversely, the majority of respondents with low self-compassion demonstrated low medication adherence (66.7%).

DISCUSSION

Respondent Characteristics

Our research found that the majority of respondents (82%) were between 41–65 years old. This aligns with previous studies by Wijanarko *et al.* (2024), who reported 51.4% of hypertension patients were aged 40–60, and Assyfa *et al.* (2024), who found 60% of respondents were 40–59 years old. Middle age is associated with decreased elasticity of blood vessels due to collagen accumulation, which increases the risk of hypertension (Yunus, Aditya, & Eksa, 2021). This confirms that hypertension often develops with physiological changes occurring in middle adulthood.

In terms of gender, most respondents were female (54%). This finding is supported by Kurnia et al. (2024), who reported that 71.8% of hypertension patients were women, and Nurhayati et al. (2023), who explained that declining estrogen levels in menopausal women reduce HDL levels, thereby increasing the risk of atherosclerosis and hypertension. Atherosclerosis causes the hardening of blood vessels and leads to increased blood pressure (Lesa, Modjo, & Sudirman, 2023). However, a study by Shierly & Soputri (2024) found that the majority of hypertension patients were male (75%), likely due to the study being conducted in a male-dominated workplace. Nevertheless, their study also found no significant difference between gender and the incidence of hypertension.

The majority of respondents' education level was Senior High School (79%)**,** indicating a dominance of secondary education. This aligns with Wijanarko *et al.* (2024) and Assyfa *et al.* (2024), who also reported that most hypertension patients had secondary education. Education level affects an individual's ability to receive and process health information, influencing healthy lifestyle behaviors (Pebrisiana *et al.*, 2022). However, Dhirisma & Moerdhanti (2022) argued that higher education does not always correlate directly with health knowledge or adherence. In some cases, high school graduates showed better knowledge than university graduates. In this study, 40% of respondents with Senior High School education had low medication adherence, suggesting that other factors, such as access to information and social environment, also influence health behavior.

For occupational status, 38% of respondents were private employees. This is supported by Khasanah et al. (2023), who found a relationship between work-related stress and increased systolic blood pressure. Work stress elevates autonomic nervous system activity, leading to increased blood pressure and potentially triggering hypertension. Regarding the duration of hypertension, most respondents (77%) had been diagnosed for less than five years. This is consistent with Asyari (2024), who reported 78.5% of respondents had a history of hypertension for <5 years. The duration of hypertension may affect patients' motivation for treatment, as those with a long history often experience treatment fatigue or feel burned out from prolonged medication use. However, different results were found by Guna *et al.* (2024) and Jayanti *et al.* (2024) who reported that a higher percentage of respondents had been living with hypertension for five years or more.

In terms of medication use, 90% of respondents were taking only one type of antihypertensive drug. This finding aligns with Dhirisma and Moerdhanti (2022), who reported the dominance of single-therapy use. However, Nababan *et al.* (2024) found that most hypertension patients (64.1%) used combination therapy, which is considered more effective in lowering blood pressure and preventing complications. The choice of therapy is influenced by severity, comorbidities, and patient response to treatment.

Self-Compassion and Medication Adherence in Hypertension Patients

Sixty-one percent of respondents had a high level of self-compassion. This finding aligns with Sutawardana *et al.* (2020) and Damayanti *et al.* (2021), who also reported that most respondents exhibited high levels of self-compassion. According to Neff (2003a), self-compassion encompasses the ability to be kind to oneself (self-kindness), recognizing suffering as part of the shared human experience (common humanity), and maintaining emotional balance (mindfulnes**s**). A high level of self-compassion enables individuals to face chronic illness more positively, leading to increased self-acceptance and reduced stress.

Demographic factors, such as gender and age, also influence self-compassion. Sutawardana *et al.* (2020) found that women were more prominent in the common humanity aspect, whereas Wahyuni and Arsita (2019) reported that women tend to have lower self-compassion due to higher self-judgment. Conversely, Damayanti *et*

al. (2021) showed that men had higher levels of self-compassion. Additionally, Lestari and Ediati (2021) noted that middle-aged individuals tend to have higher self-compassion, which is consistent with the demographics of the respondents in this study. Social support, especially from family, also plays a crucial role. Rezeki (2023) found that family support affects recovery through increased self-acceptance. These findings highlight that self-compassion not only plays a role in managing physical illness but also improves patients' quality of life and mental well-being (Miru & Siswanto, 2023; Dwinita & Palupi, 2022).

Meanwhile, medication adherence remains a challenge, with 40% of respondents showing low adherence**.** This finding is consistent with studies by Rasyid *et al.* (2022), Puspitasari *et al.* (2021), and Tumundo *et al.* (2021), all of which indicate that adherence to hypertension treatment remains a challenge. One influencing factor is the level of education. Respondents with Senior High School education (79%) tend to have limited understanding of the importance of long-term treatment (Labiba Khuzaima & Sunardi, 2021; Juniarti *et al.*, 2023). Poor adherence may be driven by misconceptions, lack of motivation, and the belief that medication is only needed when symptoms appear (Suryantara & Dewi, 2023). Although family support can motivate patients, it does not automatically increase adherence if intrinsic motivation is low (Najjuma *et al.*, 2020). Age may also influence adherence. Despite most respondents being aged 41–65 years, adherence levels were still low. This suggests the need for more personalized approaches to increase patient understanding and motivation.

The relationship between self-compassion and medication adherence shows that most respondents with high self-compassion also had high medication adherence, and vice versa. This finding is reinforced by Damayanti *et al.* (2021) and Sutawardana *et al.* (2020), who showed a positive and significant relationship between self-compassion and treatment adherence. Individuals with high self-compassion tend to be more accepting of their health condition and more motivated to maintain their health. Permana *et al.* (2024) also showed a positive relationship between self-compassion and motivation for treatment. High motivation is crucial in hypertension therapy because it influences patient discipline in adhering to medication schedules. Self-compassion helps patients manage psychological distress and encourages them to remain consistent in long-term treatment.

CONCLUSION

This study demonstrates a positive and significant relationship between self-compassion and medication adherence in hypertension patients**.** Respondents with high self-compassion were more likely to adhere to their treatment. These findings have important implications for nursing practice, particularly in developing psychological approaches that support the management of chronic diseases. This study was limited to examining the relationship between self-compassion and medication adherence; it does not extend to evaluating the effects of specific interventions aimed at improving adherence. Future research could explore CBT-based interventions to enhance self-compassion and adherence. Longitudinal studies are needed to assess the causal link between psychological traits and adherence behaviors.

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