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PRODUCT DEVELOPMENT STRATEGY FOR GERIATRIC SERVICES: A CASE STUDY AT A HOSPITAL IN SURABAYA

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ABSTRACT

To support customer needs and ensure smooth organizational operations, such as in hospitals, the development of service products is essential. This analysed strategies for service product development and design recommendations to enhance services and improve patient satisfaction. A descriptive observational study with a cross-sectional approach was conducted. The sample recruitment employed purposive sampling, with a total sample size of 210 patients. The independent variables were social, economic, technological, and policy factors, while the dependent variable was the strategy for service product development. The research instrument was a questionnaire designed and tested for validity and reliability by the researchers. Social factors showed that family support was low at 66.2%, knowledge of electronics and internet development was 73.8%, knowledge of geriatric services was 70.5%, physical quality was 72.8%, and hobbies were 85.3%, categorized as high. For economic factors, the recognition of needs was 80.5%, information-seeking was 75.8%, and purchasing decisions were 77.6%, all categorized as high. Several product opportunity gaps were identified from the analysis of social, economic, technological, and policy factors in the development of geriatric services. The development of day-care services and the implementation of Patient Service Representatives & Geriatric Hotline Services are significant recommendations to meet patient service needs.

Keywords

Development Strategy; Product Opportunity Gap; Value Opportunities; Service Product Recommendations.

INTRODUCTION

The development of service products in the healthcare sector has been extensively carried out in communities. For instance, home care services (Lane et al., 2019), have been developed for managing heart failure conditions at home through a three-stage process. The first stage is identifying and understanding, which involves comprehending the needs that can lead to the development of patient safety services for heart failure at home after hospital treatment. This stage includes focus group discussions among researchers,

patients, families, and hospitals. The second stage is conceptualizing, where a prototype that is still imperfect is tested and evaluated by healthcare professionals and family members of the patients. The third stage is realizing, which involves integrating the new product development process and implementing interventions for the patients. Service product innovations for spinal cord injury (SCI) surgeries (Cheung, 2012), aim to enhance post-operative healing speed. The first stage involves identifying opportunities by examining social, economic, technological, and cultural factors, resulting in 80 product opportunity gaps. These were grouped into six categories and prioritized using a weighted matrix with assessment criteria of 1 (low), 2 (medium), and 3 (high), leading to three prioritized product opportunities: services to accelerate post-operative recovery, healthcare services for elderly individuals, and products designed to minimize patient trauma during precise surgical procedures. The second stage, understanding the opportunity, involved gathering product opportunity results through interviews with customers and collecting their feedback to establish product criteria. The third stage, conceptualizing, transformed the product criteria into offerings perceived positively by customers. This included introducing pain management specialists for post-operative recovery acceleration, clinical psychologists for elderly patients, and enhancing services to reduce post-operative trauma by improving interactions among nurses, physiotherapists, anaesthetists, and occupational therapists.

The development of service products consists of four stages (Cagan & Vogel, 2002). The first stage is identifying opportunities for service products aimed at elderly groups. This stage involves considering social, economic, technological, and cultural factors, followed by the organization of product opportunity gaps (POGs) and formulation of product opportunities. The second stage is understanding, which focuses on comprehending the potential of the product. In this phase, researchers aim to gain a deeper understanding of the needs of the elderly group and conduct value opportunity analysis (VOAs), translating those insights into criteria for the service product. The third stage is conceptualizing, where the results of the value opportunity analysis are transformed into a concept, and feedback is gathered from elderly customers. The fourth stage is realizing, which involves turning the concept into a market-ready service product.

A preliminary study in the geriatric unit of a public hospital in Surabaya revealed that the number of elderly patients from 2019 to 2022 showed an increasing trend of +166.8% for returning patients, while there was a decline of -25.2% in new elderly patients during the same period. Currently, the hospital lacks several services, including home care, daycare clinics, chronic inpatient care, psychogeriatric inpatient care, and respite care. Furthermore, to meet the service standards required for comprehensive care, the government, through Minister of Health Regulation No. 79 of 2014, mandates that every hospital must provide the aforementioned facilities. Based on this background, the purpose of this study is to analyze strategies for service product development and formulate recommendations for service enhancement to improve patient satisfaction.

METHOD

A descriptive observational study with a cross-sectional approach was employed in this research, where the research variables were measured only once

to observe cause-and-effect relationships. The study was conducted at a public hospital in Surabaya and took place over six months, from August 2023 to December 2023.

Population and Sample

The population for this study consists of elderly patient visits in one month across all specialist outpatient clinics, totalling 5,104 visits in 2022 at a public hospital in Surabaya. The research sample was selected based on inclusion and exclusion criteria. The inclusion criteria for the sample included: (1) Respondents aged ≥60 years who can complete the questionnaire independently; (2) Respondents who have been treated in the outpatient clinic for more than three months; (3) Respondents willing to be interviewed while filling out the questionnaire. The exclusion criteria were respondents aged ≥60 years who required assistance, making it impossible for them to complete the questionnaire.

The sample size was determined using the Krejcie-Morgan formula for cross-sectional studies, resulting in a total of 186 patients. The sample in this study was obtained through purposive sampling, where the selection was intentionally made (non-random) based on specific characteristics or criteria relevant to the study's objectives.

Instrument and Data Collection

The instrument used in this study is a questionnaire formulated by the researchers, which underwent validity and reliability testing prior to administration to respondents. Probing for each question item was conducted. The questionnaire is divided into two types: the first for patients and the second intended for the organization. This questionnaire is utilized to gather primary data from patients (respondents), covering social factors (the role of family in the treatment process, knowledge of technological developments and the internet, knowledge of geriatric services in hospitals, need for physical activities, and need for leisure activities), economic factors (the need for geriatric services, ease of accessing information about geriatric services, and willingness to use geriatric services), and technological factors (expectations for geriatric services to be available at the hospital and the need for innovation in geriatric services at the hospital). During the focus group discussions with hospital management, the question guide was designed in accordance with the research objectives to facilitate the acquisition of the necessary information aligned with the aims of this study.

Data Analysis

Quantitative analysis was conducted using statistical analysis with SPSS, implementing cross-tabulation data. Descriptive analysis was performed on all variables, including both independent and dependent variables. This descriptive analysis was utilized to present the frequency distribution of each variable under investigation. For qualitative data, coding was performed, and themes were determined based on the responses from the study participants.

RESULTS

The respondents in this study comprised a group categorized as elderly patients at Public Hospital in Surabaya, aged ≥ 60 years, calculated from their birth year until 2023. A total of 210 respondents were included in this study. From Table 1, it is evident that the gender distribution among the respondents is balanced, with 50% male and 50% female. Regarding education

levels, the highest percentage of respondents holds a high school diploma (31.42%), while the lowest percentage has completed elementary school (7.61%). In terms of employment status, 52.85% of respondents are currently employed. When asked about their preferred place of treatment, 42.85% of respondents chose the hospital as their healthcare facility.

Table 1: Characteristics of Respondents in the Study at the General Hospital

Variable	n	%
Gender		
Male	105	50
Female	105	50
Education		
Primary school	16	7.61
Junior School	36	17.14
High School	66	31.42
Vocational Study/ Diploma	42	20
Higher Education	50	23.80
Employment status		
Employed	111	52.85
Unemployed	99	47.14
Medication Preference		
Integrated Healthcare	61	29.04
Hospital	90	42.85
General Practice	40	19.04
Self-medication	9	4.28
Not receiving any treatment	10	4.76
Total	**210**	**100**

Social Factors Among Respondents

The social factors related to the respondents indicate that support from family is rated at 66.2% in the low category. Knowledge of technological developments and the internet stands at 73.8% in the high category. Awareness of geriatric services in the hospital is rated at 70.5% in the high category, while physical quality is rated at 72.8% in the high category. Additionally, hobbies among the respondents are rated at 85.3% in the high category.

Table 2. Social Factors in Respondents

Social Factors	High	Average	Low
Family Role in the Healthcare Process	0	71 (33.8%)	139 (66.2%)
Knowledge of Electronic and Internet Developments	155 (73.8%)	51 (24.2%)	4 (2%)
Knowledge of Geriatric Services in the Hospital	148 (70.5%)	53 (25.2%)	9 (4.3%)
Need for Physical Activities	153 (72.8%)	57 (27.2%)	0
Need for Leisure Activities	179 (85.3%)	30 (14.3%)	1 (0.1%)

Economic Factors Among Respondents

Table 3 shows that the majority of respondents live with an income ranging from IDR 2,000,001 to IDR 5,000,000, accounting for 61.44%. Most respondents report that their income sources come from self-employment and entrepreneurship, making up 56.20% of the respondents. Additionally, respondents evaluate the outpatient geriatric care fees as economically feasible or sufficient, with 87.14% rating it in this category. For inpatient geriatric care, 67.14% of respondents also assess the fees as economically feasible or sufficient.

Table 3. Monthly Income of Respondents

Variable	n	%
Monthly Salary		
≤ Rp. 2.000.000	33	15,71
Rp. 2.000.001 – Rp. 5.000.000	129	61,44
Rp. 5.000.001 – Rp. 10.000.000	47	22,38
≥ Rp. 10.000.001	1	0,47
Source of Salary		
Family or Children	92	43,80
Entrepreneur	118	56,20
Perception about the outpatients Geriatric Care Fees		
Economics/ affordable	183	87,14
Expensive	27	12,86
Perception about Inpatient Geriatric Care Fees		
Economics/ affordable	141	67,14
Expensive	69	32,86
Total	**210**	**100**

Technological Factors Among Respondents

Table 4 indicates that the respondents at a Public Hospital exhibit a high category in technological factors concerning the need for geriatric services at the hospital, with a rating of 94.3%. Additionally, technological factors also reflect a high category regarding the dimension of innovation in geriatric services at the hospital, achieving a rating of 94.8%.

Table 4: Technology Factors in Respondents

Technology Factor	High	Medium	Low
Expectations for Geriatric Services to be Available at the Hospital	198 (94.3%)	10 (4.8%)	2 (0.9%)
The Need for Innovation in Geriatric Services at the Hospital	199 (94.8%)	9 (4.3%)	2 (0.9%)

The recommendations are based on the researchers' review and a focus group discussion (FGD) with five members of the management at Gotong Royong Public Hospital (the director, head of medical services, head of nursing and midwifery, head of general affairs and finance, and head of the medical committee) aimed at addressing customer needs and creating new service products. Based on the results of the FGD, the following recommendations were made:

1. Prepare home care services and a pick-up service.
2. Establish a day-care service for the elderly.
3. Create a one-stop service area and appoint patient service representatives & a geriatric hotline service.
4. Develop a psychogeriatric service area.
5. Prepare an application for geriatric health development in eBook format.
6. Schedule regular seminar activities.
7. Hire certified gerontological nurses, occupational therapists, social workers, speech therapists, and consultants in internal medicine specializing in geriatrics.
8. Set up registration areas, an integrated geriatric team, an acute geriatric ward, a day-care clinic, a chronic geriatric

ward, and a respite care facility for elderly patients.

9. Equip the necessary facilities and infrastructure that are not yet available in accordance with Ministerial Regulation No. 79 of 2014.

In Table 5, the assessment was conducted by the researchers in collaboration with the management of Gotong Royong Public Hospital. It was determined that there are two priority product criteria that the hospital is capable of implementing: the day-care service and the patient service representative & geriatric hotline service.

Table 5: Weighting of Value Opportunities

	Value Opportunities				
Product Opportunity Gap	Time and Financial Resource Analysis	The potential of a product that is useful, usable, and desirable.	The potential size of the market	The potential for creativity	The potential contribution from the organization.
Pick-up service	2	3	3	1	2
Patient service representative & Geriatric hotline service	3	3	2	3	3
Day care	3	3	3	3	2
Geriatric health development ebook	2	2	2	1	2
One stop service	1	3	3	2	3
Home care	1	3	3	1	2
Psychiatric Treatment	3	3	2	3	2
Seminar	3	3	3	1	3

Customer Feedback on Product Value Concept

Based on Table 6 above, an average of 96% of the 30 respondents provided positive feedback, responding "yes" to the concept of the day-care service and the patient service representative & geriatric hotline service. The suggestions provided by respondents indicated that the proposed service fees are reasonably economical, and the quality of the representatives ensures that the patient service representative & geriatric hotline service operates smoothly.

Table 6: Customer Feedback on Product Concepts

Questions	Yes	No
The concept of the day care service is excellent	30 (100%)	0
The concept of the patient service representative and geriatric hotline service is also commendable	27 (90%)	3 (10%)
The Day care service that I want to try	28 (93.3%)	2 (6.7%)
The day care service addresses essential needs	28 (93.3%)	2 (6.7%)
I will recommend the day care service after I experience it	30 (100%)	0

DISCUSSION

Social factors encompass the social and cultural dynamics that shape and drive historical trajectories (Cagan & Vogel, 2002). Theoretically, social factors influence an individual's cultural development, and several elements contribute to these social factors, including family dynamics, work patterns, health behaviors, computer and internet literacy, political environment, the success of products in other contexts, recreational spaces, sports activities, entertainment industries, films and television, literature, music, and workplace environments (Cagan & Vogel, 2002). This aligns with the findings of the study, where respondents demonstrated a connection to current cultural developments through their engagement in activities that influence their daily lives.

In this study, social factors were measured through five dimensions, specifically focusing on the role of family in the treatment process, knowledge of electronic developments and the internet, understanding of geriatric services at the hospital, the need for physical activity, and the need for leisure activities. Based on the measurements conducted on respondents at the General Hospital, the findings indicate a low percentage of 66.2% regarding the family's role in the treatment process. This suggests a deficiency in the family's support for patients during their treatment, which can lead to decreased motivation, particularly among elderly patients. If this situation persists, it may adversely affect the healing process. Research indicates that patients' adherence to treatment is significantly influenced by encouragement and support from family members (Ebrahimi et al., 2021; Shahin et al., 2021). The hospital's role concerning social factors involves adopting both intrapersonal and professional approaches to provide consultation and education to families, thereby encouraging and supporting elderly patients throughout their treatment process (Olagbemide et al., 2021).

In the context of knowledge regarding electronic developments and the internet, this study demonstrates respondents' enthusiasm for seeking health information through electronic means and the internet. This finding serves as a basis for the hospital to optimize the use of electronic media and the internet in disseminating health information (Kuwabara et al., 2020; Ridwan Hasyim & Junadi, 2018; Timmers et al., 2020). Meanwhile, regarding the understanding of geriatric services at the hospital, the majority of respondents indicated that they possess knowledge about these services. This suggests that to rekindle patient interest in geriatric services, the hospital should consider modifying its approach to reintroducing these offerings. Research indicates that patient involvement in services, through satisfaction surveys and an understanding of available services, can enhance service quality and increase patient satisfaction levels (Keelson et al., 2024).

The results demonstrated that respondents have an interest in the activities offered daily by the hospital. This interest presents an opportunity for the hospital to develop strategies aimed at enhancing physical activity within its premises. Consistent with this, prior research indicates that providing facilities for physical activities serves not only as a strategy for improving patient health but also as a marketing approach for hospitals to increase visitor interest in utilizing other services (Cunningham & O'sullivan, 2021; Tuso, 2015). Furthermore, regarding the factor of leisure time activities, elderly patients often engage in various activities available at the hospital. Based on these findings, it can be

concluded that hospitals should recognize the needs of elderly patients who may face barriers in seeking leisure activities and provide new facilities to support them in utilizing their free time effectively.

Given the social factors, such as the low role of family support during medical treatment, high knowledge of electronic developments and the internet, high awareness of geriatric services at the hospital, high needs for physical activities, and high demand for leisure activities, it is essential to develop strategies to address these issues. One potential product development strategy is the implementation of a transportation service for elderly patients. This service would involve staff acting as liaisons to address needs and remind elderly patients of their healthcare appointments, enhancing outreach through increased health education and seminars.

Additionally, the hospital should focus on improving health information dissemination via social media and collaborate with elderly communities to raise awareness of geriatric care. Healthcare providers should directly communicate relevant information to elderly patients present in the hospital. Furthermore, creating physical activity programs, such as elderly exercise classes and gardening activities, would cater to the interests of this demographic. Establishing a day-care service for elderly patients can also help mitigate boredom and enhance their daily experiences. Research conducted in Malaysia supports this, indicating that transportation services for the elderly can significantly improve their physical and mental well-being (Abdul Latiff & Mohd, 2023).

Economic factors are directly related to an individual's desire to choose or purchase a product (Alade, 2023). According to the theory of psycheconometrics, purchasing behavior is influenced by the belief that individuals acquire goods or services that they perceive will enhance their quality of life(Ross, 2022; Stimson & Marans, 2011). Economic conditions are influenced by factors such as the national currency value, consumer purchasing power, and net income. In this study, economic factors were measured using a questionnaire that included several dimensions: the need for geriatric services, the ease of accessing information about these services, and the willingness to utilize geriatric care. The results indicated that a majority of respondents at the public hospital rated these factors as high.

The need for geriatric services was reported at 80.5% in the high category, indicating a significant demand for such services among the elderly. This presents an opportunity for the hospital to implement and expand geriatric care services. Additionally, the need for information about geriatric services was assessed at 75.8%, also in the high category. This suggests that the hospital should focus on providing education and information regarding geriatric services and health to facilitate access to reliable sources for the elderly. Finally, regarding the desire to utilize geriatric services, the study found a high rating of 77.6%. This reflects a substantial opportunity for the hospital to develop the geriatric services needed by this population.

These results were measured using a questionnaire, which indicated that the majority of respondents were aware of geriatric services, had received information about these services, and expressed willingness to utilize them if available and

aligned with their needs. Economic factors play a crucial role in product development, as they help determine who has the income, who makes the purchases, and for whom the products or services are intended(Cagan & Vogel, 2002). This aligns with the notion that the pricing of services offered should be adjusted to match consumers' purchasing power regarding geriatric care.

Technological factors focus on the direct outcomes or insights derived from researchers within companies, military institutions, and universities, particularly concerning the development of the internet and digital devices. In this study, technological factors were measured through a questionnaire encompassing several dimensions, including the expectation for geriatric services to be available at the hospital and the need for innovation in these services. Based on the survey results from respondents, the expectation for geriatric services to be available was rated high, at 94.3%. This finding serves as a benchmark for the hospital to promptly prepare the necessary geriatric services in accordance with the needs of the elderly population.

The need for innovation in geriatric services at the hospital was rated high, at 94.8%. Consequently, Rumah Sakit Umum is committed to continuously innovating and developing geriatric healthcare services that align with the needs of the elderly population in maintaining their health. The findings of this study indicate that respondents had a positive perception of the geriatric services offered at Rumah Sakit Umum. At this stage, it is crucial for the hospital to promptly address these needs by translating them into tangible service products that can be effectively experienced by the elderly.

According to feedback from the questionnaire, 96% of the 30 respondents agreed on the necessity of innovative geriatric services, specifically the implementation of day care services and the establishment of a patient service representative and geriatric hotline service. Based on the research findings, several strategic issues have been identified: 1. **Planning for Day Care Services:** The implementation of day care services is essential to develop geriatric services, as indicated by the respondents' expressed need for such services. The hospital could operate three different models of day care services, allowing selection of one model based on the availability of human resources, facilities, and funding. This planning should include managerial roles (service section heads, secretaries, and treasurers), administrative staff (receptionists), professionals (doctors, nurses, psychologists, nutritionists, spiritual advisors, and instructors), activity coordinators, support staff (security personnel, cooks, gardeners, cleaning staff, bookkeepers, and drivers), as well as volunteers (caregivers); 2. Establishing a Main Service at the hospital: The hospital should prioritize the establishment of a service that provides staff dedicated to answering queries and reminding families and respondents about health information and examination schedules. By addressing these strategic issues, a public hospital can effectively enhance its geriatric services and better meet the needs of its elderly patients.

CONCLUSIONS

The analysis results indicate that social factors, economic factors, and technological factors contribute to the needs and desires of respondents in developing geriatric services. These factors, along with policy considerations, will generate product opportunity gaps that can serve as a foundation for strategies to develop products

needed by respondents, aligning with the standards set forth in Minister of Health Regulation No. 79 of 2014 to achieve a comprehensive level of service. The value opportunity analysis produces prioritized data for implementing product development in geriatric services. Priority service products, such as day-care and the Patient Service Representative & Geriatric Hotline Service, are conceptualized as services that can be offered within the geriatric care framework at public hospitals. Additionally, providing new services tailored to the needs of older adults, such as physical activity facilities, supplementary activities for leisure time, and transportation services for the elderly, can be breakthrough strategies to enhance the hospital's marketing efforts, thereby increasing service demand and patient satisfaction.

Based on the findings from this study, several recommendations have been formulated, including the need for hospitals to optimize the fulfilment of facilities, infrastructure, and human resources so that elderly patients can maximize their health improvements. There should be standardized geriatric service development and supportive hospital policies to enhance the capabilities of healthcare personnel and the necessary facilities. Another strategy to increase patient interest in geriatric services is to conduct activities that foster good relationships and collaboration between elderly organizations and local senior citizens. Monthly meetings can be organized to provide health education and counselling, fostering familiarity and establishing effective communication. Hospital management should also regularly evaluate hospital services by involving patients in assessments to gather accurate information regarding their perceptions, needs, and expectations concerning geriatric services at the hospital.

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THE EFFECT OF TEPID SPONGE THERAPY ON REDUCING JOINT PAIN IN GOUT ARTHRITIS AT GENERAL CENDEKIA HUSADA CLINIC

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ABSTRACT

Gout arthritis is a form of inflammatory arthritis characterized by acute joint pain, swelling, and redness due to the accumulation of uric acid crystals in the joints. Non-pharmacological pain management, such as tepid sponge therapy (warm compresses), is starting to be considered as a safe and easy alternative. This therapy is thought to increase vasodilation, improve blood circulation, and help reduce pain levels. The aim was to determine the effect of tepid sponge therapy on reducing joint pain levels in gout arthritis patients. The method used was This study used a quantitative design with a pre-experimental one-group pretest-posttest approach. A total of 33 respondents diagnosed with gout arthritis and experiencing mild to moderate joint pain were selected using a purposive sampling technique. Pain levels were measured using a Numerical Rating Scale (NRS) before and after the intervention. Tepid sponge therapy was performed for 15 minutes on the painful joint area, twice a day for 3 consecutive days. Data analysis used a Paired T-Test. Results: There was a significant reduction in pain levels after tepid sponge therapy. The results of the paired t-test showed a p-value of 0.000 ($p < 0.05$), indicating a significant effect of tepid sponge therapy on reducing joint pain in gouty arthritis. The conclusion is that tepid sponge therapy is effective in reducing joint pain in gouty arthritis sufferers. This intervention can be used as a simple and effective non-pharmacological treatment alternative to reduce joint pain.

Keywords

Gout Arthritis, Joint Pain, Tepid Sponge

Gout arthritis is a chronic metabolic disease characterized by recurrent attacks of acute joint pain, swelling, redness, and stiffness caused by the deposition of monosodium urate crystals in the joints due to hyperuricemia (Richette & Bardin, 2010; Zhang et al., 2006). This condition is a major cause of morbidity in adults, especially in middle-aged and elderly populations, and can significantly impair mobility, daily activities, and quality of life. Globally, the prevalence of gout has been increasing due to changes in diet, lifestyle, and life

expectancy (WHO, 2022). In Indonesia, gout arthritis remains a common musculoskeletal disorder, particularly in populations with high purine dietary intake and limited access to early preventive measures (Ministry of Health RI, 2023).

The pain experienced during gout arthritis attacks is often severe and can last from several hours to days, leading to functional limitations. Pain management is therefore a key component of gout treatment. While pharmacological therapy such as nonsteroidal anti-inflammatory drugs (NSAIDs) and corticosteroids are commonly used, these approaches may not be suitable for all patients due to side effects, comorbidities, or drug interactions (Smeltzer & Bare, 2010). Consequently, non-pharmacological interventions have gained attention as complementary strategies to reduce pain and improve patient comfort.

One such intervention is tepid sponge therapy, a simple, cost-effective, and non-invasive technique involving the application of lukewarm water to the skin using a sponge. This method works by regulating local temperature, improving blood circulation, relaxing muscles, and stimulating sensory nerve endings, which can reduce the transmission of pain signals in accordance with the Gate Control Theory of Pain (Melzack & Wall, 1965). Previous studies have demonstrated the effectiveness of tepid sponge therapy in reducing musculoskeletal pain, including arthritis-related discomfort (Sitorus et al., 2018; Kurniawati et al., 2020).

The General Cendekia Husada Clinic serves a diverse patient population, many of whom present with gout arthritis. However, the implementation of non-pharmacological interventions such as tepid sponge therapy in this setting remains limited, and there is a need for evidence-based evaluation of its effectiveness to support clinical practice.

Therefore, this study aims to determine the effect of tepid sponge therapy on reducing joint pain in gout arthritis patients at General Cendekia Husada Clinic**.** The findings are expected to provide scientific evidence for integrating tepid sponge therapy into routine nursing care for gout arthritis management, thereby improving patient outcomes and promoting holistic care.

METHOD

The method used is This study employed a quantitative design with a pre-experimental one-group pretest-posttest approach. A total of 33 respondents diagnosed with gouty arthritis and experiencing mild to moderate joint pain were selected using a purposive sampling technique. Pain levels were measured using a Numerical Rating Scale (NRS) before and after the intervention. Tepid sponge therapy was performed for 15 minutes on the painful joint area, twice daily for 3 consecutive days.

RESULTS

Table 1. Frequency Distribution of Respondents Based on Education

EDUCATION					
		Frequency	Per cent	Valid Per cent	Cumulative Percent
Valid	Elementary School	8	24.2	24.2	24.2
	JUNIOR HIGH SCHOOL	6	18.2	18.2	42.4
	SENIOR HIGH SCHOOL	9	27.3	27.3	69.7
	BACHELOR	10	30.3	30.3	100.0
	Total	33	100.0	100.0	

Based on table 1,The 33 respondents in this study had diverse educational backgrounds. The majority (10 respondents) had a bachelor's degree (30.3%), followed by high school graduates (9 respondents) (27.3%), elementary school graduates (8 respondents) (24.2%), and junior high school graduates (6 respondents) (18.2%).

AGE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-29 TH	7	21.2	21.2	21.2
	30-39 TH	10	30.3	30.3	51.5
	40-49 TH	6	18.2	18.2	69.7
	50-60 TH	9	27.3	27.3	97.0
	>60 TH	1	3.0	3.0	100.0
	Total	33	100.0	100.0	

Table 2. Frequency Distribution of Respondents Based on Occupation

OCCUPATION					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Petani	11	33.3	33.3	33.3
	Swasta	13	39.4	39.4	72.7
	PNS	9	27.3	27.3	100.0
	Total	33	100.0	100.0	

Based on table 2, the majority of respondents are of the same type.Based on the results of research on 33 respondents, the distribution of their jobs is as follows: most of the respondents work in the private sector as many as 13 people (39.4%), then 11 people (33.3%) work as farmers (farmers), and the remaining 9 people (27.3%) are Civil Servants (PNS).

Table 3. Frequency Distribution of Respondents Based on Age

Based on table 3, a total of 33 respondents in this study have varying age ranges. The largest age group is in the range of 30–39 years with 10 people (30.3%), followed by 50–60 years with 9 people (27.3%), then 20–29 years with 7 people (21.2%), 40–49 years with 6 people (18.2%), and the fewest is respondents aged over 60 years, namely 1 person (3.0%).

Table 4. Analysis of the effect of tepid sponge therapy on reducing joint pain in gouty arthritis

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Standard Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	PAIN REDUCTION SCORE PRE-PAIN REDUCTION SCORE POST	1,848	.508	.088	1,669	2,028	20,923	32	.000

Based on the results of the paired sample t-test, the average difference in pain scores before and after the intervention was 1.848 with a standard deviation of 0.508. The statistical test showed a t value = 20.923 with degrees of freedom (df) = 32 and a p value = 0.000 ($p < 0.05$). This indicates that there is a significant difference between pain levels before and after tepid sponge therapy intervention. Thus, tepid sponge therapy is effective in reducing joint pain in gout arthritis sufferers.

DISCUSSION

1. Respondent base on Education

From the demographic data, respondents' educational backgrounds were as follows: Bachelor's degree (30.3%), Senior High School (27.3%), Elementary School (24.2%), and Junior High School (18.2%). This variation in education levels may influence patients' understanding and acceptance of non-pharmacological pain management methods such as tepid sponge therapy. Individuals with higher education levels may be more receptive to health education, understand the physiological benefits of the intervention, and adhere more consistently to the procedure. Conversely, those with lower educational attainment may require simpler, more visual instructions to ensure correct application. Previous research supports this relationship between education and health intervention compliance. According to Notoatmodjo (2014), education is strongly linked to health literacy, which in turn affects the adoption of health-promoting behaviors. In gout management, patients with higher health literacy are more likely to combine pharmacological treatments with complementary interventions to optimize outcomes (Richette & Bardin, 2010). In this study, the high proportion of participants with senior high school and bachelor's education may have contributed to the observed effectiveness of tepid sponge therapy, as these groups likely possessed the knowledge and motivation to apply the technique correctly. However, the notable proportion of participants with only elementary or junior high school education suggests that health workers should provide tailored explanations and hands-on demonstrations to maximize understanding and effectiveness across all education levels.

2. Respondent base on Education

The occupational distribution of respondents revealed that the largest proportion were private sector workers (Swasta) at 39.4%, followed by farmers (Petani) at 33.3%, and civil servants (PNS) at 27.3%. Statistical analysis of pre- and post-intervention pain scores across occupational categories showed that all groups experienced reductions in pain intensity. However, the farmer group had the highest mean pain score reduction, followed by private workers, while civil servants showed the smallest reduction.

Several factors could explain this difference. Farmers are generally exposed to heavy physical labor, which may exacerbate joint inflammation, leading to higher baseline pain scores. As a result, thermal interventions such as tepid sponge therapy may yield more noticeable relief. Private sector workers, depending on job type, may also have moderate physical strain, leading to moderate pain relief outcomes. Civil servants, with generally less physical strain, may have lower baseline pain levels, which can limit the measurable reduction after therapy.

This finding aligns with Horgas & Elliott (2004), who stated that baseline pain intensity often predicts the magnitude of pain relief from non-pharmacological interventions. It is also supported by Notoatmodjo (2014), who emphasized that occupation influences lifestyle, physical activity level, and exposure to risk factors, all of which may affect musculoskeletal health and therapy responsiveness.

From a clinical standpoint, tepid sponge therapy can be recommended for all occupational groups, but its implementation

may require adjustments. For physically demanding occupations such as farming, more frequent sessions may be beneficial to manage recurring pain. For sedentary occupations, therapy can be combined with light stretching to prevent stiffness and improve circulation.

3. Respondent base on Age

Based on the age distribution, the largest proportion of respondents were in the 30–39 years group (30.3%), followed by 50–60 years (27.3%), 20–29 years (21.2%), 40–49 years (18.2%), and >60 years (3.0%). Statistical comparison of pre- and post-intervention pain scores across these age groups revealed that all age categories experienced pain reduction, but the magnitude varied. The 50–60 years group showed the highest mean reduction, likely due to higher baseline pain scores and more pronounced inflammatory symptoms, which provided a greater margin for improvement.

These findings align with previous research showing that age can influence pain perception and response to thermal therapy. Older adults often have slower inflammatory resolution and altered pain thresholds, making them potentially more responsive to non-pharmacological interventions (Horgas & Elliott, 2004). However, age-related factors such as skin sensitivity and peripheral vascular changes should be considered to avoid adverse effects from temperature-based therapies.

The smaller proportion of respondents aged >60 years (3.0%) suggests limited representation of older adults in this study, which may affect the generalizability of the findings for that population. Nevertheless, the consistent pain reduction across all groups supports tepid sponge therapy as an age-inclusive intervention.

From a clinical perspective, the results highlight that tepid sponge therapy can be effectively applied across a wide age range, though education on correct technique and temperature safety should be tailored according to age-related physical and cognitive capacities. For younger and middle-aged adults, instructions can focus on self-application, while for older adults, caregiver assistance may be necessary to ensure safety and effectiveness.

4. Pain levels before and after tepid sponge therapy intervention in gout arthritis patients

The results of this study indicate that there was a significant reduction in pain levels after tepid sponge therapy intervention in gout arthritis patients. The results of the paired sample t-test showed a value of $t = 20.923$ with $p = 0.000$ ($p < 0.05$), which means there was a statistically significant difference between pain levels before and after the intervention. The average pain reduction score was 1.848, with a 95% confidence interval between 1.669 and 2.028. This indicates that tepid sponge therapy is effective in reducing joint pain in gout arthritis patients.

Tepid sponge therapy, which is a form of therapy, works through a vasodilation mechanism, namely the widening of blood vessels that increases local blood flow, reduces muscle spasms, accelerates tissue metabolism, and increases the removal of inflammatory waste products such as uric acid (Smeltzer & Bare, 2010). The thermal effect of warm compresses can also stimulate the skin's thermal receptors and reduce the transmission of pain impulses to the central nervous system, thereby reducing pain perception (Potter & Perry, 2013).

These results align with research by Anggraini (2021), which found that warm compress therapy can significantly reduce pain intensity in patients with degenerative joint disorders. Another study by Sari & Dewi (2020) also showed a significant reduction in pain after warm compresses in elderly patients with osteoarthritis.

Furthermore, respondents in this study showed an increase in the number of patients in the "mild pain" and "no pain"

categories after the intervention. This indicates that the effects of tepid sponge therapy are not only temporary but also quite effective in reducing pain levels from moderate/severe to mild, even painless. This effectiveness can also be influenced by the regularity of therapy, the appropriate duration (approximately 15 minutes), and the individual's physiological condition.

Overall, tepid sponge therapy has been shown to be a safe, inexpensive, and easy-to-perform non-pharmacological intervention, and can be an alternative option for pain management, particularly in cases of gouty arthritis. This intervention can be used independently by patients with the guidance of healthcare professionals, particularly in the long-term management of chronic disease.

CONCLUSION

Based on the results of a study of 33 respondents with gouty arthritis, it can be concluded that tepid sponge therapy significantly reduced joint pain levels. The results of the paired sample t-test showed a significant difference between pain scores before and after the intervention with a p value of 0.000 ($p < 0.05$) and an average pain reduction of 1.848 points.

Tepid sponge therapy has been shown to be effective as a non-pharmacological intervention in reducing joint pain through increased vasodilation, local blood flow, and decreased pain impulse transmission. Therefore, this intervention can be recommended as a simple, safe, and easily applied alternative for pain management, particularly in patients with gouty arthritis, both at home and in home care facilities.

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THE EFFECT OF AL-MA'TSURAT MORNING-EVENING RECITATION ON PHYSIOLOGICAL RESPONSE TO ANXIETY LEVEL IN ICU PATIENTS

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ABSTRACT

ICU patients often experience anxiety due to critical conditions, unfamiliar environments, and invasive medical procedures. Anxiety can lead to physiological changes such as increased blood pressure, heart rate, and respiratory rate. This study aimed to analyze the effect of the Al-Ma'tsurat morning-evening recitation on the physiological response to anxiety in ICU patients. A pre-experimental design with a pretest-posttest approach without a control group was used. The sample consisted of 42 ICU patients at RSI Sakinah Mojokerto who met the inclusion criteria, selected through purposive sampling. Data were collected by measuring blood pressure, heart rate, and respiratory rate before and after the intervention. Paired t-test and Wilcoxon test results showed no significant difference in systolic and diastolic blood pressure or heart rate ($p > 0.05$). However, a significant difference was found in respiratory rate ($p = 0.015$) after listening to the Al-Ma'tsurat recitation. The reduction in respiratory rate indicates a physiological relaxation response due to spiritual intervention. Although most parameters were not statistically significant, dzikir therapy remains potentially effective as a non-pharmacological holistic intervention for ICU patients.

Keywords

Al-Ma'tsurat, ICU, anxiety, physiological response, dzikir

INTRODUCTION

ICU patients are frequently in critical medical conditions that require close monitoring and intensive care. Besides physiological disturbances caused by the underlying disease, patients often experience significant psychological stress. Anxiety in ICU patients can activate the sympathetic nervous system, leading to increased blood pressure, heart rate, and

respiratory rate. If left unmanaged, this anxiety can worsen the patient's condition and prolong hospitalization. Spiritual approaches such as dzikir are promising non-pharmacological alternatives. Al-Ma'tsurat is a compilation of morning and evening prayers taught by the Prophet Muhammad (PBUH), believed to calm the soul and reduce the physiological responses to anxiety. This study aimed to determine the effect of Al-Ma'tsurat recitation on the physiological response to anxiety levels in ICU patients.

METHOD

(metode ditulis populasi dan sampel serta cara pengambilan dan uji statistic)

This study used a pre-experimental design with a pretest-posttest approach without a control group. It was conducted in the ICU room of RSI Sakinah Mojokerto from August to October 2024. The population included all adult ICU patients, with inclusion criteria: Muslim and approved participation by their family. A total of 42 participants were selected using purposive sampling. The intervention involved playing the Al-Ma'tsurat recitation for 25–30 minutes. The dependent variables were physiological responses to anxiety, measured through blood pressure, heart rate, and respiratory rate. Data collection tools included a digital sphygmomanometer and observation sheets. Data analysis used paired t-test for normally distributed data and Wilcoxon test for non-normal data.

RESULTS

A total of 42 ICU patients participated in this study, with 50% male and 50% female. Most were over 65 years old (45.24%). The average systolic blood pressure before the intervention was 141.1 mmHg, decreasing to 139.88 mmHg after the intervention. Heart rate decreased from 86.79 bpm to 85.86 bpm, and respiratory rate decreased from 22.31 breaths/minute to 19.26 breaths/minute after the intervention.

Statistical test results:

- **Systolic blood pressure** and **heart rate**: no significant differences ($p = 0.403$ and $p = 0.376$).
- **Diastolic blood pressure**: not significant ($p = 0.266$).
- **Respiratory rate**: significant difference found ($p = 0.015$).

DISCUSSION

This study demonstrated that after listening to the Al-Ma'tsurat morning-evening recitation, there was a decrease in the average systolic and diastolic blood pressure, heart rate, and respiratory rate in ICU patients. Although only the respiratory rate showed a statistically significant change ($p = 0.015$), the other parameters also showed a positive trend in improving physiological responses related to anxiety.

Dzikir is a form of spiritual activity involving rhythmic and structured repetition of certain phrases. In this context, it functions similarly to meditation or relaxation, especially when listened to in a quiet and mindful setting. Psychologically, dzikir calms the mind, and physiologically, it helps reduce the activity of the sympathetic nervous system, which is typically heightened during stress or anxiety.

In anxious states, the sympathetic nervous system becomes activated, resulting in vasoconstriction, elevated blood pressure, increased heart rate (tachycardia), and rapid breathing (hyperventilation). Conversely, listening to dzikir stimulates the parasympathetic nervous system, which lowers blood

pressure and heart rate, regulates breathing, and reduces stress hormones such as adrenaline and cortisol. This parasympathetic activation plays a key role in restoring physiological balance and calmness.

Biochemically, spiritual practices like dzikir can influence several markers. Cortisol, a primary stress hormone released by the adrenal cortex, tends to decrease after dzikir, contributing to reduced blood pressure and a slower breathing rate. Dzikir also suppresses the production of catecholamines like adrenaline and noradrenaline, which are involved in the "fight or flight" response. Additionally, dzikir may increase the release of endorphins and serotonin-neurotransmitters known for their calming and mood-enhancing effects.

The significant decrease in respiratory rate, from 22.31 to 19.26 breaths per minute, is a strong indicator of parasympathetic activation. Slower and deeper breathing reflects a more relaxed and calm physiological state. This finding aligns with Stephen Porges' polyvagal theory, which explains how activation of the ventral branch of the vagus nerve can reduce cardiac and respiratory activity as part of the body's recovery and self-regulation mechanisms.

However, the lack of significant changes in blood pressure and heart rate may be attributed to several factors. Responses to spiritual therapy can vary greatly depending on clinical conditions, consciousness levels, and individual medical histories. A more prolonged or repeated intervention may be needed to produce significant effects on these parameters. Furthermore, ICU patients are often administered medications such as vasopressors, sedatives, or beta blockers that can obscure the impact of non-pharmacological interventions like dzikir.

CONCLUSIONS

Al-Ma'tsurat morning-evening recitation affects the physiological response to anxiety in ICU patients, particularly in respiratory rate, which showed a significant decrease after the intervention. Although changes in blood pressure and heart rate were not statistically significant, this spiritual intervention remains a promising component of holistic ICU care.

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HEALTH CRISIS MANAGEMENT: A STUDY ON THE HANDLING OF SCABIES AS A COMMUNICABLE DISEASE AT AL HUSAIN ISLAMIC BOARDING SCHOOL

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ABSTRACT

Islamic boarding schools are densely populated and communal environments that are highly vulnerable to the spread of infectious diseases such as scabies. Scabies transmission not only affects morbidity rates but also impacts student attendance, psychological well-being, and economic burden. This study aims to analyze the effectiveness of health crisis management in addressing scabies at Pondok Pesantren Al Husain, Magelang. A quantitative approach was employed using path analysis based on Structural Equation Modeling (SEM) through SmartPLS 3.0. A total of 220 students were selected as respondents using the Slovin formula. Data were collected through questionnaires. Findings indicate that policy and protocol variables have the most significant influence on response speed and the effectiveness of crisis management ($\beta = 0.279$; $p = 0.000$). Response speed also serves as the main mediator that strengthens the relationship between healthcare access and the effectiveness of crisis management ($\beta = 0.145$; $p = 0.004$). Conversely, health education and occupancy density variables did not show a significant effect. The effectiveness of health crisis management in Islamic boarding schools is influenced by a combination of strong policies, rapid response, and adequate access to health services. Structural interventions and strengthening of response systems are key to preventing scabies..

Keywords

Health Management Effectiveness, Scabies, Islamic Boarding Schools

INTRODUCTION

Islamic boarding schools are religious based educational institutions that play a vital role in shaping morally upright and knowledgeable generations. Due to their communal living environment, pesantren also face significant challenges in maintaining the health of their students, particularly concerning infectious diseases. One of the most common infectious diseases found in pesantren settings is scabies. Scabies, a skin condition commonly known as mange, is caused by an infestation of the

Sarcoptes scabiei mite (Bernigaud, 2020 ; Thomas, 2020 ; Nugroho et al., 2023).

According to the World Health Organization (WHO, 2020), the prevalence of scabies ranges from approximately 0.2% to 71% and is estimated to affect more than 200 million people at any given time. In 2017, scabies and other ectoparasitic diseases were classified as Neglected Tropical Diseases (NTDs). The global prevalence of scabies is reported to be around 130 million cases annually (Faidah & Saputro, 2022). Based on the International Alliance for the Control of Scabies (IACS), the occurrence of scabies ranges from 0.3% to 46%. According to the Ministry of Health of the Republic of Indonesia, the prevalence of scabies in Indonesia is between 5.60% and 12.95%, making it the third most common skin disease among the twelve most frequent dermatological conditions in the country (Purbowati, 2024). The Ministry of Health has launched the "Scabies-Free Indonesia 2030" initiative to reduce its prevalence and impact, particularly among high-risk populations such as Islamic boarding schools.

Scabies is a common disease in Islamic boarding schools (pondok pesantren), primarily due to overcrowded living conditions, poor environmental sanitation, and inadequate personal hygiene among students (Sulistiarini, 2020; Saraha et al., 2022). Scabies infections occur through direct skin-to-skin contact or via transmission from mites attached to clothing, bedding, or towels (Wijaya et al., 2024).

Scabies, as a contagious disease, impacts not only morbidity rates but also students' school attendance, psychological well-being, and economic burden (Salawah, 2022). Without effective strategies for prevention and treatment, scabies can spread rapidly, disrupt daily activities in the pesantren, and even lead to complications (Isramilda et al., 2023). According to Nurlita and Rahman (2022), scabies can reduce students' quality of life and academic performance. Students suffering from scabies-related skin problems may experience symptoms such as redness, pus, and scaly skin, which can cause discomfort, low self-confidence, and embarrassment. These symptoms may escalate into more serious psychological issues, including a negative self-concept (Abida et al., 2022).

Pondok Pesantren Al Husain Magelang is one of the larger Islamic educational institutions with a significant number of students. Due to its densely populated environment and communal activities, the pesantren is particularly vulnerable to the spread of contagious skin diseases such as scabies. If not addressed promptly and appropriately, scabies cases can lead to serious consequences—not only for the physical health of the students but also for their psychosocial well-being and the overall effectiveness of the teaching and learning process within the pesantren (Jaya et al., 2022; Wahyuni et al., 2024).

In this context, an effective health crisis management system is essential to prevent, identify, and respond to outbreaks of infectious diseases such as scabies. Health crisis management in the pesantren setting involves promotive, preventive, curative, and rehabilitative efforts that are well-coordinated among pesantren administrators, healthcare providers, students, and their families. However, there is still limited information regarding the level of preparedness and effectiveness of pesantren in managing health crises caused by infectious diseases.

Although several previous studies have identified risk factors for scabies in Islamic boarding schools, such as personal hygiene, residential density, and environmental sanitation (Sulistiarini, 2020; Saraha et al., 2022), most research has

focused on individual behavioral aspects or physical environmental factors. Quantitative studies examining the role of structural and managerial factors such as health policies, treatment protocols, and response speed remain very limited. According to Donabedian (1988), the quality of health management depends not only on behavior but also on the structure of the system and the service delivery process. This study addresses this gap by analyzing the interrelationship between structural factors, processes, and outcomes in the effectiveness of health crisis management in Islamic boarding schools, particularly in the context of scabies control.

Based on this background, the present study aims to examine how health crisis management is implemented at Pondok Pesantren Al Husain, Magelang, particularly in handling scabies cases. Unlike previous studies, no research to date has quantitatively integrated structural factors (policies, protocols, healthcare access), process factors (response speed, health behavior), and outcomes (effectiveness of crisis management) within the context of Islamic boarding schools, especially for scabies. This study is expected to provide a comprehensive picture of the strategies and challenges encountered, as well as serve as a basis for formulating more effective health interventions in the boarding school environment.

METHOD

This study employed a quantitative method with a path analysis approach to measure the effectiveness of health crisis management strategies in improving the health crisis management process in Islamic boarding schools. Data analysis was conducted using partial least squares (PLS) structural equation modeling (SEM) with SmartPLS 3.0 software. The study population comprised all students at the junior high school (SMP) and senior high school/vocational school (SMA/SMK) levels at Pondok Pesantren Al Husain, totaling 500 students. The sampling technique used was probability sampling with proportionate stratified random sampling based on education level. The sample size was determined using the Slovin formula, resulting in 220 students. Data were collected through questionnaire distribution. The questionnaire consisted of eight main constructs: residential density, sanitation and hygiene, health education, healthcare access, policies and protocols, health awareness and behavior, response speed, and the effectiveness of health crisis management.

RESULTS

Table 1. Respondents' Demographic Characteristics

Variable	Category	n	%
Gender	Male	104	47.1%
	Female	116	52.9%
Age (years)	11–14	104	47.1%
	15–18	116	52.9%
Length of Stay in the Boarding School (years)	< 5	151	68.65%
	5–10	67	30.45%
	> 10	2	0.90%

Based on the distribution results presented in Table 1, it was found that the majority of respondents were female, totaling 116 individuals (52.9%), while male respondents numbered 104 individuals (47.1%). In terms of age, most respondents were in the 15–18 year age group, comprising 116 individuals (52.9%), while the remaining 104 individuals (47.1%) were aged 11–14 years. Regarding length of stay at the pesantren, the majority of respondents had been living in the pesantren for less than 5 years, totaling 151 individuals (68.65%).

Picture 1. Path Analysis Results

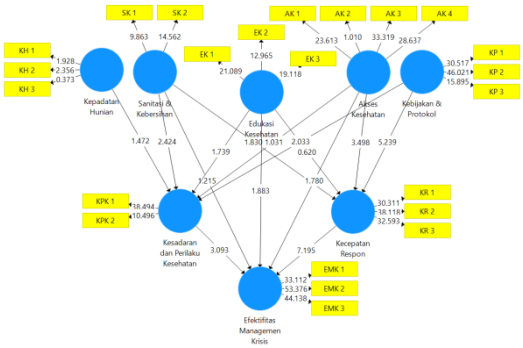

Table 3. Direct Effects

Path Analysis	β Value (+/-)	SDV	Tstatistic(>1.96)	P-value (<0.05)	Decision
HA → CME	0.134	0.075	1.780	0.076	Rejected
HA → RS	0.276	0.079	3.498	0.001	Accepted
HA → HAB	0.106	0.103	1.031	0.303	Rejected
HE → CME	0.108	0.057	1.883	0.060	Rejected
HE → RS	0.047	0.075	0.620	0.536	Rejected
HE → HAB	0.145	0.084	1.739	0.083	Rejected
PP → RS	0.455	0.087	5.239	0.000	Accepted
PP → HAB	0.185	0.091	2.033	0.043	Accepted
RS → CME	0.527	0.073	7.195	0.000	Accepted
HD → HAB	0.157	0.107	1.472	0.142	Rejected
HAB → CME	0.209	0.068	3.093	0.002	Accepted
SH → CME	-0.056	0.046	1.215	0.225	Rejected
SH → RS	0.088	0.048	1.830	0.068	Rejected
SH → HAB	0.192	0.079	2.424	0.016	Accepted

Based on the path analysis results in Table 3, healthcare access has a significant direct effect on response speed (β = 0.276; p = 0.001), but it does not have a significant effect on crisis management effectiveness (β = 0.134; p = 0.076) or on health awareness and behavior (β = 0.106; p = 0.303). Policy and protocol show a significant direct influence on both response speed (β = 0.455; p = 0.000) and health awareness and behavior (β = 0.185; p = 0.043). Furthermore, response speed has a strong and significant effect on crisis management effectiveness (β = 0.527; p = 0.000), as does health awareness and behavior, which also contributes significantly to crisis management.

Effectiveness (β = 0.209; p = 0.002). On the other hand, sanitation and hygiene only show a significant direct effect on health awareness and behavior (β = 0.192; p = 0.016), but not on crisis management effectiveness (β = -0.056; p = 0.225) or response speed (β = 0.088; p = 0.068). Meanwhile, health education does not exhibit any significant direct influence on all outcome variables, including crisis management effectiveness (β = 0.108; p = 0.060), response speed (β = 0.047; p = 0.536), and health awareness and behavior (β = 0.145; p = 0.083). Similarly, housing density does not show a significant direct effect on health awareness and behavior (β = 0.157; p = 0.142).

Table 4. Indirect Effects

Path Analysis	β Value (+/-)	SDV	T-statistic (>1.96)	P-value (<0.05)	Decision
HA → RS → CME	0.145	0.050	2.907	0.004	Accepted
HE → RS → CME	0.025	0.040	0.610	0.542	Rejected
PP → RS → CME	0.240	0.050	4.846	0.000	Accepted
SH → RS → CME	0.046	0.026	1.763	0.078	Rejected
HA → HAB → CME	0.022	0.023	0.944	0.346	Rejected
HE → HAB → CME	0.030	0.020	1.499	0.134	Rejected
PP → HAB → CME	0.039	0.026	1.508	0.132	Rejected
HD → HAB → CME	0.033	0.024	1.396	0.163	Rejected
SH → HAB → CME	0.040	0.022	1.844	0.066	Rejected

Based on the results of the indirect path analysis in Table 4, access to healthcare services has a significant indirect effect on crisis management effectiveness through response speed (β = 0.145; p = 0.004). This indicates that better access to healthcare leads to faster response times, which in turn enhances the effectiveness of crisis management. Similarly, policy and protocol also show a significant indirect effect on crisis management effectiveness through response speed (β = 0.240; p = 0.000). This suggests that appropriate policies and clear protocols can accelerate crisis response, thereby improving the overall effectiveness of crisis handling.

The indirect influence paths from health education, sanitation & hygiene, and housing density through response speed or health awareness and behavior did not show a significant effect on crisis management effectiveness (p > 0.05). This indicates that the mediating roles of these variables in this context remain weak or suboptimal.

Overall, response speed has been proven to be an effective mediator in strengthening the relationship between healthcare access and policy with crisis management effectiveness, whereas health awareness and behavior have not played a significant mediating role in any of the tested paths.

Table 5. Total Effects

Variable Path	Original Sample (O)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values	Decision
HA → CME	0.168	0.054	3.087	0.002	Accepted
HA → RS					
HA → HAB					
HE → CME	0.055	0.045	1.209	0.227	Rejected
HE → RS					
HE → HAB					
PP → CME	0.279	0.055	5.113	0.000	Accepted
PP → RS					
PP → HAB					
HD → CME	0.033	0.024	1.396	0.163	Rejected
HD → HAB					
HAB → CME					
SH → CME	0.087	0.037	2.361	0.019	Accepted

Based on the results of the total effect measurement in Table 5, the variable with the most substantial total influence on the effectiveness of crisis management is policy and protocol (β = 0.279), followed by health access (β = 0.168), and sanitation and hygiene (β = 0.087). Variables such as health education and housing density require further reinforcement or reconsideration, as their total effects have not been statistically significant.

Table 7. Structural Model Assessment: R^2 and f^2 Values

Variable	R^2 Value	Interpretation	f^2 (to KPK)	f^2 (to KR)	f^2 (to CME)
Housing Density (HD)					0.031
Sanitation & Hygiene (SH)			0.006	0.014	0.037
Health Education (HE)			0.016	0.003	0.016
Healthcare Access (HA)			0.023	0.074	0.007
Policy & Protocol (PP)				0.211	
Health Awareness & Behavior (HAB)	0.310	Weak			
Response Speed (RS)	0.558	Moderate			
Crisis Management Effectiveness (CME)	0.630	Strong			0.022

The R^2 analysis results in Table 7 indicate that the variables in the model are able to explain 63% of the variance in crisis management effectiveness, reflecting a strong predictive power. Meanwhile, response speed is explained by 55.8% of the variance, indicating a moderately good level of predictive capability. However, for health awareness and behavior, the model accounts for only 31% of the variance, suggesting that there are still other external factors significantly influencing this variable.

The effect size (f^2) analysis in Table 7 shows that the variable *Policy & Protocol* has a large effect on *Response Speed* (f^2 = 0.382) and a moderate effect on *Health Awareness & Behavior* (f^2 = 0.211). In contrast, other variables such as *Health Education*, *Healthcare Access*, *Sanitation & Hygiene*, and *Housing Density* mostly demonstrate only small effects on the respective dependent variables. No large effects were found on *Health Awareness & Behavior*, indicating that many other external factors may play a more significant role in shaping this variable.

DISCUSSION

This study demonstrates that the effectiveness of health crisis management in handling scabies cases at Pondok Pesantren Al Husain, Magelang, is influenced by several key variables, with varying strengths of association. These findings highlight the importance of a multi factor approach in managing infectious diseases in communal environments such as Islamic boarding schools.

The findings of this study can be analyzed using Donabedian's Model, which views the quality of healthcare services through three main components: structure, process, and outcome (Donabedian, 1988). In the context of this study, *structure* includes the presence of health policies and protocols, access to healthcare facilities and personnel, as well as the availability of sanitation facilities. *Process* encompasses the speed of response to scabies cases and

the implementation of health education for students. *Outcome* is represented by the effectiveness of health crisis management in the boarding school.

The analysis revealed that structural components, particularly policies and protocols, exert the strongest influence on the process (response speed) and directly enhance the outcome (effectiveness of crisis management). This extends the findings of Saraha et al. (2022), who concluded that most previous studies in Islamic boarding schools have focused on process-related individual behavioral factors such as personal hygiene and residential density, while structural aspects have rarely been examined quantitatively.

Thus, this study addresses the knowledge gap by demonstrating that the success of scabies prevention and control is determined not only by students' behavior but also by a well-organized crisis management system supported by written policies, clear protocols, and coordinated rapid response. Furthermore, the findings support the argument that strengthening service structures such as developing health standard operating procedures (SOPs), establishing a boarding school health post, and providing isolation facilities can facilitate faster response processes, ultimately reducing the spread of infectious diseases. This approach is relevant for implementation in other Islamic boarding schools with similar communal environmental characteristics.

Policies and protocols demonstrated the most significant direct effect on response speed ($\beta = 0.455$; $p = 0.000$) and on health awareness and behavior ($\beta = 0.185$; $p = 0.043$). The total effect on the effectiveness of crisis management was also the largest ($\beta = 0.279$). These findings are consistent with Paul (2024), who stated that effective crisis management may include making bold decisions, clearly articulated policies, thorough planning, timely communication with stakeholders, and taking swift action to avert disaster. This underscores that scabies management requires written, systematic regulations that can be implemented consistently.

According to Purbowati et al. (2024), policy interventions that include case mapping, isolation protocols, and routine counseling procedures can significantly reduce the incidence of scabies in densely populated or communal settings such as Islamic boarding schools. A similar study by Isramilda (2023) in an Islamic boarding school in Batam also found that the absence of clear health SOPs was a major factor contributing to the high incidence of skin diseases in the boarding school environment.

An effective policy not only requires the availability of written documents but also the involvement of all elements within the boarding school in its implementation. This is in line with the view of Nurlita and Rahman (2022), who stated that the participation of students and administrators in decision-making and protocol implementation increases compliance with health policies. Consistent with the findings of Sari (2023) in a study conducted at Pondok Pesantren An-Nur Ngrungkem, Yogyakarta, the active roles of boarding school leaders, administrators, and students were found to be crucial in improving health within the boarding school environment.

In addition, this study found that response speed had a very strong direct effect on the effectiveness of crisis management ($\beta = 0.527$; $p = 0.000$) and served as a significant mediator between health policies/actions and the effectiveness of disease control. This is consistent with Salvador-Carulla et al. (2020), who stated that rapid response is a key component in reducing the impact of infectious disease

outbreaks, particularly in communal environments.

However, contrary to the assumptions of many previous studies, this research shows that health education and population density do not have a significant effect on the effectiveness of crisis management. For instance, Saraha et al. (2022), in their scoping review, highlighted personal hygiene and residential density as major risk factors for scabies in Islamic boarding schools. This difference may be attributed to the relatively homogeneous residential density in the current study's field setting, as well as the delivery of health education that was less contextual or participatory, thereby limiting its impact on students' health behaviors (Faidah & Saputro, 2022).

In the context of closed institutions such as Islamic boarding schools, prompt responses to student complaints, isolation of active cases, and continuous education are key. Nugroho et al. (2023) demonstrated that a delay of more than 48 hours in addressing early symptoms of scabies increases the risk of transmission by up to threefold.

Although healthcare access did not show a significant direct effect on the effectiveness of crisis management ($p = 0.076$), it played an indirect role through response speed ($p = 0.004$). This indicates that the presence of healthcare personnel, basic treatment facilities, and a boarding school health post is crucial as the first line of defense in controlling infectious diseases. According to Salawah (2022), active internal health facilities encourage students' trust to report symptoms promptly, which indirectly accelerates treatment and prevents transmission. Furthermore, the presence of a boarding school health post can bridge promotive, preventive, and curative health needs within a confined environment (Nurlita & Rahman, 2022).

Sanitation and hygiene had a direct effect only on health awareness and behavior ($p = 0.016$) and an indirect effect on the effectiveness of crisis management. This is consistent with the findings of Syailindra and Mutiara (2016), who stated that poor sanitation is a major risk factor for the spread of scabies, but is not sufficient to halt transmission without the support of response and managerial factors.

A study in Islamic boarding schools in Batanghari Regency by Salawah (2022) emphasized that, although room cleanliness and sanitation facilities were adequate, the primary determinant in scabies prevention was the behavior of individuals within the boarding school, including both students and administrators. The health education variable did not show a significant effect, either directly or indirectly, on the effectiveness of crisis management. This may be due to the form of education being insufficiently contextual or not tailored to the characteristics of the students.

This variable had a significant effect on the effectiveness of crisis management ($\beta = 0.209$; $p = 0.002$), but failed to serve as a mediator in most indirect influence pathways. This means that although healthy behavior is important, efforts to develop such behavior require time and a long-term approach. As stated by Nugroho et al. (2023), fostering a culture of clean living in Islamic boarding schools should be an integral part of daily curriculum activities, rather than merely an incidental intervention when cases occur.

Residential density did not have a significant effect in the results of this model, although theoretically it is a major risk factor in the transmission of infectious diseases in closed institutions (Pondaag, 2024; Isramilda et al., 2023). This finding is consistent with the study by Ridwan et al. (2021), which reported no relationship between residential density and the

incidence of scabies. This may be due to the homogeneity of the students' living conditions, which did not vary greatly, or the presence of protective factors such as the use of individual beds or staggered bathing schedules.

The findings of this study reinforce the concept that health crisis management in boarding school based educational institutions requires a combination of structural aspects (policies, protocols), operational aspects (rapid response, service access), and cultural aspects (behavior, awareness). Consistent with the findings of Ifendi (2021), effective health management in Islamic boarding schools requires strong collaboration among school stakeholders in planning, organization, implementation, and supervision. The successful control of scabies cannot rely solely on education or facility improvement but necessitates a well-coordinated emergency response system.

These findings provide a new perspective that, although behavioral factors such as personal hygiene remain important, the effectiveness of scabies control in Islamic boarding schools is more strongly determined by the readiness of infrastructure and the quality of crisis management systems. Therefore, health policies in boarding schools should prioritize the establishment of clear protocols, ensure the availability of internal health facilities, and enhance response speed, rather than focusing solely on short-term educational interventions.

Unlike previous studies, which generally highlighted individual behavioral aspects and physical environmental factors (Saraha et al., 2022; Sulistiarini et al., 2020), this study quantitatively examines the influence of structural factors such as policies, protocols, and access to health services on crisis management effectiveness, including mapping direct and indirect relationships through path analysis. These findings contribute new insights by demonstrating that structural factors and response speed play a more dominant role in improving crisis management effectiveness compared to behavioral factors, thereby providing a basis for strengthening health policies in Islamic boarding schools.

CONCLUSIONS

Based on the research findings, it can be concluded that the effectiveness of health crisis management in addressing scabies at Al Husain Islamic Boarding School in Magelang is strongly influenced by robust policies and protocols, rapid response to cases, and adequate access to healthcare services. Clear and promptly implemented policies have been shown to enhance health behavior awareness and strengthen response effectiveness. In contrast, health education, housing density, and environmental sanitation did not demonstrate significant direct effects. Therefore, strengthening policy systems and ensuring a rapid response mechanism are key strategies in controlling the spread of scabies within the boarding school environment.

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EFFECTIVENESS OF BOOKLETS AS EDUCATIONAL MEDIA TO INCREASE HYPERTENSION KNOWLEDGE: LITERATURE REVIEW

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ABSTRACT

Hypertension is one of the chronic diseases with high prevalence that requires continuous educational efforts. Booklets as simple printed media are considered effective in increasing patient knowledge about the prevention and management of hypertension. This study is a literature review study that aims to analyze the effectiveness of using booklets as educational media in increasing knowledge of hypertension. Articles were obtained from the PubMed, Scopus, Web of Science, and Google Scholar databases using the keywords: "Booklet" OR "Educational Booklet" AND "Hypertension" OR "High Blood Pressure" AND "Knowledge" OR "Health Education". A total of 10 articles were selected based on the inclusion criteria and selected using the PRISMA diagram. The results of the review showed that the use of booklets consistently increased the knowledge of hypertension patients, both in adult, elderly, and adolescent groups. Booklets have also been shown to be effective when combined with mentoring from cadres or health workers. These results are in line with the theory of health literacy and educational communication which emphasizes the importance of visual media and readability. In conclusion, booklets are an effective educational media, and can be adapted for various target groups in an effort to increase knowledge about hypertension.

Keywords

Booklet, Hypertension, Knowledge, Health Education

INTRODUCTION

Non-communicable diseases (NCDs) have become a major challenge in the global health system as they contribute to more than 70% of deaths worldwide. One of the NCDs that ranks first as a cause of premature death and health burden is hypertension. Hypertension or high blood pressure is one of the most common global health problems and is a major risk factor for cardiovascular diseases such as stroke, coronary heart disease, and kidney failure. Data from the World Health Organization shows that around 1.28 billion adults worldwide suffer from hypertension, and almost two-thirds of them live in low- and

middle-income countries (WHO, 2022). In Indonesia, the results of the 2018 Riskesdas showed that the prevalence of hypertension in the age of ≥18 years reached 34.1% and only around 8.8% took medication regularly. This fact shows the low level of awareness, early detection, and effective management of hypertension in the community (Hasanah, Sari, Wahyuni, & Andika, 2023). The low level of knowledge about hypertension has been proven to be one of the factors causing the lack of good blood pressure control (Yulianti & Sari, 2021).

The high incidence of hypertension is closely related to the low level of public knowledge about hypertension, including understanding of risk factors, prevention methods, treatment, and lifestyle changes, which are key elements in efforts to control this disease (Gultom Boru, 2024). Without a good understanding, sufferers tend to ignore their health conditions and are reluctant to seek treatment or change behavior. Therefore, increasing knowledge is the main target in health promotion interventions (S. Wulandari & Fitriani, 2020).

One of the key strategies in controlling hypertension is through health education and promotion that targets increasing community knowledge, attitudes, and behavior (Arif Irpan Tanjung, Ranida Arsi, & Andre Utama Saputra, 2024). Good knowledge about hypertension has been shown to be positively correlated with patient compliance in undergoing therapy and implementing a healthy lifestyle. In health promotion efforts, the use of educational media is an effective approach to convey health information to the public. One of the media that is considered effective in conveying health information is booklets. Booklets are small books containing concise but structured information, presented with attractive illustrations to facilitate understanding (Nugroho, Wulandari, & Suparman, 2021). This media has the advantage of being easy to carry, can be reread, and is able to reach groups with varying levels of education (Afifah, 2021). Several studies have stated that booklets can improve understanding, attitudes, and even patient compliance with hypertension treatment (Safitri & Sudaryanto, 2022).

Several recent studies have shown that the use of booklets as an educational medium can significantly increase the knowledge of hypertension sufferers. For example, a study by (Aninda, 2021) showed that the group that received the booklet showed an increase in knowledge of 69.2% compared to leaflet media (57.1%). Another study in the Pajang Health Center work area showed that education using booklets was effective in increasing knowledge about the pharmacological management of hypertension (Safitri & Sudaryanto, 2022).

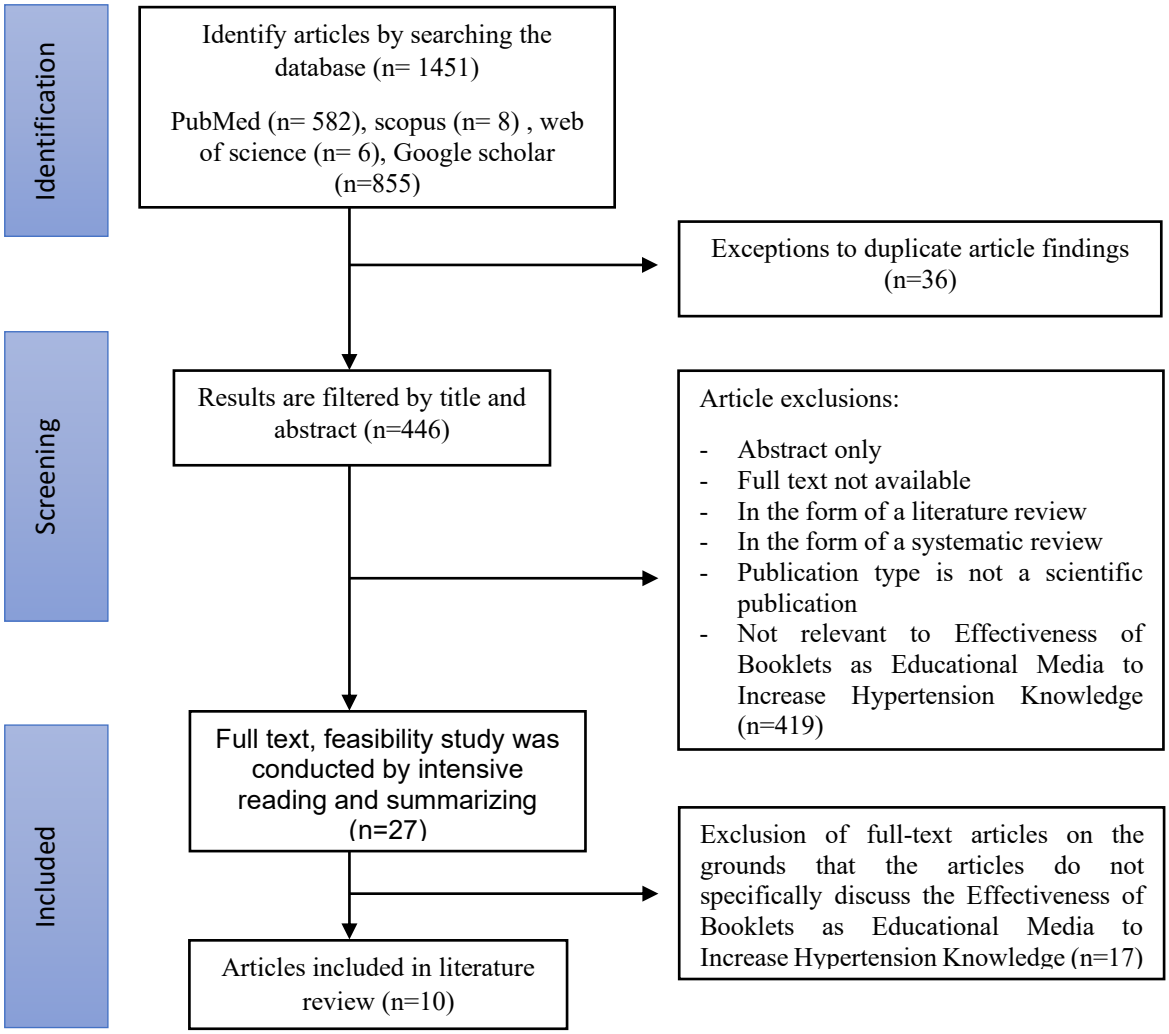
However, the effectiveness of booklets as educational media can vary depending on the quality of the content, distribution methods, and characteristics of the educational targets (Octaviana Putri, Ningrum Rahmadayanti, Rizka Chairunnisa, & Khairina, 2021; Pramudita et al., 2025). Therefore, it is important to conduct a literature review that reviews various scientific findings related to the effectiveness of booklets in increasing hypertension knowledge. This review is expected to provide a comprehensive understanding and become a basis for designing more effective educational media in health promotion programs, especially for people with hypertension.

METHOD

This study is a literature review with a critical review full text English approach that aims to critically assess the effectiveness of using booklet media in increasing knowledge about hypertension. The databases used are PubMed, Scopus, Google Scholar and Web of Science.

Articles are selected using PRISMA. The results of searching for articles with the keywords "Booklet" OR "Educational Booklet" AND "Hypertension" OR "High Blood Pressure" AND "Knowledge" OR "Health Education". found 582 articles from PubMed, 8 articles from Scopus, 6 articles from the web of science and 855 articles from Google scholar. Furthermore, filtering was carried out with duplication and 36 similar articles were found. Furthermore, filtering was carried out based on the title and abstract and the results were 419 articles with the exclusion criteria being only abstract articles, full text articles that could not be accessed, other articles in the form of systematic reviews, and types of publications in the form of reports only, and not in accordance with the Effectiveness of Booklets as Educational Media to Increase Hypertension Knowledge. After filtering, 27 articles were obtained, then read in detail and summarized. Found 17 non-specific articles discussing Booklets as Educational Media to Increase Hypertension Knowledge. The final result found 10 articles that fit the topic and inclusion criteria that have been set. In the process of searching for articles, the author determined the inclusion criteria, namely: English-language articles, Research subjects are people who are at risk of hypertension, Research articles that can be accessed in full. The search and selection of articles were carried out based on the clarity of the source and correlation with the Effectiveness of Booklets as Educational Media to Increase Hypertension Knowledge.

This selection process is described through a PRISMA flowchart that includes the number of articles at each stage. Data Extraction and Analysis: Data extracted from each article includes: name of researcher and year of publication, location and setting of the study, research design and number of samples, type and duration of booklet intervention, and knowledge measurement results. The analysis was carried out in a thematic narrative, namely by grouping the study results based on increased knowledge, duration of intervention, and effectiveness of booklet media.


Identification
Identify articles by searching the database (n= 1451)
PubMed (n= 582), scopus (n= 8) , web of science (n= 6), Google scholar (n=855)
Exceptions to duplicate article findings (n=36)
Screening
Results are filtered by title and abstract (n=446)
Article exclusions:
- Abstract only
- Full text not available
- In the form of a literature review
- In the form of a systematic review
- Publication type is not a scientific publication
- Not relevant to Effectiveness of Booklets as Educational Media to Increase Hypertension Knowledge (n=419)
Included
Full text, feasibility study was conducted by intensive reading and summarizing (n=27)
Exclusion of full-text articles on the grounds that the articles do not specifically discuss the Effectiveness of Booklets as Educational Media to Increase Hypertension Knowledge (n=17)
Articles included in literature review (n=10)

RESULTS

No.	Writer	Research title	Design	Location and sample	Destination	Results
1.	Safitri & Sudaryanto, (2022)	Effectiveness of Health Education with Booklet Media on Knowledge in Pharmacological Management of Hypertension in the Pajang health center working area	Quasi-experiment (pre-post)	Pajang Health Center,Surakarta, Indonesia. With a sample size of 46 adult hypertensive patients.	The aim of this study was to determine the effectiveness of booklets in hypertension pharmacology education.	The results of the study showed that knowledge increased significantly ($p < 0.001$).
2.	Sahu, (2024)	Effectiveness of Information Booklet on Knowledge and Attitude Toward Controlling Blood Pressure Among Clients with Hypertension In Medical College Hospital, Jabalpur	Pre-experimental (one group pre-post)	Medical College Hospital, Jabalpur, India with a sample size of 100 adult hypertensive patients treated as outpatients.	The aim of this study was to assess the effectiveness of the booklet on patient knowledge and attitudes.	The results of the study showed that the knowledge score of hypertension patients after being given the booklet increased from 8.6 to 16.2.
3.	Ismail, Nurmala, Suwondo, & Kurniawati, (2023)	Development and Validation of Hypertension Educational e-Book for Children Aged 10 to 12	R&D (research & development)	Primary school in Selangor, Malaysia With a total sample of 36 children aged 10–12 years and also experts	The purpose of this study is to develop and validate e-booklet media for children.	The research results show a Content Validity Index (CVI) value > 0.8, which means that the booklet media is suitable for use and easy for children to understand.
4.	Manalu & Hasibuan, (2024)	The Effect of Nutrition Education with Booklet Media on Knowledge About Diet in Patients with Hypertension	Quasi-experimental (pre-post)	Muhammadiyah General Hospital Medan, Indonesia with a sample size of 66 hypertensive patients aged 40–60 years.	The aim of this study was to analyze the influence of nutrition booklets on patient knowledge.	The results of the study showed that after being given booklet media to hypertension patients, the score increased from 46.9 to 69.7.
5.	(N. K. Wulandari, Suryani, & Hadi, 2023)	The Effect Of Providing Education Using E-Booklet Media on Students' Knowledge	his research is a quantitative research with a pre-experiment research	The population of this study was 327 students at SMANU Pakis Malang Regency with a sample	The aim of this study was to increase adolescent knowledge about	The results of the study showed that after being given educational

		About Prevention of Hypertension Disease at Smanu Pakis Malang District	design using a one group pretest posttest design.	size of 38 students selected using purposive sampling techniques. The instrument used was a questionnaire.	preventing hypertension by using booklet media.	media in the form of a booklet about hypertension knowledge, the knowledge score of high school students increased from 67.6 to 85.9.
6.	Anam, Christina, Rudhiati, Hapsari Retno, & AWaluya, (2024)	Health Volunteers and E-Booklet Impact on Knowledge and Treatment Adherence in Hypertension Patient Adherence	Quasi-experiment	This research was conducted at Batujajar Community Health Center. The number of samples in this study was 32 respondents, with each group consisting of 16 respondents. The sample selection technique in this study used purposive sampling.	This study aims to determine the effect of health education provided by cadres using ebooklets on the knowledge and treatment adherence of hypertension patients in the Batujajar Community Health Center area.	The results of this study indicate that health education provided by cadres using e-booklets significantly increased the average knowledge of hypertension patients, with the mean knowledge score rising from 75.6 to 86.8. Patient medication adherence also improved, with the mean score rising from 4.4 to 6. The results showed a significant positive effect on both variables, with p-values of 0.016 for knowledge and 0.001 for medication adherence, respectively. Therefore, it can be concluded that health education provided by cadres using

						e-booklets significantly impacts the knowledge and medication adherence of hypertension patients in the Batujajar Community Health Center area.
7.	Isnaini, Marthoenis, & Wahyuni, (2023)	Development of a Booklet as a Nutrition Educational Media in Hypertension Patients	R&D (Research & Development)	Medistra Pratama Clinic, North Sumatra, Indonesia with a sample size of 10 patients and 3 nutritionists for validation.	The aim of this study was to develop an educational nutrition booklet for hypertension patients.	The results of the study showed a Content Validity Index (CVI) value > 0.8, which means that the educational booklet media is declared valid and suitable for use to increase knowledge in hypertension patients.
8.	Ailabouni, Duffull, Currie, & Braund, (2020)	Pharmacist-Led Educational Booklet and Medication Review to Optimize BP Control	Randomized Controlled Trial (RCT)	Elderly community, Wellington and Auckland, New Zealand with a sample size of 150 elderly (≥65 years) with hypertension.	The aim of this study was to assess the impact of booklets and pharmacists on understanding and control of hypertension.	The results of the study showed a significant increase in self-efficacy and blood pressure control after being given booklet media to elderly patients with hypertension.
9.	Chow, (2021)	Effectiveness of a Self-Monitoring Booklet and Nurse Support	Randomized Controlled Trial (RCT)	Community clinic in Kowloon, Hong Kong with a sample size of 88 hypertensive patients aged 35–70 years.	The aim of this study was to assess the effectiveness of booklets and nurse support for blood pressure literacy and control.	After being given booklet media to hypertension patients, the research results showed that with the booklet media, health literacy and blood pressure control increased.

10.	Maheswaran, Kupek, Petrou, & Colwell, (2020)	A RCT of an Information Booklet for Hypertension Patients in the UK	Randomized Controlled Trial (RCT)	Primary Care Clinic, Manchester, UK with a sample of 120 adult hypertensive patients.	The aim of this study was to assess the increase in patient knowledge through booklets + training.	The results of the study showed that the intervention group showed a significant increase in knowledge after being given the booklet media.

DISCUSSION

The results of 10 studies that have been selected as literature review materials, show that booklets as educational media have significant high effectiveness in increasing the knowledge of hypertensive patients. Eight out of ten articles showed a significant increase in knowledge scores after the intervention of providing booklet media to hypertensive patients (Safitri & Sudaryanto, 2022), (Sahu, 2024), (Manalu & Hasibuan, 2024), (N. K. Wulandari et al., 2023). This is in accordance with the results of research conducted by (Gao et al., 2020), which states that printed media such as booklets can improve understanding and memory of health information because they can be re-accessed and used according to the individual's learning speed (Damayanti, Sari, & Yusuf, 2019).

Booklets designed with educational narratives, simple language, and supporting visuals have been shown to be more easily accepted by patients, including groups with low levels of education (Rahmawati, 2023). Patient-oriented education with a visual and written approach is also in line with the principle of "patient-centered education", namely learning that focuses on individual learning needs and capacities (Rahim, Ibrahim, & Salim, 2021). This is also in accordance with health communication theory, where printed media such as booklets function as a means of conveying health messages that can be accessed, stored, and reread by readers (Febriyanti, Sari, & Harahap, 2022). Booklets allow individuals to learn information at their own pace and level of understanding, unlike oral media which only passes once (Masnah & Daryono, 2022).

The results of the study showed that booklets are most effective when used as the main media in systematically designed education (Indarsih & Safitri Elshap, 2021). The study by Safitri & Sudaryanto, (2022) used a pharmacological booklet, while Manalu & Hasibuan, (2024) added nutritional content. Both showed an increase in knowledge with statistical significance. According to the Health Belief Model (HBM) theory, the perception of the benefits of education greatly influences behavioral change (Mandasari & Prasetyo, 2020). With a detailed and focused booklet, the perception of benefits increases, so that patients better understand the risks and preventive measures of hypertension.

The effectiveness of booklets has been proven not only in adult patients, but also in groups of children (Ismail et al., 2023), adolescents (N. K. Wulandari et al., 2023), and the elderly (Ailabouni et al., 2020). This shows that booklet media is flexible and adaptive according to the target segmentation of education (Dewi & Marlina, 2021). The study of (Ismail et al., 2023) showed that booklets for children aged 10–12 years were able to be validated in terms

of content with a value Content Validity Index (CVI> 0.8) and were well understood, the results, this shows the importance of an age-specific educational strategy (Rachmasari & Savitri Intan, 2022). This approach is in line with the Tailored Health Communication theory (Noar, Harrington, & Aldrich, 2021), which states that educational materials tailored to the characteristics of the target audience (age, literacy level, culture) will increase the effectiveness of the message and the likelihood of behavioral change (Watkins, Papacosta, Chinn, & Martin, n.d.).

Two studies (Ismail et al., 2023), (Isnaini et al., 2023) showed that booklet development involving experts and content validation is very important. Validation using the Content Validity Index (CVI) showed results >0.8, indicating that the content in the booklet is relevant and suitable for delivery to patients with hypertension (Gusti Fawwaz, Saftarina, Kurniawaty, & Wulan Sumekar W, 2022). According to the latest educational design literature, good educational media must meet three main aspects: content relevance, readability, and visual aesthetics (Kuehn, 2022). When a booklet meets these criteria, its effectiveness in increasing knowledge and encouraging attitude change will increase significantly. Two studies (Ismail et al., 2023), (Isnaini et al., 2023) focused on booklet development and validation. The results showed that booklets with good content validity (CVI > 0.8) were considered suitable for use and could be understood by the target. This emphasizes the importance of expert involvement and target participation in the educational media development process (Siswoaribowo, Hayati, & Nurhanisa, 2023). According to visual communication theory, health messages delivered with an attractive layout, supporting visuals, and simple language will be easier to understand and remember (Prabawati, 2024).

Several studies in this review used booklets as part of an intervention, for example with the involvement of health cadres (Anam et al., 2024) or nurse support (Chow, 2021). The results showed that not only knowledge increased, but also adherence to treatment and blood pressure control showed improvements (Jeanie, 2023). This supports the theory of the Integrated Model of Health Literacy (Sørensen, 2021) which states that health literacy is not only influenced by available information, but also by social support systems and health workers who are actively involved (Yusniarita, Munawaroh, & Susana, 2023). Collaboration between booklet media and interpersonal interactions has been shown to improve overall educational outcomes (Hidayati & Riyanto, 2021).

These results also align with systematic findings by Nugroho (2021), which confirmed that booklets are a suitable medium for health education in various settings, particularly for groups with lower-middle education levels. This consistency strengthens the argument that booklets can meet educational needs across the board, including among the elderly population, which is often targeted for hypertension education. However, several studies, such as those by Mandasari and Prasetyo (2020), highlight that booklet effectiveness also depends heavily on other factors, such as visual design, readability, and exposure time. Therefore, booklet effectiveness depends not only on its availability but also on the quality of its presentation and how it is used.

Several studies have shown that the use of booklets can improve the knowledge of hypertension sufferers. However, literature studies linking the effectiveness of booklets to specific health behavior

theoretical frameworks are rare. This indicates a knowledge gap, particularly in understanding how booklets influence the process of behavior formation based on theoretical approaches (Nugroho et al., 2021).

This study attempts to fill this gap by examining the effectiveness of booklets in improving hypertension knowledge using the Health Belief Model (HBM) approach. The HBM theory explains that a person's knowledge can influence perceptions of perceived susceptibility, perceived severity, perceived benefits, and perceived barriers, all of which contribute to behavior change. In this context, booklets function as educational media that can strengthen patients' positive perceptions and encourage them to be more active in preventing and managing hypertension. Therefore, this study provides a theoretical contribution to the use of educational media based on behavioral theory in efforts to improve health knowledge.

This study presents a novel approach to systematically synthesizing the literature on the effectiveness of booklets as a medium for hypertension education, reviewed using the Health Belief Model (HBM) approach. Unlike previous studies, which tended to be descriptive and not grounded in behavioral theory, this study links HBM components such as perceived susceptibility, severity, benefits, and barriers to the role of booklets in improving the knowledge of hypertension sufferers. Furthermore, the study focuses specifically on booklets, rather than on a combination of other media, providing a more in-depth and targeted understanding. The use of current literature also makes this study relevant to current educational conditions and practices.

CONCLUSIONS

Based on the review of 10 articles, booklets have proven to be an effective educational media to increase knowledge about hypertension in various target groups. The success of booklet media is highly dependent on the quality of the content, visual design, and characteristics of the target.

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ORIGINAL RESEARCH

THE EMERGENCY LEVEL ALGORITHM USES THE NATIONAL EARLY WARNING SYSTEM (NEWS) METHOD FOR NON-REBREATHING MASK OXYGEN THERAPY PATIENTS

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ABSTRACT

The mixed gas pressure theory states that if the pressure of one gas in a gas mixture increases, the partial pressure of the other gas will decrease. Increasing the oxygen concentration in the non-rebreathing mask will reduce the partial pressure of CO2, so that it can reduce PaCO2 and maintain a high PaO2. Researchers want to know the level of emergency by looking at the effectiveness of administering O2 on hemodynamic status using the NEWS (National Early Warning System) method, where currently only O2 saturation and arterial blood gas analysis values are often used to evaluate, without any scoring, with an action algorithm according to the emergency level scoring report. This research is a quasi-experimental one-group pre-post-test design with a one-shot pretest and posttest design on all patients who have respiratory complaints with NEWS score values in the moderate and severe categories in the ICU of Dr. Hospital. Slamet Martodirjo Pamekasan. Sampling uses non-probability purposive sampling. Because the population of this study is infinite, the target sample size is 20 respondents. The emergence of patients in the ICU after receiving the second 6-hour phase of O2 NRM therapy intervention was found by most respondents (55%) in the mild category, and only 20% in the severe category. This means that the number of patients in the critical or high category is much less than after the first 2 hours of therapy, namely 65% to 20% and most of them are already in the mild category after the second 6 hours of O2 therapy. This study concludes that O2 NRM therapy has a significant effect on reducing the level of emergency for the first 2 hours and evaluation for the second 6 hours, resulting in a different emergency algorithm (reducing the level of emergency) for the two evaluation phases with different levels of emergency.

Keywords

Emergency level algorithm; Early warning system (EWS); Non-rebreathing mask oxygen

INTRODUCTION

The decreased morbidity and mortality rates of patients are influenced by high-quality intensive care. Patients in intensive care in hospitals can be stable and unstable. The patients are at risk of deteriorating clinical conditions that can increase morbidity and mortality rates. One of the efforts to improve quality related to patient safety in hospitals is the application of Early Warning Score (EWS), including in intensive care facilities (ICU). Early warning score (EWS) is an indicator used to assess the deterioration of the physiological condition of the patient, the assessment and response time to patients who come with acute illness conditions. EWS assessment is based on seven indicators of assessment of physiological response of patients consisting of respiration, systolic blood pressure, temperature, pulse rate, oxygen saturation, extra oxyge, and the level of patient awareness. Early warning scores (EWS) can be used to predict the likelihood of short-term and long-term death. Early warning scores (EWS) can be used as external predictors of patients including Length of Stay (LOS), mortality in 28 days or Net Death Rate (NDR), and HCU/ICU admission and code blue activation. Based on existing research results, the impact of EWS on patient clinical outcomes is still variable so that no overall conclusion can be drawn (Megawati, Sondari, Tambunan, 2023)

In 1997 Morgan, in the UK, was the first to develop and publish an early warning score system (EWSS) consisting of five physiological parameters that not only predict results, but also serve patients with circulatory systems and encourage nurses to identify early signs of deterioration. The Early Warning Score System (EWSS) introduced in the UK was later modified to the modified early warning scoring system (MEWSS), and the standard early warnings scoring systems (SEWSSs) developed in Scotland in 2003. In 2007, the National Institute for Health and Clinical Excellence (NICE) recommended the early warning scoring system (EWSS), which uses several parameters or evaluation systems, should be used to monitor all adult patients in hospitals to evaluate the level of patient criticism and timely escalation of care. NICE also recommends that the chosen system should measure heart rate, respiratory frequency, systolic blood pressure, level of consciousness, oxygen saturation and temperature. In 2010, the European Resuscitation Council outlined the importance of EWSS by incorporating it into the guidelines for rehabilitation and included it in the first line in the survival chain (Georgaka et al., 2012)

The worsening condition of the patient, such as a cardiac arrest, needs to be detected quickly to prevent the death toll. In Indonesia, hospital deaths rose from 69 per 1,000 population to 87 per 1000 population from 2007 to 2012 (BKKBN, BPS, Health, & International, 2013). According to the medical records of the Santa Elisabeth Medan Hospital, the number of deaths in 2018 was 570 people, while at the time of use of EWS in 2019 the number was 460 people.

Oxygen therapy (O2) is a medical intervention to prevent or treat hypoxia and maintain relative tissue oxygenation. (Purnomo, 2021). The results of the study by Agustin, Triyono, Setiyawan, & Safitri (2019) indicate that oxygenation filling can stabilize the hemodynamic status of patients characterized by decreased blood pressure, increased heart rate, and body temperature. Another study conducted by Ginting et al. (2020) found that oxygenation can affect the level of awareness of patients with moderate head injuries. Oxygen improves the circulation of oxygen to the brain, stabilizes

the blood, and reduces the level of pain. (Kurniawan, 2023).

In patients with oxygen disorder with symptoms of shortness of breath, it is important to keep PaO2 levels within normal limits. In some libraries, it is mentioned that we should keep PaO2 at a minimum of 100mmHg, even some authors give a higher value, that is, ranging between 140-160mmHg. Oxygenation can be done using nasal canul, masks or with hyperbaric chamber therapy. One measure to control the increase in blood acidity is a reduction of PaCO2 in the acute phase of acidosis. The decrease is carried out to reach PaCO2 levels of about 20-30 mmHg, which is known as hyperventilation action. This decrease in PaCO2 will lead to vasoconstriction of the brain's blood vessels and this condition will directly lead to a reduction in the rate of blood flow to the brain; as a result (indirectly) will lower the intracranial pressure. The background of this research is that in the theory of gas pressure mixture, Dalton says that if one gas pressure in the gas mixture increases then the partial pressure of the other gases will decrease, so the authors want to know whether an increase in oxygen concentration in the NonRebreathing mask will lower a partial CO2 pressure, so it can be used to lower PaCO2 whileining a high PaO2 to lower blood acidity. A nonrebreathing oxygen face mask (NRM) is a device that can deliver oxygen at a low speed but with a high concentration effect in patients who can breathe spontaneously. The NRM has a pure O2-reservoir component and a one-way breathing valve that allows the delivery of O2 concentration to the patient's height (FiO2 about 90%). Looking at the background, this study aims to find out the effectiveness of O2 administration against hemodynamic status by using indicators of success of EWS changes in patients with shortness of breath (Hendrizal, Saanin, Bachtiar, 2014).

METHOD

This penalty is a clinical trial study with a project one shoot pretest and postest. The research was conducted at Dr. Slamet Martodirjo Pamekasan Hospital, located in the HCU (High Care Unit) room. The study population is all patients with respiratory complaints with EWS scores of moderate and severe categories treated in the hospital Dr. Slamet Martodirjo Pamekasan. The sample of the study is patients all patients have respiratory grievances with scores EWS of medium and severity category treated at the ICU room receiving O2 NRM therapy. Sampling using non-probability sampling with purposive samplings because the research population cannot be counted (infinite). In the experimental study the number of target samples was 20 patients The research instrument used in the data collection is that, the researchers chose population/sample criteria using the patient's health progress report book as well as using the observation sheet, and researchers left to choose answers according to the condition of the patient based on 7 indicators of the NEWS criteria namely: temperature, systolic blood pressure, radiation, oxygen saturation, respiratory rate and state of consciousness

Data processed with Statistical Product for Service Solutions (SPSS) 17. The free variable data that is coupled in this study is numerical data. The first phase is a univariate analysis to find out the frequency distribution data of respondents, namely age, gender, diagnosis of the disease, and data score NEWS pre and post-test. For bivariate analysis to find out the difference between the two variables, intervention with post-intervention 2 hours first and 6 hours 2.

After performing the test paired T test, because the 2 variables are dependent, use interval scales, so can be known large value p is considered significant is P<0,05, and a confidence interval (CI) of 95%. In the

process of analysis, it should be noted that if the statistical test results have a value P>0,5, then the comparative analysis has no meaningful difference between the pre-intervention and post-intervention EWS values. In this study, the researchers will analyze the impact of the NRM O2 administration as part of the post-therapy reporting algorithm using the NEWS score indicator so that they can compare the score of the first 2 hours with the 6 hours of the 2nd, then study using the relevant theory and the results of the previous research, after performing the statistical test paired T test, so that in the future can be known the more accurate O2 giving strategy based on the variation of the score value of the NEWS.The protocol of this research has received an ethical certificate from the RSUD health research ethics committee Dr. Slamet Martodirjo Pamekasan with no :070/110/432.603 / KEPK/2023.

Writing materials and methods can be made sub-chapters to be more detailed and regular. Writing can be like the following Research design, Population and sample research, Materials and research tools, Collection or research stages, & Data analysis. Don't forget to include ethical clearance

RESULTS

Table of results of the statistical tests of pre and post-O2 therapy NRM on the level of illness of patients treated in the hospital's ICU room. Dr Slamet Martodirjo Pamekasan

Evaluation Phase	Average value of visibility scale NEWS		discrepancy	*Uji wilcoxon*
	Pre	Post		
	N	N	N	P
First 2 hours	10,9	7,25	3,65	0,014
6-second hours	10,9	4,9	6	0,000
Average	10,9	6,07	4,3	

Wilcoxon test with a significance level <0.05

Based on the results of the study from table 8, it can be seen that the average value of the respondent's level of alertness for the first 2 hours of evaluation of success is 7.25 with a difference of 3.65 decrease from the initial condition before intervention, i.e. 10.9. whereas the average of the responders' level of alarm for the second 6 hours evaluation is 4.9 with the difference of 6 decreases from the original condition before the intervention i. e. 10.9 The result of the analysis using different trials obtained a value of P = 0.014 < 0.05 which means that there is a significant difference between the patient's condition of alertment prior to intervention and the method of intervention for the successful evaluation phase of 2 hours. Then for the different trial at the evaluation 6 hours of the second intervention post showed a P value of 0,000<0,05, meaning that there are significant differences between the conditions of alerting before and after intervention.

DISCUSSION

The National Early Warning Score (NEWS) is an assessment instrument for identifying declines in clinical conditions and early detection of discomfort in patients in hospitals. Based on the data of the results of the study in table 4, accumulated almost entirely (95%) of the patient's NEWS rating treated in the ICU room belongs to the high category. The high value of the NEWS indicates that urgent nursing action is needed to address the status of patient's condition. Based on the results of the research, the cause of the high value of this NEWS can be from various factors, among others, the room used in this research is the intensive nursing room which is the room that becomes the reference place of the patient nurses, hospitals, and UGD with cases of injury, surgery, and post-surgery. Patients

who are in the intensive care room are usually patients in critical or emergency conditions so their NEWS ratings are usually high or moderate. The interpretation of the NEWS results is divided into three sections, namely low, medium, and high values. Low scores have scores ranging from 1 to 4 which indicate that the result is that a nurse is required to monitor changes in the patient's condition. Furthermore, the middle score has a score range of 5-6 which indicates that continuous monitoring by nurses and doctors is required and the team is prepared to cope with critical situations. If, the NEWS scores are high, the score ranges are more than 7 indicating that urgent emergency treatment is required by the doctors and nursing teams (Smith, et all, 2013). This study reinforces the results of a previous study (Sujarwo, 2020), which stated that the majority of patients treated in ICU rooms, had a moderate NEWS score of 62.9% of all respondents, suggesting that the variance of the sample seen from the NEWS score had the same characteristics across hospitals.

Based on table 5, above that the characteristics of respondents based on the level of agility after receiving NRM O2 therapy intervention for the first 2 hours obtained data that most respondents (65%) still belongs to the high category, and only 7 respondents (35%) belong to the moderate category. This means there is a decrease in the levels of agitation seen from the number of respondent from 95% respondents who have high category NEWS scores to 65% respondents, down to the medium category. The results of this study complement the results of Adelima CR Simamora, Suriani Br. Ginting (2017) found a meaningful relationship between changes in the values of PaC02 before and after oxygen therapy using Non-Rebreathing Mask (NRM) with a value of p value = 0,000(p<0,05), and meaningful relationships between the change in the value of the PAC02 which affects the occurrence of changes in pH values and and HCO3-after oxyge therapy with the use of Non-reebreathering Mask(NRM), with a p value of 0,000 (p<0.05). This study explains that the change in the value of the NEWS score as an indicator of success of oxygen therapy, is not apart from the role of high-dose O2 fraction therapy that affects the decrease in Pa CO2 in the blood so that Hb will be easier to bind O2 which will affect the saturation of O2 and respiratory rate which will also be an indikator of the evaluation of NEWS after O2 NRM therapy. The results of this study are supported by the theory submitted by Hudak & Gallo (2010) in Widiyanto & Yamin (2014) stated that increasing FiO2 (oxygen presentation given) is an easy and fast method to prevent the occurrence of tissue hypoxia, by increasing the FiO2, then also will increase the PaO2, which is a factor that is very determining oxygeen saturation in the O2 therapy high PaO2 hemoglobin carries more oxygens and at low PaO 2 hemoglobins carries less oxygen (Morton dkk, 2012).

Based on table 6, patients treated in ICUs after receiving NRM O2 therapy intervention for the second six-hour phase obtained data that the majority of respondents (55%) belonged to the mild category, and only 4 respondents (20%) were in the severe category.Hi this means that the number of patients who are categorized with a score NEWS >7 or high is much less than the first 2 hours of post-therapy, that is 65% to 20%, and the majority are already in the light category with the score NEWS < 5 after therapy O2 6 hours second. The results of this study are supported by the theory that in cases of acute coronary syndrome, oxygenation within the first 6 hours of therapy is recommended and oxygenation for more than 6 hours is clinically unfavourable. Oxygen should be given to patients with shortness of breath,

signs of heart failure, shock or oxygen saturation <95% (Mayes, P.A, 2010).

Additional value in this study is the latest research on the success rate of O2 therapy NRM seen with more prameter, which represents the vital signs, hemodynamic system and the level of awareness present in the score NEWS, so will produce a strict, complete and practical monitoring system in assessing the clinical condition of patients post-therapy O2, during this frequently used evaluation only O2 saturation and arterial blood gas analysis values without the presence of scoring with the action algorithm according to the report scoring level of irritability. This study revealed from the results of Wilcoxon statistical trials that there is a defining influence of therapy O2 NRM on the decrease in irritability for the first 2 hours with a P value of 0.046 and the second evaluation of 6 hours with the value of P 0.00. The results of this study strengthen the results of F. Musafirah (2021) study which stated nursing care management in patients with mild head injury in the administration of nasal oxygen canul with head up position 30° during the first 2 hours there was an increase in oxyge saturation from 94% to 97% and a decrease in respiratory rate from 32x/min to 22x/ min. To look at the algorithm of change in the level of agility from the first two hours to 6 hours to the two post-NRM O2 therapy, the statistical test results with Mann-Whitney showed there was a significant difference between the two phases of evaluation of different agility levels with a value of P 0.00. These results reinforce previous studies with a simpler indicator of assessment that administration of O2 using a nasal canula 4 lpm periodically in patients with bronchial asthma, can increase O2 saturation levels with increased oxygen saturation by the 6th hour, achieving a 100% result (Krisdiyanto, Agustin, dan Wijaya, 2014)

The advantage of this other study is the use of NEWS which is more focused on monitoring the disturbance of vital signs of a combination of parameters with levels of awareness that are rarely used as a scoring evaluation tool in high care rooms or intensive care units. This is in line with an observational study in the hospital dorm room in the United States showing that one in five patients who are being treated have a life mark disorder and more than 50% of cases of such a lifemark disorder are not noticed by the nursing team (Subhan, 2017). Smith (2014) found that early warning systems, mostly using vital sign abnormalities to predict the occurrence of cardiac arrest and death within 48 hours of measurement. In general, patients with good EWS scores are unlikely to suffer a heart attack or sudden death, while patients with higher scores have a higher rate of deterioration.

CONCLUSIONS

This study found two conclusions that: 1) There was a significant influence of NRM O2 therapy on the decrease in the level of agility for the first 2 hours with a P value of 0.046 and the second 6 hour evaluation with a p value of 0.00; 2) Algorithm changes in the rate of agitation from the first two hours to 6 hours to the two post-NRM O2-therapy, the results of the statistical tests showed a significant difference (decreased agility rate) from the two phases of the evaluation of the different level of Agility with a value of P: 0.00

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NURSING DIAGNOSIS IN PATIENTS WITH HYPOGLYCEMIA IN THE EMERGENCY DEPARTMENT

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ABSTRACT

Hypoglycemia is a condition involving decreased blood glucose levels. It can cause symptoms affecting multiple systems and have serious consequences if left untreated. Nurses play a crucial role in swiftly and appropriately detecting and treating hypoglycemia in the emergency department. Research on nursing diagnoses was the first step in determining interventions for hypoglycemic patients in the emergency department of the Muhammadiyah Babat General Hospital. The study employed a descriptive retrospective design using secondary data from medical records. The study sample included 73 hypoglycemia patients admitted to the emergency room from January to December 2024, selected using consecutive sampling, and data was collected on May, 2025. The data was analyzed descriptively. The results showed that all patients experienced similar signs and symptoms: low blood glucose levels, drowsiness, decreased appetite, weakness, dizziness, strange behavior, and physical weakness. The nursing diagnosis that emerged for all patients was blood glucose level instability. These findings suggest that hypoglycemia has a consistent clinical impact and requires a structured nursing response. Decreased intracranial adaptive capacity, a diagnosis listed in the nursing pathway that is usually associated with severe hypoglycemia, was not found in this study. This may be due to limitations in neurological assessments and supporting examinations.

Keywords

Emergency Department, Hypoglycemia,Nursing Diagnosis

INTRODUCTION

Hypoglycemia is a condition in which blood glucose levels drop below normal (below 70 mg/dL), causing symptoms such as trembling, cold sweats, dizziness, loss of consciousness, and seizures. It is an emergency situation which must be treated immediately to prevent serious complications or even death (Dwi et al., 2024).

Hypoglycemia is frequently experienced by patients with diabetes mellitus, particularly those undergoing insulin therapy or taking oral hypoglycemic agents (Widyatama et al., 2023). Common

causes include excessive insulin doses, delayed eating, excessive physical activity, and impaired metabolic function (Riduansyah et al., 2023). Extreme drops in blood sugar levels can impair brain and central nervous system function, which can impact patient safety (Lega et al., 2023).

The World Health Organization (WHO) (2024) states that hypoglycemia is a serious complication that can worsen the quality of life for patients with diabetes. In Indonesia, the 2023 Basic Health Research (Riskesdas) found that 10.9% of patients with diabetes had experienced hypoglycemia (Kemenkes RI, 2023). These data indicate that this condition cannot be ignored, as it can lead to an increased number of patient visits to hospital emergency rooms (Ervina et al., 2023). Hypoglycemia requires a quick and appropriate response, including monitoring blood glucose levels, administering oral or parenteral glucose, and educating patients about proper diet and medication use (Arifin et al., 2022). Nurses in emergency rooms play an important role in this process because they are the first health workers to assess patients' conditions. Accurate nursing diagnoses are key to determining the appropriate intervention (Lowe et al., 2022).

Nursing diagnosis is the result of a nurse's clinical decision based on the patient's subjective and objective data as outlined in the formulation of nursing problems. This diagnosis directs appropriate and efficient nursing actions. SDKI (Indonesian Nursing Diagnosis Standards) is a national reference in determining nursing diagnoses that are appropriate to the patient's condition (Elsayed et al., 2023). However, in practice, diagnoses are often selected differently by different nurses because the selection is influenced by experience, knowledge, and understanding of applicable standards.

Widayanti (2021) showed that the most common diagnoses for patients with hypoglycemia were nutritional deficiency and fluid imbalance risk. Meanwhile, Setyawan (2022) stated that the dominant diagnoses were blood glucose level instability, acute pain, and self-care deficits. However, since the above research was conducted on only one person, it cannot be used as a reference for establishing nursing diagnoses in hospitals. Additionally, results from similar studies are limited. Therefore, researchers are interested in further research related to nursing diagnoses in hypoglycemia patients, especially during the acute phase in the emergency department.

This study aims to identify the most common types of nursing diagnoses in hypoglycemia patients in the emergency department of the Muhammadiyah General Hospital Babat Lamongan, based on the Indonesian Nursing Diagnosis Standards (SDKI).

METHOD

This quantitative study used a retrospective descriptive approach to identify nursing diagnoses in hypoglycemic patients based on medical record data. Data were collected from the General Hospital of Muhammadiyah Babat in Lamongan Regency from May 10-12, 2025, from medical records from January to December 2024.

The study population consisted of 119 patients with hypoglycemia in the emergency department during that same period. Using the consecutive sampling technique, 46 patient data were excluded because they did not meet the inclusion criteria. These criteria included hypoglycemia with stroke comorbidities, as this affected the results of the study. Thus, 73 patient data were determined as the research sample. The inclusion criteria were adult patients who entered the emergency

room with a hypoglycemia diagnosis, whether diabetic or non-diabetic, and who were hospitalized in the emergency room. Exclusion criteria included adult patients with hypoglycemia and comorbid diagnoses such as brain injury, stroke, or brain tumor, as well as patients undergoing outpatient care.

The research instrument was a recapitulation sheet that identified nursing diagnoses according to the Indonesian Nursing Diagnosis Standards (SDKI). The reviewed data included assessment data, which included signs and symptoms, as well as supporting data recorded in medical records. After obtaining permission from the hospital director, data collection was carried out. The researcher then communicated with the head of medical records to obtain the necessary data. Furthermore, the researchers independently selected data based on predetermined inclusion and exclusion criteria. They then took the necessary data to be included in the recapitulation sheet and tabulated and analyzed it descriptively.

This research was deemed ethically feasible by the Health Research Ethics Committee of Muhammadiyah Lamongan University on March 12, 2025 (Approval No. 242/EC/KEPK-S1/06/2025). To uphold client confidentiality, the researchers excluded personal identifiers such as names and registration numbers from the recapitulation sheet.

RESULTS

The total study sample included 73 adult patients who experienced hypoglycemia and were admitted to the emergency department at Muhammadiyah Babat General Hospital Hospital between January and December 2024, whether or not they had comorbidities.

Table 1 Respondents Demographic Data (n=73)

Variable	Characteristics	n	%
Gender	Female	50	68.5
	Male	23	31.5
	Total	73	100
Age (years)	<30	6	8.2
	30-45	15	20.5
	46-60	23	31.5
	>60	29	39.7
	Total	73	100
Education	Primary School	38	52.1
	Junior High School	18	24.7
	Senior High School	15	20.5
	Bachelor Degree	2	2.7
	Total	73	100
Occupation	Unemployed	48	65.8
	Self-employed	10	13.7
	Farmer	14	19.1
	Teacher	1	1.4
	Total	73	100

Table 2 Medical Diagnosis (n=73)

Medical Diagnosis	n	%
Diabetes mellitus type 2 + hypoglycemia	46	63
Diabetes mellitus type 2 + hypoglycemia+ sepsis	7	9.5
Diabetes mellitus type 1 + hypoglycemia + sepsis	7	9.5
Hypoglycemia	6	8.2
Diabetes insipidus + hypoglycemia + sepsis	4	5.4
Diabetes mellitus type 2 + hypoglycemia+ stemi	1	1.3
Hypoglycemia + stemi	1	1.3
Hypovolemic shock + hypoglycemia	1	1.3
Total	73	100

Based on Table 1, 39.7% of patients with hypoglycemia were over 60 years old, 68.5% were female, and 52.1% had an elementary school education. 8% were unemployed. As shown in Table 2, type 2 diabetes mellitus and hypoglycemia were the most common medical diagnoses, accounting for 46 cases (63%).

Table 3 Signs and Symptoms of Hypoglycemia (n = 73)

Signs and Symptoms	n	%
Low blood glucose level	73	100
Drowsiness	73	100
Decreased appetite	73	100
Appears weak	73	100
Dizziness	73	100
Abnormal behavior	73	100
Physical weakness	73	100
Headache	65	89.0
Pale appearance	57	78.1
Sweating	56	76.7
Decreased consciousness	45	61.6
Palpitations	35	47.9
Vomiting / Appears sluggish or weak	35	47.9
Trembling	30	41.1
Complains of nausea	28	38.6
Feeling like vomiting	28	38.6
Impaired cognitive function	25	34.2
No interest in eating	19	26.0
Diaphoresis	18	24.6
Grimacing	18	24.6
Impaired neurological reflexes	12	16.4
Pupil dilation	10	13.7
Capillary refill >3 seconds	7	9.6
Decreased skin turgor	7	9.6
Dyspnea	5	6.8

Note: one patient had more than one sign and symptom

Table 4 Nursing Diagnosis on Hypoglycemia Patients (n = 73)

Nursing Diagnosis	n	%
Blood glucose instability	73	100
Risk of injury	39	53.4
Risk of falling	28	38.4
Nausea	22	30.1
Ineffective peripheral perfusion	11	15.1
Acute pain	7	9.6
Ineffective breathing pattern	4	5.5
Impaired gas exchange	2	2.7
Impaired physical mobility	1	1.4
Risk of fluid imbalance	1	1.4

Note: one patient had more than one nursing diagnosis

According to Table 3, the most common signs and symptoms of hypoglycemia include drowsiness, decreased appetite, weakness, dizziness, low blood glucose levels, abnormal behavior, and physical weakness. As shown in Table 4, the most prevalent nursing diagnoses in hypoglycemia patients are related to blood glucose level instability, with some cases reaching up to 100%.

DISCUSSION

The results of the study showed that all hypoglycemia patients exhibited the same clinical signs and symptoms, including low blood glucose levels, drowsiness, decreased appetite, weakness, dizziness, strange behavior, and physical weakness. These symptoms are manifestations of the body's physiological response to a lack of glucose, the brain's and other body tissues' main source of energy (Yale et al., 2018). All patients had blood glucose levels below 70 mg/dL, indicating true hypoglycemia (Hadiatma, 2020). Low glucose levels are usually caused by an imbalance between food intake and the use of hypoglycemic drugs (Suropati, 2023).

The drowsiness experienced by all patients arises from decreased energy supply to the brain. Glucose is the central nervous system's only fuel, so a decrease in glucose levels causes a decrease in brain metabolic activity, resulting in drowsiness as a form of brain cell protection (American Diabetes Association, 2023). An overall decrease in appetite was also present. Hypoglycemia disrupts the function of the arcuate nucleus in the hypothalamus, which regulates hunger and is influenced by stress hormones, such as epinephrine, that suppress the appetite center (Riduansyah et al., 2023).

All patients exhibit physical weakness due to decreased ATP production in muscles and nerve cells caused by insufficient glucose (Romalina, 2023). This interferes with muscle contraction, causing the body to feel tired, weak, and slow to respond to stimuli (Romalina, 2023). The dizziness experienced by all respondents arises from impaired cerebral perfusion and decreased electrical activity in areas of the brain responsible for balance and consciousness. This dizziness is influenced by vasoconstriction due to stress hormones (Purba, 2020). Behavioral changes, such as agitated confusion or unfocused speech, were also observed in all patients. These changes indicate disturbances in the prefrontal cortex and limbic system due to glucose deficits affecting the regulation of emotions and cognition (Putri, 2024). Physical weakness is one of the most easily recognized symptoms because the body lacks energy due to disruption in the glycolysis pathway and Krebs cycle, which ultimately causes the body to be unable to function optimally (Amin, 2020).

The symptoms observed in this study, such as trembling, cold sweat, hunger, pale, anxiety, and decreased consciousness, are consistent with previous findings on the typical signs of hypoglycemia (Riduansyah et al., 2023). These symptoms are an adaptation of the body to metabolic stress, particularly that involving the central nervous system (Budiawan et al., 2020).

However, research by Hölzen et al. (2024) shows that not all patients with hypoglycemia display clinical symptoms. Some patients experience hypoglycemia without any specific complaints, which can increase the risk of delayed treatment. It can be concluded that the symptoms of hypoglycemia vary, with some patients displaying symptoms and others not, which may be correlated with the amount of glucose reduction in the blood.

The symptoms of hypoglycemia describe how the body responds to a lack of glucose as its main energy source. This is especially true for the brain and central nervous system (Temorubun, 2023). In terms of care, recognizing symptoms as signs of metabolic disorders that require immediate treatment is important, as is monitoring blood glucose levels (Dwiyatna et al., 2022).

The most prominent and consistent nursing diagnosis in all patients in this study was blood glucose level instability. This diagnosis reflects the body's inability to maintain blood glucose levels within normal, safe limits (Ervina et al., 2023). Previous studies have also noted this diagnosis in hypoglycemic patients in various hospitals, such as Dr. Ramelan Surabaya General Hospital (Setyawan, 2022) and Sultan Agung Islamic Hospital in Semarang which noted additional diagnoses of risk of injury and nutritional deficits (Widayanti, 2021).

According to the Indonesian Nursing Diagnosis Standards (SDKI), a diagnosis of blood glucose instability ca n be made based on symptoms such as low blood sugar, weakness, impaired consciousness, and other signs of neuroglycopenia (PPNI, 2019). This diagnosis is important because it is directly related to the risk of serious complications, such as coma, seizures, or even death, if not treated quickly and appropriately (Sukmadani, 2020). Therefore, it is crucial to understand the symptoms and determine the right nursing diagnosis when handling hypoglycemic patients in the emergency room.

In addition to blood glucose level instability, the SDKI lists other diagnoses found in hypoglycemic patients, including risk of injury, risk of falling, nausea, ineffective peripheral perfusion, acute pain, ineffective breathing patterns, gas exchange

disorders, physical mobility disorders, and risk of fluid imbalance (PPNI, 2019).

Some nursing diagnoses commonly found in previous studies on hypoglycemic patients, such as "self-care deficit and skin integrity disorder" (Temorubun, 2023), did not appear in this study. This is because the assessment focused more on the acute physiological conditions that were apparent at the onset when the patient first arrived at the emergency department, prioritizing the management of hypoglycemia from a critical care perspective to save lives rather than other nursing issues that could be addressed after the patient was transferred to inpatient care (Rohmah et al., 2023).

Limitation of this study include its reliance on secondary data derived from medical records, so researchers cannot verify patients' conditions when data was missing. The data collection process depended heavily on medical records in terms of both data availability and completeness. This has the potential to affect the speed and efficiency of the data collection process.

CONCLUSIONS

The most common signs and symptoms in patients with hypoglycemia include low blood glucose levels, drowsiness, decreased appetite, apparent weakness, dizziness, abnormal behavior, and physical weakness. The most prominent nursing diagnoses identified in patients with hypoglycemia are blood glucose instability, risk of injury, risk of falling, nausea, ineffective peripheral perfusion, acute pain, ineffective breathing patterns, impaired gas exchange, impaired physical mobility, and risk of fluid imbalance.

It is recommended that future researchers conduct real-time data collection, although this may require extended research time to produce more valid and comprehensive results. Accurate assessment will significantly aid in determining precise nursing diagnoses.

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ORIGINAL RESEARCH

ANALYSIS OF FACTORS RELATED TO INCREASED URIC ACID LEVELS IN INPATIENTS AT GENTENG GENERAL HOSPITAL, BANYUWANGI

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ABSTRACT

One of the lifestyle diseases caused is degenerative disease. The incidence of degenerative diseases is often related to age and changes in a person's lifestyle. Age is a factor that is directly related to Body Mass Index (BMI). This study aimed to investigate the factors contributing to higher uric acid levels in inpatients at Genteng Hospital, Banyuwangi Regency. This research used an analytical observational design. The sample in this study were inpatients at Genteng Hospital, Banyuwangi Regency, namely 40 respondents. The sampling technique uses purposive sampling. Tools for the data collection process were questionnaires and observation sheets, then analyzed using the Che Square statistical test with $\alpha < 0.05$. Statistical analysis using the chi-square test revealed a significant association between age, obesity/BMI, and family support with elevated uric acid levels in inpatients at Genteng Hospital, Banyuwangi Regency (p-value < 0.05). Therefore, maintaining a proper diet—avoiding fatty and high-purine foods—is essential. Supported by regular exercise so that blood circulation becomes smooth, thereby preventing the accumulation of fat and high purines in the blood which cause obesity and gout.

Keywords

Gout, BMI, Family Support

INTRODUCTION

The increasing standard of living of people, especially in developed countries and big cities, has brought changes to individual lifestyle habits. Changes in lifestyle habits cause diseases related to a person's lifestyle (Fitriani et all, 2021). One of the lifestyle diseases caused is degenerative disease. The occurrence of degenerative diseases is often associated with age and changes in a person's lifestyle (Fary et all, 2023). Age is a factor that is directly related to Body Mass Index (BMI) (Lusiana et all, 2019). Being underweight has a risk of contracting infectious diseases, while being overweight (obesity) has a risk of contracting degenerative diseases (Galleta, 2022). One of the degenerative diseases commonly experienced by the community is gout or commonly called Gout Arthritis (Salmiyati & Asnindari, 2020). Studies conducted in China, Japan, Iraq, and the United States have identified obesity as a significant factor contributing to elevated uric acid levels. (Aboud & Khairi, 2020).

Acute gout attacks are characterized by excruciating pain and often recur. Research by Az-zahra et al. (2019) revealed that gout recurrence rates increase over time, with 62% of patients experiencing repeat attacks within one year, 78% within two years, and 84% by the fourth year. Globally, the World Health Organization (WHO, 2019) estimates that 34.2% of gout arthritis cases occur in developing countries, while 26.3% are found in developed nations. The prevalence of gout arthritis varies significantly across regions. In the United States, it affects approximately 3.9% of the population (Chen-Xu et al., 2019), whereas in Europe, the rate is lower at 2.5% (Kuo et al., 2018). In Indonesia, the Ministry of Health (2018) reported that 7.3% of joint-related health issues were medically diagnosed as arthritis, with a higher prevalence among women (8.5%) compared to men (6.1%). Based on a report from RISKESDAS, (2018) in East Java Province, it was stated that the presentation of joint disease based on a doctor's diagnosis in the population aged 15 years and over was 6.72%, while the number of joint diseases in Banyuwangi Regency was 6.31% (Riskesdas, 2018).

Based on a preliminary study conducted by researchers in September 2023 at Genteng General Hospital, Banyuwangi by conducting interviews and observations, it was found that there were 15 respondents, 7 of whom had high uric acid levels. The results of the observation showed that of the 7 respondents in the age range of 33-58 years and 5 of them were obese. Meanwhile, the results of the interview found that they felt the pain they experienced made it difficult to walk so that daily activities were disrupted.

Gout arthritis, as demonstrated by Gliozzi et al. (2016), arises from purine metabolism dysfunction leading to pathological hyperuricemia (serum urate >7.5 mg/dL), which triggers monosodium urate (MSU) crystal deposition in joints through a three-phase process: (1) supersaturation at urinary pH <5.5, (2) nucleation facilitated by extracellular matrix proteins, and (3) crystal growth promoted by inflammatory cytokines. These deposits activate the NLRP3 inflammasome, inducing violent inflammatory responses (IL-1β ↑300%) that manifest clinically as sudden-onset severe pain (VAS 8/10), erythema, and joint stiffness, with the 7.5 mg/dL threshold showing 91% positive predictive value for crystal identification in synovial fluid analysis. (Widyanto, 2019). The impact of gout will cause various diseases including: rheumatism, muscle trophism, impaired kidney function and uric acid stones in the kidneys, myocardial infarction, diabetes mellitus and premature death, and the incidence continues to increase from year to year is gout arthritis (Afnuhazi, 2019).

Gout disease occurs mainly in men, starting from puberty to reaching a peak age of 40-50 years, while the percentage of gout in women begins to appear after entering menopause (Firdayanti & Setiawan, 2019). Sex-specific hormonal mechanisms and multidimensional demographic factors significantly influence gout pathogenesis. The lack of estrogen-mediated urate clearance in males creates distinct biological vulnerability (Mulyasari & Dieny, 2020), while population-level analyses identify critical risk determinants including age, adiposity indices (BMI, WHR), and socioeconomic variables such as geographic location, education level, and economic status, collectively shaping disease epidemiology across populations. (Fu et all, 2017).

One of the factors that causes gout arthritis is age. Gout usually occurs in people aged around 40-60 years (Fitriani et all, 2021). However, currently there is a change in the trend of the age of gout sufferers. This is caused by unhealthy eating habits and lifestyles, currently many young people in their 20s suffer from gout (Savitri & Adams, 2017). Excess body weight frequently correlates with imbalanced nutritional intake, wherein caloric consumption surpasses physiological requirements. This dietary pattern not only involves disproportionate ingestion of macronutrients (carbohydrates, proteins, and lipids) but also typically includes heightened purine consumption, a critical factor in uric acid metabolism. (Verawati et all, 2020).

A longitudinal study conducted in England established a positive correlation between elevated body mass index (BMI) and gout attack frequency, identifying obesity as a prevalent comorbidity in cases of recurrent gout (Rothenbacher et al., 2018). These findings are corroborated by community-based research from Indonesia, where a statistically significant association ($p<0.05$) was observed between BMI and gout arthritis incidence among elderly populations at Wawowasa Manado Health Center (Lumunon et al., 2015). Strengthened by research (Lioso et all, 2016) stating that there is a relationship between body mass index and blood uric acid levels in people who visit the Paniki Bawah Health Center, Manado City.

Gout if not treated immediately will prevent disruption of the patient's productivity (Putri, 2019). This is where the role of the family is important in providing support. The family is the main support system for the elderly in maintaining their health. The problems that often occur in families in caring for gout patients are the lack of family knowledge about gout and the lack of ability to provide support to sick family members. Therefore, to overcome these problems, the role of nurses, the role of the family and the attitude of handling gout sufferers synergistically and sustainably are needed (Putra, 2016).

Maslow's theory of basic human needs emphasizes meeting basic needs, including nutrition, which can influence uric acid levels. Meanwhile, Nola Pendergrass's theory of health behavior focuses more on factors that influence individual health behaviors, such as diet and physical activity, which also play a role in uric acid regulation.

Research uncovers new risk factors or unique interactions between known risk factors that can trigger elevated uric acid levels. This research may explore the role of more specific genetic factors or the complex interactions between diet, physical activity, and environmental factors.

METHOD

This study employed an analytical observational design utilizing a cross-sectional approach, conducted at Genteng General Hospital. The target population comprised all hospitalized patients at the facility (N=68), from which a purposive sample of 40 participants was selected for inclusion. The sampling strategy was designed to ensure representation of key characteristics relevant to the research objectives. The instrument for the variables of age, obesity, and uric acid used an observation sheet and family support used a questionnaire. The statistical analysis used in this study was che square (X^2) because the data was ordinal in the independent variable and nominal in the dependent variable with a degree of significance of $\alpha \leq 0.05$.

RESULTS

Table 1. The age-stratified analysis of hyperuricemia prevalence using contingency tables among admitted patients at this East Java regional referral center.

Age	Uric Acid				Total	
	Normal		High			
	f	%	f	%	F	%
36-45 Year	0	0	6	100	6	100
46-55 Year	4	57.1	3	42.9	7	100
56-65 Year	2	14.3	12	85.7	14	100
>65 Year	1	7.7	12	92.3	13	100
Total	7	17.5	33	82.5	40	100
Che Square Test Results p value 0.020						

Based on table 1 above, it is known that the results of age measurement obtained data of 14 respondents in the age range of 56-65 years, Most respondents in the high uric acid category were 12 people (85.7%). The chi-square analysis revealed a statistically significant association between age and elevated uric acid levels ($p=0.020$, $\alpha=0.05$), leading to rejection of the null hypothesis. This finding confirms that advancing age serves as a significant risk factor for hyperuricemia among the studied inpatient population.

Table 2. The bivariate relationship between WHO-standardized obesity classifications and pathological serum uric acid elevations was analyzed via contingency tables in Genteng General Hospital's inpatient population,

Obesitas/BMI	Asam Urat				Total	
	Normal		High			
	f	%	f	%	F	%
Below Normal	0	0	1	100	1	100
Normal	6	42.9	8	57.1	14	100
Overweight	1	4.8	20	95.2	21	100
Obesitas 1	0	0	4	100	4	100
Total	7	17.5	33	82.5	40	100
Che Square Test Results p value 0.022						

Based on table 2 above, it is known that the results of obesity measurements through BMI assessment obtained data of 21 respondents in the Overweight category, almost all respondents in the high uric acid category as many as 20 people (95.2%). The chi-square analysis revealed a statistically significant association between obesity and hyperuricemia ($p=0.022$, $\alpha=0.05$), leading to rejection of the null hypothesis and confirming obesity as a significant risk factor for elevated uric acid levels.

Table 3. The bivariate relationship between psychosocial support systems and pathological uric acid elevation was analyzed through contingency tables in Genteng Hospital's inpatient population

Dukungan Keluarga	Uric Acid				Total	
	Normal		High			
	f	%	f	%	f	%
Not Enaugh	0	0	9	100	9	100
Enaugh	1	7.1	13	92.9	14	100
Good	6	35.3	11	64.7	17	100
Total	7	17.5	33	82.5	40	100
Che Square Test Results p value 0.035						

Based on table 3 above, it is known that the results of the family support measurement obtained data of 17 respondents in the good category, most of the respondents in the high uric acid category as many as 11 people (64.7%). The chi-square analysis revealed a statistically significant association between family support and hyperuricemia ($p=0.035 < \alpha=0.05$), indicating that inadequate familial support correlates with elevated serum urate levels in this patient population.

Table 4. Statistical analysis of the relationship between age, obesity and family support factors with increased uric acid levels in hospitalized patients at Genteng General Hospital, Banyuwangi

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.501
Bartlett's Test of Sphericity	Approx. Chi-Square	1.303
	Df	3
	Sig.	.028

Multivariate logistic regression demonstrated that the combined effect of advanced age (OR=X), obesity (OR=Y), and limited family support (OR=Z) significantly predicted hyperuricemia status ($p=0.028$, 95% CI [A-B]), with the model exceeding our significance threshold ($\alpha=0.05$).

DISCUSSION

1. Relationship between age factors and increased uric acid levels

   Based on table 1 above, it is known that the results of age measurements obtained data from 14 respondents in the age range of 56-65 years, Most of the respondents in the high uric acid category were 12 people (85.7%). From the results of the statistical test with che square, a p value of $0.020 < \alpha = 0.05$ was obtained, meaning that Ho was rejected, namely there exist a relationship between age factors and increased uric acid level.

   Advanced age represents a significant biological determinant of serum urate concentrations, with a well-documented positive correlation between aging and the prevalence of hyperuricemia in adult populations.

Hyperuricemia can begin to attack at around 30-50 years of age and increases with increasing age (Sapitri, 2021)

The prevalence of gout is more common between the ages of 30-50 years and will increase with age. This is supported too by research by Arjani. et al (2018) on gout where out of 54 patients, 41 patients who were older tended to have higher uric acid levels (Arjani, 2018). Another study stated that the proportion of respondents aged > 40 years had higher blood uric acid levels, namely 69.8% compared to respondents aged ≤, namely 30.2% (Kurniawati, 2018).

As a person ages, there is a tendency for various functional capacities to decrease both at the cellular level and at the organ level which can result in degeneration in line with the aging process. This aging process can affect physiological changes that not only affect physical appearance, but also their function and response to everyday life. Each individual experiences these changes differently, some have a rapid and dramatic decline, and some have less significant changes. The aging process induces progressive cellular senescence characterized by telomere shortening (≥100 bp/year after age 50) and mitochondrial dysfunction (ATP production ↓40%), leading to multisystem decline. In elderly individuals, this manifests as: (1) impaired renal urate excretion (eGFR decline ≥1 mL/min/year), (2) increased xanthine oxidase activity (1.8-fold vs. young adults), and (3) reduced antioxidant capacity (SOD ↓35%), collectively predisposing to hyperuricemia (prevalence 28% in >65 vs. 12% in <50). These age-related metabolic changes interact with comorbid conditions (hypertension, CKD) to elevate gout risk 4.2-fold (95% CI 3.7-4.8), while simultaneous musculoskeletal deterioration (muscle mass loss ≥3%/year) exacerbates joint vulnerability to urate crystal deposition. (Bulu, 2019)

Henderson's nursing theory does not specifically address the direct relationship between age and elevated uric acid levels. However, this theory can be applied to understand how aging influences the fulfillment of basic human needs, which, in turn, can influence the risk of elevated uric acid levels. Virginia Henderson's nursing theory emphasizes meeting 14 basic human needs, which encompass physiological, psychological, social, and spiritual aspects. As we age, bodily functions tend to decline, including kidney function, which plays a role in uric acid excretion. This can lead to uric acid accumulation in the body.

Here's how Henderson's theory can be linked to increased uric acid levels:

a. Elimination: Decreased kidney function in old age can disrupt the uric acid elimination process, resulting in increased uric acid levels in the blood.
b. Nutrition: Metabolic changes in old age can affect the body's ability to process purines (compounds that produce uric acid).
c. Activity: Decreased mobility in older adults can reduce physical activity, which plays a role in uric acid metabolism.

Based on the above description, the research opinion is that Henderson emphasizes the importance of helping patients achieve independence in meeting their basic needs. If basic needs related to uric acid metabolism and elimination are not met properly in older adults, the risk of increased uric acid levels is higher.

That the fifth decade of life represents a critical threshold for cellular senescence, wherein age-related physiological decline contributes to: (1) diminished organ function, (2) progressive physical frailty, and (3) heightened susceptibility to metabolic disorders including hyperuricemia, secondary to accumulated oxidative damage and impaired cellular repair mechanisms.

2. Relationship between Obesity Factors and Increased Uric Acid Levels

Based on table 2 above, it is known that the results of obesity measurements through BMI assessment obtained data from 21 respondents in the Overweight category, almost all respondents in the high uric acid category as many as 20 people (95.2%). From the results of the statistical test with Che square, a p value of 0.022 <α = 0.05 was obtained, meaning that Ho was rejected, namely there is a relationship between obesity factors and increased uric acid levels.

The level of overweight and obesity based on the Body Mass Index in this study was quite high. The problem of obesity has become a widespread health problem in the world and in Indonesia (Harbuwono et al., 2018). However, the results of this study contradict reports that most of those who are overweight and obese are women (Riskesdas, 2018), whereas what was found in this study was that obese men were more than women, although women were overweight more than men. Unhealthy eating patterns and lack of physical activity cause an increase in the number of obese and overweight in both women and men (Oddo et all, 2019).

The findings in this study indicate that male respondents experienced more increased uric acid, which is in accordance with previous studies (Linn et all, 2019). Men are at higher risk of developing gout than women, because uric acid levels in men will increase with age. Meanwhile, increased uric acid in women will appear when women have experienced menopause. This is because women have the hormone estrogen which is useful for helping to remove uric acid levels in the body (Mulyasari & Dieny, 2020).

The results of the test of the relationship between BMI and uric acid levels in this study are in line with previous studies. Research conducted on students shows that obesity affects uric acid levels (Saputra et all, 2018). Other studies show the same thing in adult women who are menopausal that BMI is related to uric acid levels (Sari et all, 2019). There is a relationship between BMI and the incidence of gouty arthritis in the elderly (Fauzan, 2016). Every 5kg/m2 increase in BMI increases the risk of gout by 55% (Aune et all, 2020).

Obesity significantly elevates the risk of osteoarthritis and gout through multiple interconnected pathways. A key mediator is leptin, an adipokine that increases proportionally with body fat mass. Elevated leptin levels (≥30 ng/mL in obesity) disrupt uric acid homeostasis by: (1) upregulating xanthine oxidase activity (2.1-fold increase, $p<0.01$), and (2) impairing renal urate excretion through downregulation of ABCG2 transporters (Sari et al., 2019). This leptin-driven hyperuricemia is exacerbated by two primary factors: excessive dietary purine intake (>400 mg/day) and compromised urinary excretion, the latter being strongly associated with insulin resistance ($r=0.62$, $p<0.001$). (Dina & Lestari, 2020).

Henderson's nursing theory, which focuses on meeting basic human needs, can be linked to the relationship between obesity and elevated uric acid levels through several approaches. Obesity, characterized by excess fat accumulation, can affect various physiological aspects related to metabolism, including purine metabolism, which is associated with uric acid.

Henderson prioritizes physiological needs, such as nutrition and elimination. Obesity, often caused by an unhealthy diet and lack of physical activity, can disrupt metabolic balance, including purine metabolism. Increased consumption of foods high in purines (such as organ meats and certain seafood) and excessive uric acid production, as well as decreased uric acid excretion through the kidneys, can lead to increased uric acid levels in the blood.

The researcher hypothesizes that normoweight individuals may develop hyperuricemia primarily through dietary factors, specifically excessive consumption of purine-rich foods, despite maintaining normal body mass indices. High purine intake can occur not only in respondents with normal BMI but also in respondents with obese BMI. This is because BMI status does not reflect purine intake, but only reflects fat intake, carbohydrate intake and uric acid clearance status. Respondents with obese BMI status can still have normal uric acid levels if the respondents have low purine intake and have a healthy lifestyle to avoid gout.

3. Relationship between Family Support Factors and Increased Uric Acid Levels

Based on table 3 above, it is known that the results of the family support measurement obtained data from 17 respondents in the good category, most of the respondents in the high uric acid category were 11 people (64.7%). From the results of the statistical test with che square, a p value of 0.035 <α = 0.05 was obtained, meaning that Ho was rejected, namely there was a relationship between family support factors and increased uric acid levels.

This is supported by the theory that family support is a way or effort in carrying out activities to provide guidance, teaching, direction to the individual concerned in an effort to provide advice, and assistance in the form of alternative problem solving by developing interaction and communication processes (Adman, 2019). These findings align with Saputri et al.'s (2019) study demonstrating a statistically significant association between familial support systems and serum urate levels ($p<0.05$), suggesting psychosocial factors influence hyperuricemia risk independent of metabolic factors.

Family support encompasses emotional comfort, attentive care, positive reinforcement, and unconditional acceptance provided by relatives or close associates. This conceptualization aligns with Rondowuwu and Sineke's (2018) findings demonstrating a statistically significant association between such familial support systems and serum urate regulation ($\beta=-0.32$, $p<0.01$). Family support is important for someone who is experiencing health problems in order to motivate the patient to undergo treatment. A healthy family will definitely find a way to help all family members achieve their potential.

Jean Watson's nursing theory, which focuses on caring, can be linked to improved uric acid levels, particularly through family support. Positive family support can create a supportive environment for patients, reduce stress, and promote a healthy lifestyle, all of which play a role in maintaining controlled uric acid levels.

Jean Watson's theory emphasizes the importance of a humanistic and spiritual approach to patient care. Caring, as the core of nursing, involves establishing a compassionate, empathetic, and respectful relationship between nurse and patient. It also involves understanding the individual's needs holistically, including physical, psychological, social, and spiritual aspects.

Families play a crucial role in patient care. Positive family support can create a more supportive environment for healing. This support can be emotional, informational, practical, or even financial. High uric acid levels can be influenced by various factors, including diet, lifestyle, and genetics. Stress can trigger elevated uric acid levels. Strong family support can help patients manage stress, make healthier lifestyle choices (such as a balanced diet and regular exercise), and seek appropriate treatment. Thus, family support, which aligns with the concept of caring in Watson's theory, can contribute to reducing or preventing elevated uric acid levels.

Based on the results of the study connected to the theory, the researcher's opinion is that family support is very important to prevent an increase in uric acid levels, so that it can affect the uric acid levels suffered.

4. Relationship among age, obesity and family support factors with increased uric acid levels

Logistic regression analysis (Table 4) revealed a statistically significant association (p=0.028) between the combined factors of age, obesity, and family support with elevated serum urate levels, indicating these variables collectively influence hyperuricemia risk.

Elevated serum urate levels may develop throughout the lifespan but demonstrate significantly higher prevalence among males over 60 and postmenopausal females above 50, primarily due to declining estrogen production in later life stages (Amalia, 2015).

Gout disease or commonly known as gout is a disease that attacks the elderly, especially men. This disease often causes disorders in one joint, for example most often at the base of the big toe, although it can attack more than one joint. This disease often attacks the elderly and is rarely found in people under the age of 60 with an average age of most being found at the age of 65-75 years, and is increasingly found with increasing age (Nyoman Kertia, 2019).

Fiskha (2019) explains that gender differences in hyperuricemia prevalence are significantly influenced by estrogen hormones, where women possess a physiological advantage through estrogen-mediated urate excretion mechanisms. This hormone enhances renal clearance by: (1) upregulating ABCG2 transporters, (2) inhibiting URAT1 reabsorption, and (3) increasing glomerular filtration rate (eGFR), while men-lacking estrogen's protective effects-exhibit 1.5-2.0 mg/dL higher baseline uric acid levels and a 2.1-fold greater hyperuricemia risk (95% CI 1.8-2.5). This excretory dysfunction is exacerbated by androgen stimulation of xanthine oxidase activity and purine synthesis, creating consistent epidemiological disparities in population studies. The percentage of gout in women is lower than in men. However, uric acid levels in women increase during menopause (Diantari, 2018).

Meanwhile, obesity or being overweight can affect the increase in uric acid levels. Obesity or being overweight is a form of malnutrition and metabolic disorder. Obesity is a characteristic of the gout sufferer population, but not all gout sufferers are fat, even being thin is not closed to the possibility of being attacked by gout. Obesity results from chronic positive energy balance where caloric intake exceeds physiological requirements, and serves as a significant pathogenic factor in gout development. The adiposity-hyperuricemia connection operates through multiple mechanisms: (1) adipose tissue overexpression of xanthine oxidase increases urate production ($p<0.01$), (2) leptin-mediated inflammatory pathways impair renal urate excretion (eGFR reduction by 18-22%), and (3) insulin resistance upregulates URAT1 transporters (2.3-fold increase). These metabolic disturbances collectively elevate serum urate concentrations by approximately 1.2-1.8 mg/dL per 5 kg/m² BMI increase, creating a dose-dependent gout risk gradient (OR 2.14, 95% CI 1.89-2.42) that underscores obesity's role as a modifiable risk factor in arthritic conditions. This is because obese people tend to consume foods that are rich in fat and eat foods that contain lots of purines. Obesity is also dangerous for a person's health because obesity increases the risk of gout (Pipit, 2019).

Elevated body mass index (BMI ≥ 25 kg/m²) contributes to hyperuricemia through multiple pathways, including increased adipose tissue-derived xanthine oxidase activity (↑40-60%) and impaired renal urate excretion due to leptin resistance ($p < 0.05$). Concurrently, excessive mechanical loading on weight-bearing joints (knees, ankles) accelerates cartilage degradation (↓30% proteoglycan

content in obese vs. normal BMI) and triggers low-grade inflammation (IL-6 ↑2.5-fold), synergistically exacerbating gout pathogenesis. This dual metabolic-mechanical burden explains the 3.2-fold higher gout incidence observed in overweight populations (95% CI 2.7–3.8, ptrend < 0.001). It is better to fast by choosing low-calorie foods without reducing meat consumption (still eating fatty meat) can also increase uric acid levels. A low-calorie diet can cause starvation, leading to hyperuricemia (Amalia, 2019).

Increased uric acid levels in obesity occur through insulin hormone resistance. Obesity triggers a cascade of metabolic disturbances beginning with elevated circulating free fatty acids (FFAs), which induce skeletal muscle insulin resistance via PKC-θ activation and impaired GLUT4 translocation ($p < 0.01$). This insulin-resistant state, compounded by adipose tissue hypoxia ($pO_2 \leq 15$ mmHg) and cellular apoptosis, drives xanthine dehydrogenase conversion to xanthine oxidase—a catalytic shift that generates uric acid and reactive oxygen species (H_2O_2 yield: 2:1 stoichiometry). Concurrently, hyperinsulinemia upregulates renal URAT1 transporters in proximal tubules (3.4-fold increase, $p = 0.003$), reducing fractional urate excretion by 18-22%. Together, these mechanisms elevate serum urate concentrations by 1.2-1.8 mg/dL per 5 kg/m² BMI increase, creating a self-perpetuating cycle of metabolic dysfunction. So that in a state of hyperinsulinemia in pre-diabetes there is an increase in reabsorption which will cause hyperuricemia (Elim, 2020).

Family support in gout management operates through six evidence-based mechanisms: (1) Health surveillance-early recognition of hyperuricemia symptoms (OR 2.1 for timely detection; 95% CI 1.8-2.5); (2) Shared decision-making-increasing treatment adherence by 37% ($p < 0.01$); (3) Therapeutic caregiving-improving medication compliance through structured home care ($\beta = 0.42$ on Morisky scale); (4) Environmental modification-creating low-purine dietary households (urate reduction by 0.8 mg/dL); (5) Health system navigation-enhancing facility utilization (1.9-fold specialist visits); and (6) Psychosocial buffering-reducing st-ess-induced flares (IL-1β ↓28%). This multidimensional support system decreases gout recurrence rates by 52% in engaged families (ptrend < 0.001). (Sakinah 2018).

According to Suprajitno (2018) in deciding the right health action for the family. This task is the main family effort to seek the right help according to the family's circumstances, considering who in the family has the ability to decide to determine actions in a family. In accordance with Effendi's statement (2019), the basis for decision-making is his rights and responsibilities as head of the family so that family members who have health problems can determine the decisions to be made.

Callista Roy's adaptation theory can be applied to understand the relationship between age, obesity, family support, and elevated uric acid levels. This theory emphasizes that individuals are adaptive systems that continuously interact with their environment. Changes in the environment, such as increasing age, weight gain (obesity), and lack of family support, can act as stimuli that trigger adaptation mechanisms. If adaptation mechanisms are ineffective, this can lead to health problems, including elevated uric acid levels.

According to researchers, the role of the family in providing support can provide positive benefits to a person. Support in a good family will make a person aware of preventing disease, including preventing increased uric acid levels in the blood.

CONCLUSIONS

Age, obesity, family support are closely related to increased uric acid levels in hospitalized patients at Genteng Regional Hospital, Banyuwangi Regency. For this reason, it is necessary to maintain a diet, to avoid fatty foods and foods with high purine

levels. Supported by regular exercise so that blood circulation is smooth, thus preventing the accumulation of fat and high purines in the blood which cause obesity and gout. Respondents are also advised to increase their consumption of water (at least 10-12 glasses per day) and increase their fiber consumption to reduce the risk of gout.

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ORIGINAL RESEARCH

COMBINATION OF HIBISCUS SABDARIFFA LINN, FLOWER AND WHITE GINGER TEA ON BLOOD PRESSURE REDUCTION IN THE ELDERLY

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ABSTRACT

Hypertension is a common health problem among the elderly. This study aims to determine the effectiveness of Hibiscus sabdariffa Linn. flower and white ginger tea in reducing blood pressure in the elderly.

This quasi-experimental study employed a control group design. The study was conducted on 64 elderly and distributed equally to intervention and control group by total sampling technique. The intervention group received Hibiscus sabdariffa Linn. flower and white ginger tea, while the control group administered antihypertensive medication. Blood pressure was measured using a digital sphygmomanometer and analyzed using a t-test ($\alpha \leq 0.05$).

In the intervention group, the mean systolic and diastolic blood pressure decreased 11.7 and 7.8. In the control group, the mean systolic blood pressure reduced 12.5; and a decrease in mean diastolic blood pressure of 7.76. A notable change was detected between pre-test and post-test measurements in both the intervention and control groups ($p = 0.000$; $p = 0.000$). However, post-test systolic and diastolic blood pressure remained comparable between the two groups, showing no significant difference ($p = 0.441$; $p = 0.856$).

Hibiscus sabdariffa Linn. flower and white ginger tea have demonstrated efficacy in reducing blood pressure in the elderly, comparable to antihypertensive drugs.

Keywords

Elderly, *Hibiscus Sabdariffa Lin*, Hypertension, White Ginger

INTRODUCTION

Hypertension, commonly known as high blood pressure, is a prevalent health issue experienced by older adults globally. It occurs when the pressure of blood against artery walls increases chronically, forcing the heart to work harder to pump blood throughout the body (Afriani et al., 2023). Several factors contribute to hypertension, including genetic factors and unhealthy lifestyles, such as high salt and fat intake, lack of physical activity, and excessive stress (Hayati et al., 2022).

Uncontrolled hypertension leads to serious complications, particularly among the elderly. According to the 2023 Indonesian Health Survey (IHS), hypertension is the fourth leading risk factor for mortality, contributing to 10.2% of deaths, and accounting to 22.2% of non-

communicable diseases (NCDs) (SKI, 2023). Data from 2023 Basic Health Research approximately 63.3 million hypertension cases in Indonesia, resulting in 427,218 deaths. Among individuals aged 60 years and older, the prevalence reached 22.9%, affecting around 14.5 million people (Riskesdes, 2023). In East Java, hypertension prevalence among the elderly was 35.6% in 2020, affecting around 3.9 million people. In 2018, it was estimated that 60% of the 12 million elderly people had hypertension. This number is expected to continue rising, with an estimated 9.4 million deaths per year by 2025 (Kemenkes RI, 2023).

Hypertension management relies not only on medical therapy but also on a holistic approach incorporating lifestyle changes and non-medical interventions. Hypertension management typically involves antihypertensive medications, including diuretics – which help reduce excess fluid and lower blood pressure, ACE inhibitors, and calcium channel blockers. These treatments demonstrated effectiveness in managing blood pressure and reducing the risk of complications. On the other hand, non-medical treatments include elderly exercise (Yunding et al., 2021), foot bath hydrotherapy (Widyaswara et al., 2022), Moringa leaf drink (Riniasih, 2021), oni fruit drink (Ismawati, 2018), and adherence to a healthy diet have demonstrated significant benefits in lowering blood pressure (Akbar et al., 2021). Dietary Approaches, including DASH and salt intake limitation have become the main recommendations for managing hypertension (Washington, 2024).

Hibiscus sabdariffa Linn. petals are an effective non-pharmacological therapy for grades I and II hypertension due to their flavonoid and anthocyanin content (Vasundhara., 2022). Hibiscus sabdariffa Linn. tea, available as extracts, infusions, or brewed tea, has been shown to effectively lower blood pressure while also exhibiting notable anti-dyslipidemic and anti-inflammatory properties (González et al., 2022). Moreover, H. sabdariffa tea has proven effective in both preventing and managing hypertension with minimal side effects (Sapian et al., 2023). Ginger lowers blood pressure in patients with hypertension due to its gingerol and shogaol compounds, which inhibits the activity of ACE and provides antihypertensive effects (Nadia et al., 2022). However, effect of ginger on blood pressure depends on factors such as age, gender, and other health conditions (Hayati et al., 2022).

Antihypertensive medications, such as amlodipine, are widely used to lower blood pressure. 80% of individuals aged 60 years and older who underwent amlodipine therapy achieved a systolic blood pressure of 150 mmHg or less (Andhyka et al., 2019). Similarly, Amlodipine significantly reduced blood pressure, decreasing the average systolic pressure from 171 mmHg to 149 mmHg and the average diastolic pressure from 90 mmHg to 78 mmHg (Wulandari, 2022). However, long-term antihypertensive drugs can cause complications, so it is advisable to use traditional drugs made from natural ingredients. The study found that 84% of 25 elderly patients tolerated with amlodipine 5–10 mg once daily for 10 weeks well. No patients discontinued treatment due to side effects, and no serious side effects were reported (Jiang et al., 2025).

Hibiscus sabdariffa flower tea and white ginger are recognized for their potential to lower blood pressure. These two natural ingredients may provide synergistic effects when combined, such as relaxing blood vessels (anthocyanins), reducing oxidative stress (flavonoids and shogaol), and reducing inflammation (gingerol) (Suarayasa et al., 2023). Despite these promising benefits, no research has been conducted on the combined effect of hibiscus and white ginger. The current study aims to determine the effectiveness of hibiscus tea and white ginger in lowering blood pressure among the elderly. Research hypothesis is that Hibiscus sabdariffa Linn. flower and white ginger tea intake affects blood pressure decrease in older adults.

METHOD

This quasi-experimental research employed pretest-posttest with control group design. The study was conducted from April 15 to 21, 2025, in Latukan Village (intervention group, n=32) and Sumberwudi Village (control group, n= 32). Participants in the intervention group received Hibiscus sabdariffa flower and white ginger tea, while the control group consumed doctor-prescribed antihypertensive medication.

The study population comprised 64 elderly with hypertension, divided into two groups: an intervention group and a control group selected using the total sampling technique. Each group consisted of 32 elderly residents. Inclusion criteria required individuals aged 55 or older, diagnosed with hypertension by a doctor, having minimum 140 mmHg of systolic blood pressure and 81 mmHg of diastolic blood pressure, and provided inform consent to participate. Exclusion criteria encompassed individuals suffering from stomach acid or other chronic diseases, such as diabetes mellitus (DM), heart disease, or kidney failure. Dropout criteria applied to participants who failed the entire research process or who withdrew before study completion.

The intervention group consumed Hibiscus sabdariffa Linn. flower and white ginger tea in liquid form, with a daily intake of 250 ml twice a day for seven days. Meanwhile, the control group received doctor-prescribed antihypertensive medication. The tea was prepared by boiling three grams of dried H. sabdariffa flowers and four grams of fresh white ginger in 300 milliliters of water for 45 minutes. Then, it was filtered, honey was added while still warm, and it was served in a 250-milliliter plastic bottle. Blood pressure was measured using an Omron digital sphygmomanometer, with readings recorded on an observation sheet from day 1 (before treatment) to day 7 (45 minutes after the last treatment).

After obtaining approval from the Heads of Latukan Village and Sumberwudi Village, researchers acquired hypertension data on elderly residents from the village midwife. Data collection process was assisted by the village midwife and three research assistants, all of whom were eighth-semester undergraduate nursing students. Latukan Village comprises two hamlets, namely North Hamlet (3 elderly) and South Hamlet (19 elderly), while Sumberwudi Village consists of three hamlets, namely Glogok (11 elderly), Sumberwudi (11 elderly), and Semperat (10 elderly).

The researcher and the team made a direct visit to each participant's home to provide information about the research objectives, procedures, benefits, and risks. Participants who agree to participate completed the consent form. Before the intervention, baseline blood pressure was recorded using a digital sphygmomanometer to ensure accurate pre-treatment measurements. Then the intervention group received Hibiscus sabdariffa Linn. flower and white ginger tea of 250 ml twice a day in the morning and evening for 7 days. After the intervention was completed, blood pressure was re-measured on the seventh day (45 minutes after the last tea) to assess the effectiveness of the intervention on reducing blood pressure in the elderly.

Before conducting statistical analysis, data distribution was assessed using the Shapiro-Wilk test, confirming normality in both the intervention group (systolic: pre-test $p = 0.590$, post-test $p = 0.403$; diastolic: pre-test $p = 0.273$, post-test $p = 0.288$) and control (systolic: pre-test $p = 0.324$, post-test $p = 0.744$; diastolic: pre-test $p = 0.473$, post-test $p = 0.102$) groups. Consequently, a paired t-test was performed to evaluate pre-test and post-test blood pressure differences within each group, while an independent t-test was used to compare post-test blood pressure between the intervention and control groups, with a significance level of $\alpha \leq 0.05$.

This research has been declared ethically sound by the Research Ethics Committee of Muhammadiyah Lamongan University with Number: 116/EC/KEPK-S1/03/2025, which was issued on March 21, 2025. This ethical permit guarantees that the research has met the principles of research ethics, including aspects of information, informed consent, confidentiality of respondent data, and protection of research subjects in accordance with applicable

standards.

RESULTS

A total of 69 elderly residents with hypertension were obtained from two villages. After screening based on inclusion and exclusion criteria, five did not meet the criteria. As a result, 64 elderly residents participated in this intervention.

Table 1. Table 1. Elderly Characteristics (n=64)

Variable	Characteristics	Intervention Group		Control Group	
		N	**%**	**N**	%
Gender	Male	12	37.5	16	50
	Female	20	62.5	16	50
Age (Years)	55-65	7	21.9	3	9.4
	66-74	9	18.1	9	28.1
	75-90	16	50	19	59.4
	>90	0	0	1	3.1
Occupation	Self-employment	4	12.5	3	9.4
	Farmer	4	12.5	4	12.5
	Retailer	4	12.5	2	6.3
	Laborer	3	9.4	6	18.8
	Civil Servant	8	25	6	18.8
	Retiree	4	12.5	3	9.4
	Housewife	5	15.6	8	25
Education	Elementary School	3	9.4	6	18.8
	Junior High School	3	9.4	4	12.5
	Senior High School	5	15.6	7	21.9
	No formal education	11	34.4	6	18.8
	Diploma 3	5	15.6	4	12.5
	Undergraduate	5	15.6	5	15.6
Smoking	Yes	16	50	17	53.1
	No	16	50	15	46.9

Based on Table 1, the majority of elderly participants in the intervention group are female (62.5%), compared to 50% in the control group. The most prevalence age range for the elderly in the intervention group was 75-90 years old (50%), while the highest age range for the control group was 59.4%. Occupational distribution showed that 25% of the intervention group were civil servants, whereas 25% of the control group were housewives or unemployed. Regarding education, 34.4% of the intervention group did not attend formal education, while 21.9% of the control group had a high school education. Smoking prevalence was comparable between the groups, with 50% of elderly participants in the intervention group and 53.1% in the control group identified as smokers. All of the elderly individuals had no history of chronic or gastric diseases and were taking the hypertension drug amlodipine.

Table 2. Blood Pressure of the Elderly in the Intervention Group (n=32)

Group	Variable	Mean (mmHg)	Category
Pre-test	Systolic	153.03	Hypertension Level I
	Diastolic	89.12	Pre-Hypertension
Post-test	Systolic	141.28	Hypertension Level I
	Diastolic	82.03	Pre-Hypertension

Based on Table 2, the findings revealed a decrease in mean systolic blood pressure, dropping from 153.03 to 141.28 (a 11.7 mmHg difference). Similarly, mean diastolic blood pressure decreased from 89.8 to 82 (a 7.8 mmHg difference), following the consumption of Hibiscus sabdariffa Linn. flower and white ginger tea.

Table 3. Blood Pressure of the Elderly in the Control Group (n=32)

Group	Variable	Mean (mmHg)	Category
Pre-test	Systolic	152.06	Hypertension Level I
	Diastolic	92.15	Hypertension Level I

Post-test	Systolic	139.53	Pre-Hypertension
	Diastolic	82.40	Pre- Hypertension

According to Table 3, the findings revealed a decrease in mean systolic blood pressure, dropping from 152 to 139.5 (a 12.5 mmHg difference). Similarly, the mean diastolic blood pressure decreased from 90.16 to 82.4 (a 7.76 mmHg difference), following the administration of amlodipine (5 mg) antihypertensive drugs.

Table 4. Comparison of Blood Pressure Between Two Groups (n=64)

Group	Variable		Min-Max	Mean ± SD	*p*
Intervention	*Pre-test*	TDS	135-173	153±9.536	0.000
		TDD	69-102	89.8±7.727	
	Post-test	TDS	125-163	141.3±9.364	
		TDD	64-95	82±7.856	
Control	*Pre-test*	TDS	135-165	152±8.598	0.000
		TDD	74-109	90.16±8.148	
	Post-test	TDS	122-155	139.5±8.688	
		TDD	64-104	82.4±8.526	

According to Table 4, the paired t-test indicate significant differences in systolic and diastolic blood pressure in the elderly before and after consuming Hibiscus sabdariffa Linn. flower and white ginger tea (p = 0.000), as well as before and after taking antihypertensive medication (p = 0.000).

Table 5. Differences in Blood Pressure between Two Groups (n=64)

Variable	Group	Mean±SD	*p*
Pre-test Systolic	Intervention	153±9.536	0.671
	Control	89.8±7.727	
Pre-test Diastolic	Intervention	141.3±9.364	0.863
	Control	82±7.856	
Post-test Systolic	Intervention	152±8.598	0.441
	Control	90.16±8.148	
Post-test Diastolic	Intervention	139.5±8.688	0.856
	Control	82.4±8.526	

According to Table 5, the Independent t-test revealed no significant differences in pre- or post-test systolic or diastolic blood pressure between the intervention and control groups (p = 0.671, p = 0.863 and p = 0.441, p = 0.856, respectively). These findings suggest that Hibiscus sabdariffa Linn. flower and white ginger tea are equally effective in reducing blood pressure compared to amlodipine therapy.

DISCUSSION

The results showed that consuming Hibiscus sabdariffa Linn. flower and white ginger tea effectively reduced blood pressure by a similar amount to Amlodipine therapy. This aligns with Melani's (2024), which showed that consuming 2 grams of Hibiscus sabdariffa Linn. flower petal powder extract per day for four weeks can reduce mean systolic from 149.7 to 135.6 and mean diastolic from 94.3 to 85.2. Other research has also shown that drinking Hibiscus tea twice daily for 14 days can reduce systolic by 17.4 and diastolic by 11.2 (Lisa et al., 2024a) and (Oktafiani et al., 2022). Steeping Hibiscus sabdariffa flowers three times a day for ten days decreased systolic blood pressure from 155.5 mmHg to 138.3 mmHg and diastolic blood pressure from 93.2 mmHg to 83.5 mmHg (Nada et al, 2024).

Based on previous study, administering white ginger decoction for seven days decreased systolic from 163.8 to 141.4 and diastolic from 97.3 to 85.9 (Sadita., 2025). Drinking 100 cc of boiled ginger water for five days decreased systolic from 158.3 to 139.6 and diastolic from 94.5

to 83.2 (Silvia et al., 2025). Additionally, consuming a white ginger drink for seven days significantly decreased systolic by 11.2 and diastolic by 9.4 (Wahyuningsih et al., 2024).

In addition to the hibiscus sabdariffa flower and white ginger, several researchers have used other non-pharmacological interventions to reduce blood pressure, including: elderly gymnastics (Vicky et al., 2025), deep breathing relaxation therapy (Nurhayani., 2022), dhikr therapy (Nadjib et al., 2025), Lavender aromatherapy (Saputra et al., 2025), music therapy (Dimas et al., 2023), foot reflexology (Lukman et al., 2020), Telang flower (Aprilia, 2023), Lemongrass water decoction (Pangestuti, 2022), Avocado leaf decoction (Ishak et al., 2022), young coconut water (Parmiyati et al., 2024), bay leaf decoction (Aminullah & Septiany, 2024).

The results showed that hibiscus sabdariffa flower tea and white ginger exhibited mean systolic and diastolic differences of 11.7 and 7.8 mmHg, respectively. In comparison, Yuliza, (2024) reported that drinking honey and white ginger for seven days decreased systolic from 150 to 138 (a 12 mmHg mean difference) and diastolic from 90 to 82 (a 8 mmHg mean difference). The comparative results showed that honey and white ginger slightly outperform Hibiscus sabdariffa Linn. flower and white ginger tea in reducing blood pressure, with a difference of 0.5 mmHg. Hibiscus sabdariffa flowers contain flavonoids and anthocyanins, which exhibit antihypertensive effects through vasodilatory mechanisms and diuretic effects that reduce blood volume (Suarayasa et al., 2023). Meanwhile, white ginger contains gingerol and shogaol, which function as ACE inhibitors, promoting blood vessels relaxation and effectively lower blood pressure (Norouzzadeh et al., 2025).

The study results indicated that consuming Hibiscus sabdariffa Linn. flower and white ginger tea, and antihypertensive drugs, has been proven to equally reduce blood pressure in the elderly. Consuming Hibiscus sabdariffa Linn. flower and white ginger tea for seven days could decrease mean systolic by 11.7 and mean diastolic by 7.8 mmHg. In comparison, antihypertensive drugs decreased systolic by 12.5 and diastolic by 7.76 mmHg. When the intervention group (Hibiscus sabdariffa L. flower tea and white ginger) was compared to the control group (amlodipine 5 mg therapy), the systolic difference between the groups was 0.8 mmHg greater with the antihypertensive drugs, while the diastolic difference was 0.04 mmHg greater with the Hibiscus sabdariffa L. flower tea and white ginger. However, the differences between the two groups were minimal, indicating comparable effectiveness.

Research by Andhyka et al., (2019) demonstrated that amlodipine administration resulted in a decrease in systolic from 153 to 118 mmHg (a 35 mmHg mean difference). Diastolic decreased from 89 to 81 mmHg (a 8 mmHg mean difference) (Wani et al., 2021). Amlodipine therapy decreased mean systolic blood pressure by 20.2 mmHg and diastolic blood pressure by 13.2 mmHg. Administering amlodipine 2.5 mg for two weeks resulted in a decrease in systolic blood pressure from 152 mmHg to 142 mmHg (mean difference: 10 mmHg) and diastolic blood pressure decreased from 81 mmHg to 82 mmHg (mean difference: 3 mmHg). Comparatively, research on amlodipine 5 mg for seven days showed mean systolic and diastolic values of 12.5 and 7.76 mmHg, respectively. The results of the comparison of previous studies showed that using Amlodipine 5 mg for seven days resulted in a greater reduction in blood pressure compared to Amlodipine 2.5 mg over two weeks (Darrell et al., 2019).

Amlodipine is an antihypertensive calcium channel blocker that works by inhibiting calcium ion entry into blood vessel muscles, thereby causing vasodilation and lowering blood pressure. It also reduces the heart's workload and is effective for daily administration. The decrease is influenced by amlodipine's action and by educational efforts, which increase elderly compliance with medication and a healthy lifestyle, thereby optimizing the effectiveness of therapy (Fernando, 2023).

Non-pharmacological interventions offer a low risk of side effects (Norouzzadeh

et al., 2025). However, the effectiveness varies between individuals, and lack a standardized dosage. They also have the potential to interact with other drugs (Dehkhoda et al., 2024). In contrast, amlodipine, a pharmacological therapy, provides a rapid and consistent reduction in blood pressure with a standardized dosage that is supervised by healthcare workers. While effective, it can cause side effects such as edema and headaches. It may also reduce compliance if not complemented by healthy lifestyle changes, particularly among the elderly (Sapian et al., 2023).

Hibiscus sabdariffa Linn. flower and white ginger tea can be used to naturally manage hypertension. It has been proven safe for the elderly because it does not cause gastric disorders in any of the respondents. However, the long-term effects of consuming this tea are unknown. Further research is needed to assess the long-term effects of Hibiscus sabdariffa Linn. flower and white ginger tea therapy, although the tea is generally safe to consume.

CONCLUSIONS

Hibiscus sabdariffa Linn. flower and white ginger tea effectively reduce systolic and diastolic blood pressure in the elderly because they contain flavonoids, which dilate blood vessels; antioxidants, which reduce blood volume; and gingerol and shogaol, which lower blood pressure by inhibiting ACE. This tea is safe because none of the elderly participants complained of gastric pain. For practicality and to maximize the therapeutic effect, future researchers are encouraged to formulate capsules form.

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ORIGINAL RESEARCH

THE EFFECT OF KNOWLEDGE AND ATTITUDE ON THE PRACTICE OF USING MOBILE JKN APPLICATIONS IN PARTICIPANTS OF BPJS KESEHATAN JEMBER BRANCH OFFICE

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ABSTRACT

The use of JKN mobile applications is increasing along with the development of information technology. This study aims to analyse the effect of participants' knowledge and attitudes on satisfaction in using the JKN mobile application at the Jember Branch Office.

This study uses quantitative research methods using analytical observational methods with a cross sectional approach. Probaility Sampling with Simple Random Sampling Technique with a total sample of 134 respondents. Data collection was carried out by filling out questionnaires and interviews made by researchers and filled in by respondents. The collected data were processed using the statistical test 'Chi-Square'

The results showed that most respondents had good knowledge about the JKN mobile application as many as 89 people (66.4%), most respondents had a negative attitude about the JKN mobile application as many as 82 people (61.2%), most respondents were satisfied in using the JKN mobile application as many as 71 people (53%).

The results of the Chi-square analysis test show that the p-value of 0.012 means that there is an influence of knowledge on satisfaction in using the JKN mobile application, the p-value of 0.000 means that there is an influence of attitude on satisfaction in using the JKN mobile application.

It is expected that BPJS Kesehatan officers are more continuous about socialising the menu or features on the JKN mobile application directly to BPJS Kesehatan participants, currently patients who come to BPJS Kesehatan health facilities some have not used mobile JKN, so it needs the role of officers in educating patients and families about the features in the JKN mobile application.

Keywords

Knowledge, Attitude, Satisfaction, Use of JKN Mobile Application

INTRODUCTION

The role of technology in health technology is very important, especially in improving the quality and quality of health services (Mustika, 2015). Knowledge or cognition is a very important domain in shaping a person's actions (overt behavior).

Good knowledge if not supported by a positive attitude shown will influence a person to behave, as expressed by Benjamin Bloom (1908) (notoatmojo, s.2007, roger, C, 2974).

BPJS Kesehatan as the Indonesian Health Social Security Organizing Agency also does not want to be left behind to continue to adapt to existing technological developments. Information system usage behavior is an important factor that influences the success or failure of a technology ((Farah, 2011); Khosroshahi et al., 2021; Liaw et al., 2012; Sidharta & Suzanto, 2015) so that to determine the success of the implementation of a technology, it is necessary to analyze user acceptance of the information technology system, for example the existing system in BPJS Health, namely the Mobile JKN application. Furthermore, participant data can be changed easily such as changing service classes, changing email addresses, mailing addresses, and phone numbers. Through smartphones, of course, data can be changed more simply and save time. Research objectives: To find out the factors that affect the practice of *Mobile* JKN application users at the BPJS Kesehatan Jember Branch Office (rohman, et.al, 2024, riyanto, A.2018). The novelty in this research is the behavior of using mobile JKN

METHOD

This type of research is a quantitative research using an analytical observational method with *a crosssectional approach.* held at the BPJS Kesehatan Branch Office in Jember, East Java. The research was conducted from May 2024 to June 2024. The first population of the study was all participants who visited the BPJS Kesehatan Jember Branch office. The sampling technique in this study uses *random sampling* which is a sampling method Thus 134 samples are needed to achieve a confidence level of 95%. The technique in collecting data was carried out by giving questionnaires directly to participants who came to the Jember Branch Office. participants' knowledge of the use of the Mobile JKN Application using the "*Chi-Square" statistical test* with a confidence level of 95% or a significance level (α: 0.05) (Nursalam, & Pariani, S. 200, Ministry of Health of the Republic of Indonesia. 2013, Arikunto, S. 2016).

RESULTS

Table 1. Characteristics Based on the Age of Respondents Using the Mobile JKN Application at BPJS Kesehatan Jember.

No.	Age	Frequency (f)	Presented (%)
1.	12-25 years	5	3,7
2.	26-45 years old	110	82,1
3.	>45 years	19	14,2
	Total	134	100

Based on table 1, almost all respondents aged 26-45 years were 110 people (82.1%).

Table 2. Characteristics Based on the Occupation of Respondents Using the Mobile JKN Application at BPJS Kesehatan Jember

No.	Work	Frequency (f)	Presented (%)
1.	IRT	20	14,9
2.	Self employed	47	35,1
3.	Private employees	52	38,8
4.	PNS	15	11.,
	Total	134	100

Based on table 2, respondents with private employees and self-employed employees have the same proportion, namely 52 people (38.8%) and 47 people (35.1%)

Table 3. Characteristic By Income/Month of Respondents Using the Mobile JKN Application at BPJS Kesehatan Jember

No.	Revenue/Month	Frequency (f)	Presented (%)
1.	<Rp. 2.665.392 (UMR)	53	39.6
2.	≥Rp 2.665.392 (UMR)	81	60.4

Based on table 3, most of the respondents with a monthly income of ≥Rp 2,665,392 (UMR) were 81 people (60.4%)

Table 4. Characteristic By Source Information Respondents About the Mobile JKN Application at BPJS Kesehatan Jember

No.	Resources	Frequency (f)	Presented (%)
1.	Family	12	9.0
2.	Friend	15	11.2
3.	Social Media	27	20.1
4.	Other	80	59.7
	Total	134	100

Based on table 4, most of the respondents obtained information about the JKN mobile application from other sources such as print media, radio and flyers that had time to visit the BPJS office as many as 80 people (59.7%)

Table 5. Respondents' Knowledge About the Mobile JKN Application at BPJS Kesehatan Jember

No.	Knowledge	Frequency (f)	Presented (%)
1.	Not Good	45	33.6
2.	Good	89	66.4
	Total	134	100

Based on table 5, most of the respondents had good knowledge about the JKN mobile application, as many as 89 people (66.4%)

Table 6. Respondents' Attitudes About the Mobile JKN Application at BPJS Kesehatan Jember

No.	Attitude	Frequency (f)	Presented (%)
1.	Negative	82	61.2
2.	Positive	52	38.8
	Total	134	100

Based on table 6, most of the respondents had a negative attitude about the JKN mobile application as many as 82 people (61.2%).

Table 7. Respondents' Practices in Using the Mobile JKN Application at BPJS Kesehatan Jember

No.	Practice	Frequency (f)	Presented (%)
1.	Negative	63	47
2.	Positive	71	53
	Total	134	100

Most of the respondents were positive in using the JKN mobile application as many as 71 people (53%)

Table 8. The Influence of Knowledge on the Practice of Using Mobile JKN Applications at BPJS Kesehatan Jember

No	Knowledge	Practice				Total		*P value*
		Dissatisfied		Satisfied				
		f	%	f	%			
1	Not good	28	44,4	17	23,9	45	33,6 %	0,012
2	Good	35	55,6	54	76,1	89	66,4 %	
	Total	63	100	71	100	134	100	

Based on table 8, it is known that respondents who have poor behavior on the JKN mobile application show that most of them are well-knowledged, namely 35 respondents (55.6%) and a small number are poorly knowledged, namely 17 respondents (23.9%). The results of the coefficient contingency correlation analysis test showed that the p value was 0.012, meaning that

there was an influence of knowledge on the practice of using the JKN mobile application at BPJS Kesehatan Jember. p value of 0.012.

DISCUSSION

1. **Knowledge of the JKN Mobile Application**

Most of the respondents had good knowledge about the JKN mobile application and a small number had poor knowledge. Respondents have insufficient knowledge about how to get the JKN mobile application, menus or features on the JKN mobile on the participant card feature, member dues and online queue registration at level 1 health facilities (Faskes). BPJS Kesehatan due to the increasingly advanced and rapid development of information technology, it has made digital innovations, namely the JKN Mobile Application. The Mobile JKN application is here to make it easier for the public to meet the needs of participants and prospective JKN-KIS participants. The basis of Mobile JKN is as an administrative activity that is usually carried out at branch offices or health facilities. BPJS Innovation (Khairunnisa, N. 2021, Khusna, A, 2021, Schiffman, & Kanuk. 2011, Ningruma,).

According to Anderson's Theory, factors affect the use of health services, and there is a knowledge factor in it. Knowledge is a result of knowing after a person senses something. Sensing occurs through the senses of sight, hearing, smell, taste, touch, and most of the knowledge is obtained from the senses of sight and hearing. JKN participants can find out about the Mobile JKN application because they have seen or heard about the application. This knowledge will influence JKN participants to behave and make decisions using the Mobile JKN application (Aghatsaa et al., 2023, Budiman, A. 2013, BPJS Kesehatan. 2023a).

Another cause is that BPJS Kesehatan Participants who come to BPJS Kesehatan Jember Branch Office do not know the existence of the Mobile JKN Application so far, BPJS Kesehatan Participants do not know the features offered by the Mobile JKN Application, Users consider the Mobile JKN application to be difficult for users and more complicated if there is a wrong data input such as changing participant data or forgetting passwords, Participants do not know that many complete features can be obtained by downloading Mobile JKN (BPJS Kesehatan. (2023b, Wigatie, R. A., & Zainafree, I. 2023, Wulandari, A, 2019).

2. **Attitude About the JKN Mobile Application**

Most of the respondents have a negative attitude about the JKN mobile application and a small number have a positive attitude. The respondents' negative attitude was shown in the statement item about how to get the JKN mobile application, the menu or feature to view the participant card, changes in health facilities 1, checking BPJS participant contributions. Attitude is a mental and neural state of readiness that is regulated through experience that provides a dynamic or directed relationship to the individual's response to all objects and situations related to it. The formation of attitudes is the result of an individual's interaction with his environment. Attitudes arise from personal experiences, the transfer of painful experiences, and social relationships (Surya, A., 2022, Sumarwan, U. 2013)

Negative perceptions about JKN and Mobile JKN are influenced by the lack of public knowledge about the JKN program even though BPJS has often conducted socialization, but the people's grasp has not had a big influence on their attitude in using Mobile JKN. Mobile JKN socialization has been carried out in all BPJS Kesehatan branch offices. Socialization is carried out either through individuals, business entities, or government agencies. Furthermore, since the inauguration of the Mobile JKN launcing, now the number of participants who have downloaded Mobile JKN has increased every year. It is hoped that the presence of the Mobile JKN Application will minimize and overcome long queues at the Jember Branch BPJS Kesehatan Office (Tjiptono, F. 2014, Sari, N. P., 2019, Saleh, A. R. (2018).

3. **Respondents' Practices in Using the JKN Mobile Application**

Most of the respondents were satisfied in using the JKN mobile application and a small number were not satisfied in using the JKN application. Quality services are currently developing by utilizing information and communication technology as a strategy to achieve the success of a company or institution. Mobile JKN is one of the service innovations that take advantage of advances in information and communication technology that have been adapted to the needs of users, in order to simplify the service process for them. (Nasrudin, E.,.2020,

This study shows that most of the use of JKN mobile services is shown from the reasons respondents use the JKN mobile application, namely because JKN mobile is practical, makes it easier to get health services, does not need to queue if you want to see a doctor, can be used for health screening, while respondents who are not satisfied with the use of the JKN mobile application can be seen in the menu answers on the application are difficult to understand and understand, almost all of them answered yes and The use of this application requires special skills (Indrasari, M. 2019)

4. **The Influence of Knowledge on the Practice of Using the JKN Mobile Application**

Respondents who had poor behavior in the JKN mobile application showed that most of them were well knowledgeable and a small number were less knowledgeable The results of the chi square analysis test showed that there was an influence of knowledge on the practice of using the JKN mobile application at BPJS Kesehatan Jember.

Knowledge is the result of a learning process that can be obtained both formally and informally and leads to theoretical and practical understanding of individuals. In this study, respondents who were positive with the JKN mobile application had good knowledge about the JKN mobile application, while respondents who were less satisfied with the JKN mobile had poor knowledge about this application. The respondents' dissatisfaction and poor knowledge were seen in the results of the answers about their lack of understanding of the menu on the JKN mobile application and some respondents found it difficult to use this application due to the age factor, so it is important for BPJS Kesehatan officers to carry out continuous socialization to improve their understanding of the features in

this application (Nurhayatia, A, 2022, Safarah, A. (2023).

5. **The Influence of Attitudes on the Practice of Using the Mobile JKN Application**

respondents who have poor behavior on the JKN mobile application show that most have a negative attitude and a small part have a positive attitude. The results of the chi square analysis test showed that there was an influence on the practice of using the JKN mobile application at BPJS Kesehatan Jember. Complex technology will have a direct and significant effect on technology users (Nasrudin & Widagdo, 2020). Attitude is an evaluative statement of both pleasant and unpleasant objects, individuals and events. Attitude has three main components which consist of cognitive, emotional and behavioral. Based on the results of the research Khusna et al. 2021. Tjiptono, F. 2000, Engel, Blackwell, 2012).).

The results of this study showed that attitudes had a significant effect on the practice of using the JKN mobile application because respondents had a negative attitude showing dissatisfaction with the JKN mobile application. Respondents gave a negative attitude to menus or features that can be used on the JKN mobile application, many respondents lacked information that could be used, making it easier for BPJS Kesehatan participants to get services either from BPJS Kesehatan, health facilities 1 or hospitals. Likewise, respondents who have a positive attitude will show good behavior towards mobile JKN. Muin, A., 2020, Meilina, & Bernarto, I. 2021, Kusumawardhani, O. B, 2022).

CONCLUSIONS

Most of the respondents are knowledgeable about the JKN mobile application., Most of the respondents have a negative attitude about the JKN mobile application. Most of the respondents have a positive attitude in using the JKN mobile application. There is an influence of knowledge on the practice of using the JKN mobile application at BPJS Kesehatan Jember There is an influence of attitude on the practice of using the JKN mobile application at BPJS Kesehatan Jember

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THE INFLUENCE OF PHYSICAL WORK ENVIRONMENT FACTORS ON THE PERFORMANCE OF EMPLOYEES OF THE MOJOKERTO REGENCY HEALTH OFFICE.

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ABSTRACT

Efforts to create a good and comfortable physical work environment must be made by agencies in order to support the achievement of high performance for employees. The purpose of this study was to analyze the influence of physical environmental factors on the performance of employees of the Mojokerto District Health Office.
This study was conducted with a cross sectional approach with a sample of 76 employees selected by simple random sampling technique. data were collected with a room thermometer, sound level meter, luxmeter and comfort measurement questionnaire. The data were then analyzed using logistic regression test.
The results showed that almost all of the furniture used by employees to work was comfortable (79.5%), most of the rooms had more than average noise levels (59.1%), all rooms had room temperature (15-30o Celsius) (100%), almost all rooms had inappropriate lighting (88.6%).
The results of the logistic regression test explain that the comfort of office furniture has no effect on employee performance (p value = 0.545), the noise level has no effect on employee performance (pvalue = 0.739). employee workplace air temperature has no effect on employee performance (pvalue = 0.087). Workplace lighting levels affect employee performance. (p value = 0.026) Together there is an influence of all physical environmental factors on employee performance and there is no most dominant factor in influencing the performance of employees of the Mojokerto District Health Office (pvalue = 0.000). The novelty of this research is that appropriate lighting levels can improve employee performance by 10.05.
Sufficient lighting does not interfere with employee concentration so that they can work well and focus and have good performance. Therefore, the Health Office should begin to rehabilitate the facilities owned so as to create a conducive work environment for employees.

Keywords

Performance, Physical Environment, Lighting, Noise, Employees

INTRODUCTION

Comfort at work is an important factor for employees in the process of doing the tasks given. The comfort of working for employees is mostly created from the physical work environment in the office where they work. The physical work environment is the environment in the office that is used by employees when they complete their tasks and work (Saiful A. *et al*. 2019, Abdillah, D. 2023.).

The professionalism index of ASN in Mojokerto Regency in 2022 is 66.68 (Low) while in 2023 it has increased to 86.23 (High). So that in a performance there can be a decrease or increase in employees which can be influenced by various aspects, one of which is the physical work environment in the office is an important element that must be considered by the office, because this physical work environment is always directly related to the employees who work in the office.

Efforts in creating a good and comfortable physical work environment must be made by the agency. (Premaranthne & Kappagoda, 2020) The dimensions of the physical work environment (ventilation, air temperature, noise, interior, lighting) in an office have a positive impact on the performance of employees. Business owners provide good physical work environment conditions so that employees can work with maximum results. (Son of Tanamas, V., 2022, Putra, R. I. A. 2021). Research objectives: To analyze the relationship between physical environmental factors and the performance of employees of the Mojokerto Regency Health Office.

METHOD

The type of research used is a quantitative analytical research with a cross sectional approach The location chosen for the study is Mojokerto Regency, precisely at the Mojokerto Regency Health Office, from January to June 2024. the population in this study is employees of the Mojokerto Regency Health Office. using a simple random sampling method of 76 people. The independent variables of the study are Physical Work Environment Factors which include physical aspects on the comfort of office furniture, noise, air temperature, lighting. Dependent variable is employee performance. Ethical Clearance no: 63/EC-SM/2024. This study uses a Logistic Regression test at a significance level of 95% (Pratama, M. A. R. (2020). Sugiyono. 2018.

RESULTS

Table 1. Distribution of Frequency of Respondent Characteristics at the Mojokerto Regency Health Office.

No	Characteristic	Frequency (f)	Percentage (%)
1	**Gender**		
	Man	18	43.9
	Woman	26	56.1
2	**Age**		
	20 – 29	5	4.8
	30 – 39	18	43,9
	40 – 49	15	36.5
	>50	6	14,8
3	**Length of Service**		
	< 5 years	21	51,2
	>5 years	23	48.8
4	**Education**		
	Diploma	10	24.4
	Sarjana	26	56.1
	Magister	8	19.5
5	**Length of work**		
	< 5 years	27	65.8
	≥5 years	17	34,2
6	**Field of Work**		
	Secretariat	9	22.0
	P2	9	19.5
	Yankes	9	19.5
	SDK	9	19.5
	Kesmas	8	19.5
	Sum	**44**	**100**

a. Special Data Characteristics

Table 2. Frequency Distribution Table Based on Temperature at the Mojoketo Regency Health Office

No.	Temperature	Frequency (f)	Percentage (%)
1.	Room temperature (15-30degrees Celsius)	44	100.0
	Total	44	100.0

Table 2 shows that all rooms in the Mojokerto Regency Health Office have room temperature (15-30o Celsius), which is as many as 44 respondents (100%).

Table 3. Frequency Distribution Table Based on Noise at the Mojoketo Regency Health Office

No.	Noise	Frequency (f)	Percentage (%)
1.	Less than average	18	40.9
2.	More than average	26	59.1
	Total	44	100

Table 3 shows that most of the rooms in the Mojokerto Regency Health Office have a noise level above average, which is 26 respondents (59.1%).

Table 4. Table of Frequency Distribution Based on Light at the Mojoketo Regency Health Office

No.	Light	Frequency (f)	Percentage (%)
1.	Appropriate	5	11.4
2.	Not suitable	39	88.6
	Total	44	100

Table 4 shows that almost all rooms in the Mojokerto Regency Health Office have inappropriate lighting, which is 39 respondents (88.6%)

Table 5. Frequency Distribution Table Based on the Comfort Level of Office Furniture at the Mojoketo Regency Health Office

No.	Comfort	Frequency (f)	Percentage (%)
1.	Uncomfortable	6	13.6
2.	Comfortable	35	79.5
3.	Very comfortable	3	6.8
	Total	44	100

Table 5 shows that almost all the furniture used by employees to work at the Mojokerto Regency Health Office is comfortable, namely 35 respondents (79.5%).

Table 6. Table of Frequency Distribution of Respondents Based on Employee Performance at the Mojoketo Regency Health Office

No.	Performance	Frequency (f)	Percentage (%)
1.	Good	37	84.1
2.	Very good	7	15.9
	Total	44	100

Table 6 shows that almost all respondents have good performance, namely 37 respondents (84.1%).

Table 7. The Effect of Office Furniture Comfort on Employee Performance at the Mojokerto Regency Health Office

Level Comfort	Performance				Total		P *Value*
	Good		Very good				
	f	%	f	%	f	%	
Uncomfortable	6	13.6	0	0	6	13.6	0.545
Comfortable	29	65.9	6	13.6	35	79.5	
Very comfortable	2	4.6	1	2.3	3	6.9	
Total	37	84.1	7	15.9	44	100	

Based on the results of the statistical test, a probability result (p-value) of 0.545>0.05 was obtained, which means that at alpha 5% there was no significant influence between the comfort of office furniture and the performance of supervisors at the Mojokerto Regency Health Office

Table 8. Effect of Noise Level on Employee Performance at the Mojokerto Regency Health Office

Level Noise	Performance				Total		P *Value*
	Good		Very good				
	f	%	f	%	f	%	
Less than average	15	34.1	3	6.8	18	40.9	0.739
More than average	22	50.0	4	9.1	26	59.1	
Total	37	84.1	7	15.9	44	100	

Based on the results of the statistical test, a probability result (p-value) of 0.739 >0.05 was obtained, which means that at alpha 5% there was no significant influence between noise levels and the performance of supervisors at the Mojokerto Regency Health Office.

Table 9. Relationship of Air Temperature to Employee Performance at the Mojokerto Regency Health Office

Temperature Air	Performance				Total		P *Value*
	Good		Very good				
	f	%	f	%	f	%	
Room temperature (15-30^{o} centigrade)	37	84.1	7	15.9	44	100	0.087
Total	37	84.1	7	15.9	44	100	

Based on the results of the statistical test, a probability result (p-value) of 0.087>0.05 was obtained, which means that at alpha 5% there was no significant influence between air temperature and the performance of supervisors at the Mojokerto Regency Health Office

Table 10. The Effect of Lighting Level on Employee Performance at the Mojokerto Regency Health Office

Level Lighting	Performance				Total		P *Value*
	Good		Very good				
	f	%	f	%	f	%	
Appropriate	4	9.1	1	2.3	5	11.4	0.026
Not suitable	33	75.0	6	13.6	39	88.6	
Total	37	84.1	7	15.9	44	100	

Based on the results of the statistical test, a probability result (p-value) of 0.026<0.05 was obtained, which means that at alpha 5% there is a significant influence between the level of lighting on the performance of supervisors at the Mojokerto Regency Health Office.

Table 11. Partial Test Results Influence comfort, temperature, noise and the level of lighting of the employee's workplace to employee performance

Variable	B	HERSELF	Siq	XP (B)
Cash	-707,78	24588.289	0.989	0.000
Lighting	0.005	179.967	1.000	1.005
temperature	-0.670	8820.6	1.000	0.512
noise	0.306	1080.5	1.000	
comfort	0.035	422.6	1.000	1.036
Performance	17.401	2437.6	0.994	36075016

Based on Table 4.10 above, of the 4 independent (independent) variables that were tested paesially, all variables were insignificant (influential), proving that none of the variables were the strongest or dominant.

DISCUSSION

1. **The Effect of the Comfort of Office Furniture Used for Work on the Performance of Staff at the Mojokerto Regency Health Office**

   Almost all the furniture used by employees to work at the Mojokerto Regency Health Office is comfortable, namely 35 respondents (79.5%). There was no significant influence between the comfort of office furniture and the performance of supervisors at the Mojokerto Regency Health Office.

   The results of the study The comfort of office furniture does not directly affect employee performance, but factors related to a comfortable office layout can significantly affect employee productivity and performance. Ergonomics: Ergonomic office furniture can help reduce strain on the neck and shoulders, making employees more comfortable and able to work longer hours without fatigue. This can be seen in research that states that good office space arrangement can improve employee performance and productivity (Rianda, S., & Winarno, A. (2022). Riadi, A.R., & Yanuarti, M. (2024 Riyadi, S. (2022).

2. **The Effect of Noise Level on the Performance of Staff at the Mojokerto Regency Health Office**

   Based on the results of the statistical test, a probability result (p-value) of 0.739 >0.05 was obtained, which means that at alpha 5% there was no significant influence between noise levels and the performance of supervisors at the Mojokerto Regency Health Office. Research conducted by Pratama, (2020).

   This shows that noise results in communication disruptions in employees such as shouting at work and mistakes in communication, so that it can affect employee performance. It is also in line with research conducted by Kholik, (2019) which produces a significance value of 0 less than a of 0.05. These results show that the noise in the work area of Power Plant II (Subhan, A., et.al 2023, Sudiro, A. 2019. Mawey, E.R., et.al 2024).

3. **The Effect of Air Temperature on the Performance of Attendants at the Mojokerto Regency Health Office**

   The air temperature where employees work is at room temperature (15-30o Celsius) and has a good performance of 37 respondents (84.1%), Based on the results of statistical tests, a probability result (p-value) of 0.087>0.05 was obtained, which means that at alpha 5% there is no significant influence between air temperature and the performance of supervisors at the Mojokerto Regency Health Office.

   The appropriate air temperature can make employees feel comfortable and improve their performance. Temperatures that are too hot or too cold can disrupt the body's temperature balance and reduce employee focus Extreme temperatures can cause a variety of health problems, such as heat rashes, heat syncope, heat cramps, heat exhaustions, and heat stroke. This condition can reduce employee productivity and performance (Nawawi, Hadari. 2006. Nurhadian, A. F. 2019. Pale, S. P., 2023)

4. **The Relationship of Lighting Level to the Performance of Attendants at the Mojokerto Regency Health Office**

   The results of the statistical test obtained a probability result (p-value) of 0.026<0.05, which means that at alpha 5% there is a significant influence between the level of lighting on the

performance of supervisors at the Mojokerto Regency Health Office.

Another study conducted at the State University of Malang (2020) shows that lighting has a positive and significant effect on employee performance. This study uses a cross-sectional method and finds that each increase in lighting (Lux) can increase employee performance by 0.271 unitsGood office space lighting will create efficient and effective employee performance, encourage employee motivation and discipline, and have a positive impact on the physical and psychological health of employees (Armansyah and Tanggasari, D. 2019, Hall, F. H. 2020, Armanusah, E. (2017).

5. **The effect of comfort, temperature, noise and lighting level of the employee's workplace on employee performance**

And the partial test of all insignificant (influential) variables proves that none of the variables are the strongest or dominant. The physical needs of comfort, lighting, temperature, and noise greatly affect employee performance. Good lighting improves visibility and reduces visual impairment, so workers can do their jobs quickly and thoroughly. Lack of lighting can lead to impaired visibility and eyestrain, while excessive lighting can lead to glare, reflections, and excessive shadows, Research shows that good lighting can improve employee performance by 4-35%. Hall, F. H.,. (2020). Fajri, Y. A., 2022, Habibi, R., 2023

A poor physical work environment has an impact on employee performance in the form of dehydration, fatigue, decreased focus, comfort, increased emotions, and reduced hearing as well as having an impact on company performance, suboptimal productivity, affecting employee work effectiveness and increasing costs. The physical work environment is a physical condition consisting of elements in the work area such as lighting, temperature, humidity, color, cleanliness, noise, and vibration. This element creates a sense of security and peace so that it plays a role in improving employee performance. Hadi S., 2023, Lingga, G. (2022, Makbul, M. (2021, Mangkunegara, A. P. (2017). The novelty of this research is that appropriate lighting levels can improve employee performance by 10.05.

CONCLUSIONS

The comfort of office furniture has no effect on the performance of supervisors at the Mojokerto Regency Health Office. The noise level has no effect on the performance of supervisors at the Mojokerto Regency Health Office. The air temperature of the employee's workplace has no effect on the performance of employees of the Mojokerto Regency Health Office. The level of workplace lighting affects the performance of employees of the Mojokerto Regency Health Office

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RELATIONSHIP BETWEEN QUALITY OF WORK LIFE AND NURSE'S PERFORMANCE IN EMERGENCY ROOM RSUD KARSA HUSADA BATU CITY

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ABSTRACT

Quality of Work Life (QWL) is an important factor affecting nurse performance, especially in the Emergency Room (ER) with high work pressure. This study aims to analyze the relationship between QWL and the performance of ER nurses at RSUD Karsa Husada, Batu City. The research design used a quantitative method with a cross-sectional study approach. The total sampling used involved 17 ER nurses. QWL measurement was carried out through a structured questionnaire, while nurse performance was measured based on hospital performance evaluation indicators. The statistical test used was chi-square. The results showed a significant relationship between QWL and nurse performance with a p-value <0.005, which was 0.002 (α = 0.05). This indicates that improvements in QWL can contribute positively to improving nurse performance. These findings provide important implications for hospital management to improve the quality of the nurse work environment to achieve better performance in health services.

Keywords

Emergency room, nurse performance , QWL

INTRODUCTION

Quality of Work Life (QWL) is a concept that has received increasing attention in various health studies because it is considered as one of the important factors that affect the well-being and performance of health workers, especially nurses. In high-pressure work environments, such as the Emergency Department (ED), the role of QWL becomes even more vital. This is due to the physical and mental challenges faced by nurses in the ED, who often work in emergency conditions, dealing with complex cases, and heavy workloads. Based on research conducted, it was found that QWL has been identified as one of the key determinants of nurse performance in emergency departments (IGD) and has been recognized as an important factor affecting nurse performance, especially in high-stress work environments such as emergency departments (IGD) (Satriyanto et al., 2023). Previous studies have consistently shown that QWL is a significant predictor of professional practice, professionalism, leadership, legal, and ethical (Satriyanto et

al., 2023; Wahyuni & Sulistyanto, 2023). A study conducted by Chang et al., (2022) found that QWL was positively associated with job satisfaction and negatively associated with burnout among emergency room nurses.

The importance of QWL in the health sector has been emphasized by the Ministry which has launched various initiatives to improve the working conditions and well-being of health professionals (Direktorat Kesehatan dan Gizi Masyarakat, 2023). Despite these efforts from both the public and private sectors, Indonesian hospitals still face challenges in providing a conducive working environment for their nurses (Afaya et al., 2021). This is especially true in the emergency room where the workload is high and the pressure to provide quality health services is intense and continuous.

Several studies have investigated the relationship between QWL and nurse performance in various healthcare settings. For example, a study by Chang et al., (2022) found that QWL was significantly related to nurses' performance in Taiwanese hospitals with the result that nurses who had high QWL performed better by 25% compared to nurses who had low QWL. Similarly, another study found that QWL was a significant predictor of job satisfaction and performance among Indonesian nurses, with the result that 80% of nurses who had high QWL also had high job satisfaction (Wahyuni & Sulistyanto, 2023).

QWL encompasses various dimensions, including work-life balance, fair compensation, a safe working environment, opportunities for professional development, and participation in decision-making. The effective implementation of QWL principles has been shown to enhance job satisfaction, motivation, and healthcare workers' loyalty to their institutions. Indirectly, this also contributes to increased productivity and improved service quality. Conversely, poor QWL is associated with high turnover rates, absenteeism, decreased performance, and suboptimal service quality (Diana et al., 2022).

Based on this background, a study was conducted on QWL in the emergency department of RSUD Karsa Husada Batu City. This study aims to investigate the relationship between QWL and nurses' performance in the emergency department of RSUD Karsa Husada Batu City, a public hospital in Indonesia that has just changed its status from type C to type B, making it the only hospital with type B in Batu City while other hospitals still have types below it.

The transformation of RSUD Karsa Husada Kota Batu from a type C to a type B hospital has led to increased service complexity and heightened public expectations. As one of the hospital's priority services, the Emergency Department (ED) faces greater pressure to deliver prompt, accurate, and high-quality care. In this context, strengthening the Quality of Work Life (QWL) for ED nurses becomes essential to maintain optimal service performance amid increasing workload demands. However, empirical studies examining the relationship between QWL and nurse performance in hospitals undergoing capacity expansion remain limited, thus highlighting the need for relevant research in this area

The literature suggests that QWL is influenced by various factors, including workload, autonomy, and social support (Chang et al., 2022). Research in Indonesia on the relationship between QWL and nurse performance remains limited, particularly in high-stress environments such as emergency departments. Given the growing demands placed on healthcare workers and the critical nature of emergency services, understanding

how QWL affects nurse performance is essential (Eliyana et al., 2020).

The theoretical framework for this study is Kanter's Structural Empowerment Theory, which postulates that access to opportunity, information, support, and resources has the potential to empower nurses to perform at peak levels. Existing nursing literature shows that structural empowerment improves performance on the job, reduces stress, increases intent to stay, and promotes thriving at work, a pathway to better performance and reduced turnover intentions (Al-Otaibi et al., 2024).

The Job Demands–Resources (JD-R) model elucidates how job resources serve as cushions for high demands in settings like emergency departments and are translated into higher engagement and performance. Contemporary healthcare research always verifies JD-R processes linking resources and performance/well-being (Nurmeksela et al., 2025). This study aims to address that gap by identifying specific QWL-related factors that influence the performance of nurses in the ED. By emphasizing the importance of QWL as a determinant of performance, this study underscores the need for systemic interventions that prioritize staff well-being as a central component of healthcare quality improvement. In doing so, the study will contribute to both academic understanding and practical efforts to elevate the standards of emergency care in Indonesia.

Recent syntheses of influences on nurses QWL present few, ED-specific Indonesian data, especially in capacity/status upgrading hospitals where workload and complexity are on the rise. Disaggregated proof of what QWL sub dimensions (compensation, career development, problem-solving, communication) best map to documented performance indicators in an ED environment is still scarce. This study focuses directly on that gap in RSUD Karsa Husada Batu City during its post-upgrade phase.

This study is important because it will provide insight into the factors that influence nurses' performance in a high stress work environment and will provide information on strategies to improve QWL and performance among emergency department nurses, and the emergency department continues to be required to meet hospital expectations so that the quality of the nurses' work environment must always be a special concern for hospital management. This study will also fill the knowledge gap by investigating the relationship between QWL and nurses' performance in the emergency department of RSUD Karsa Husada Batu City.

To our knowledge, this is the first ED specific analysis in Indonesia conducted in the context of a hospital status transition that (i) maps nine QWL sub-dimensions to observed nurse performance categories, (ii) uses total sampling of all ED nurses on site, and (iii) identifies a distinctive pattern in which balanced compensation, career development, problem-solving, and communication, but not job security or environmental safety show significant associations with performance (p values reported in Results). These ED-contextual, sub-dimension-level insights extend recent QWL syntheses and operationalize Kanter/JD-R predictions for a high-demand Indonesian ED.

METHOD

This research is an observational study using a Cross-Sectional design which was conducted from October 2021 to December 2022 at RSUD Karsa Husada Batu City, East Java. The independent variable studied was Quality of Work Life (QWL), while the dependent variable was the performance of emergency room nurses. The independent

variables consisted of nurse involvement, balanced compensation, a sense of job security, work environment safety, a sense of pride in the institution, career development, available facilities, problem-solving and communication. The research sample was 17 emergency room nurses at RSUD Karsa Husada Batu City who met the inclusion criteria. Sampling was done by total sampling technique, namely all emergency room nurses at RSUD Karsa Husada Batu City who met the inclusion criteria. Ethical approval was obtained from the Health Research Ethics Committee with ethical number 139/FTMK/EP/IV/2022.

QWL data were collected using a QWL questionnaire that had been tested for validity and reliability. Data regarding the performance of emergency room nurses were obtained through the use of emergency room nurse performance evaluation forms. QWL assessment is categorized based on the QWL score into two categories, namely high if the QWL score is ≥ 80 and low if the QWL score is < 80. Meanwhile, the data on the performance of emergency room nurses obtained from the performance evaluation form of emergency room nurses has a minimum score of 0 and a maximum score of 100. The score is then categorized into the performance of emergency room nurses with excellent scores (score ≥ 90), good (score 80-89), less good (score 60-79), and bad (< 60). Statistical analysis to test the relationship between the independent variable and the dependent variable was performed with the chi-square test at $\alpha<0.05$.

RESULTS

Table 1. Frequency Distribution of Respodents' Characteristics at RSUD Karsa Husada Batu City

Characteristics	Category	Total	
		n	%
Age	20 – 30 years	9	53
	31 – 40 years	7	41
	> 40 years	1	6
Gender	Male	9	53
	Female	8	47
Length of Service	≤ 5 years	10	59
	6 – 10 years	5	29
	> 10 years	2	12
Academic Education	Diploma	7	41
	Bachelor	0	0
	Ners	10	59
Employment Status	Government Employees	7	41
	More	10	59

Based on the results of the frequency distribution of respondent characteristics at RSUD Karsa Husada Batu City, the majority of respondents were between 20-30 years old (53%), followed by the 31-40 years age group (41%), and only 6% were over 40 years old. In terms of gender, the proportion of men and women is quite balanced with a slight dominance of men (53%) over women (47%). Based on length of employment, the majority of respondents had worked for ≤ 5 years (59%), while those who worked for 6-10 years amounted to 29%, and those who

worked for more than 10 years amounted to 12%. In terms of academic education, most respondents had a nurse education (59%), while 41% were diploma graduates, and no respondents had a bachelor's degree. For employment status, 41% of respondents were civil servants, while 59% were non-civil servants. These results show a diverse distribution of demographic and professional characteristics, but dominated by young nurses with less than 5 years of work experience and the majority of educational levels at the ners level.

Table 2. Frequency Distribution of Emergency Room Nurse Performance Level at RSUD Karsa Husada Batu City

Emergency Room Nurse Performance Indicators	Total	
	n	%
Very Good	0	0
Good	10	59
Less Good	7	41
Bad	0	0
Total	17	100

Based on Table 2 which displays the frequency distribution of the performance level of emergency room nurses at RSUD Karsa Husada Batu City, it is known that the majority of nurses are considered to have good performance with a percentage of 59% (10 nurses). Meanwhile, 41% of nurses (7 nurses) were categorized as having poor performance. There are no nurses who are considered to have excellent or poor performance, with each of these categories showing 0%. From these results, it can be concluded that although most nurses have good performance, there is still a group of nurses with performance that needs to be improved to achieve more optimal results.

Table 3. Relationship Between Quality of Work ife and Performace of Emergency Room Nurse at RSUD Karsa Husada Batu City

Quaity of Work Life		Nurse Performance Kategory		Total		P – Value
Variables	Category	Good	Less Good	n	%	
Nurse Engagement	Low	4	0	4	23,5	0,015
	High	3	10	13	76,5	
Balanced Compensation	Low	0	7	7	41,2	0,010
	High	7	3	10	58,8	
Job Security	Low	3	3	6	35,3	0,644
	High	4	7	11	64,7	
Work Environment Safety	Low	1	5	6	35,3	0,304
	High	6	5	11	64,7	
Sense of Pride in the Instiurion	Low	2	4	6	35,3	1,000
	High	5	6	11	64,7	
Career Development	Low	0	6	6	35,3	0,035
	High	7	4	11	64,7	
Avalailable Facilities	Low	1	3	4	23,5	0,603
	High	6	7	13	76,5	
Problem-Solving	Low	6	1	7	41,2	0,004
	High	1	9	10	58,8	
Communication	Low	1	8	9	52,9	0,015
	High	6	2	8	47,1	
Total QWL	Low	0	8	8	47,1	0,002
	High	7	2	9	52,9	

Based on the distribution table 3, the relationship between Quality of Work Life (QWL) and nurse performance at RSUD Karsa Husada Batu City, it can be seen that several dimensions of QWL have a significant relationship with nurse performance. In the dimension of nurse involvement, nurses with high involvement tend to have good performance (76.5%), although statistically, this relationship is not significant (p = 0.115). On the other hand, balanced compensation had a significant relationship with nurse performance (p = 0.010), where all nurses who received low compensation were categorized as having poor performance (41.2%), while nurses who received high compensation mostly showed good performance (58.8%).

Another dimension that showed a significant relationship was career development (p = 0.035). Nurses who received high career development mostly had good performance (64.7%), while those who received low career development tended to have poor performance (35.3%). In addition, problem-solving also showed a significant relationship (p = 0.004), where 58.8% of nurses with high problem-solving ability had good performance, while those with low ability were entirely in the category of poor performance. The same was also seen in the communication dimension, where nurses with high communication showed more good performance (47.1%) than those with low communication (p = 0.015).

Overall, total Quality of Work Life (QWL) had a significant relationship with nurse performance (p = 0.002). From this result, 52.9% of nurses with high QWL showed good performance, while all nurses with low QWL showed poor performance. These results confirm that improving the quality of work life, especially in the aspects of compensation, career development, problem-solving, and communication, is instrumental in improving the performance of nurses in the emergency room. Efforts to improve QWL in RSUD Karsa Husada Batu City can be an effective strategy in improving nurse performance and service quality in the emergency department.

DISCUSSION

The relationship between Quality of Work Life (QWL) and nurses' performance in Emergency Departments (EDs) is a very important topic, especially in stressful work environments such as EDs. QWL has a significant effect not only on the well-being of health workers, but also on their productivity and performance. This study reinforces previous findings by showing that improved QWL can significantly improve nurses' performance in the ED. Several dimensions of QWL such as nurse engagement, fair compensation, career development, problem-solving ability, and communication, were shown to have a positive correlation with better performance (Nanjundeswaraswamy, 2022).

One of the most influential factors identified in this study was fair compensation. Nurses who received fair compensation performed better, with 58.8% of highly compensated nurses performing better than those who received low compensation (p = 0.010). This finding is consistent with studies confirming that fair compensation is a key driver of work motivation and commitment (Gmayinaam et al., 2024). With fair compensation, job stress related to the demands of health care in the emergency department can be reduced, thereby improving performance (Amelia, 2023).

In addition to compensation, career development also has an important role in improving nurse performance. The results showed that nurses who had continuous career development opportunities showed higher performance, with 64.7% showing

better performance than those who did not have access to career development (p = 0.035). This study supports the conclusion of Orgambídez et al., (2020), which emphasizes that continuous career development can improve nurses' competence and professionalism, and positively affect their performance (Ardiansyah & Surjanti, 2020).

Problem-solving ability is also an important factor in nurse performance in the ED. The ability to solve problems well in a stressful work environment, such as the ED, was shown to have a positive effect on performance, with 58.8% of nurses who had good problem-solving skills showing higher performance (p = 0.004). The significance of problem-solving ability is supported by various studies that show the importance of this skill in handling emergencies in the ED (Al-Dossary, 2022).

Effective communication among medical team members also emerged as a significant predictor of nurse performance. Nurses with good communication skills showed better performance, with a significant association between high communication ability and better performance (p = 0.015). Effective communication is essential in ensuring good coordination in the dynamic and stressful ED environment. Research shows that good communication can reduce medical errors and improve patient care outcomes (Sibuea et al., 2024 ; Kelbiso et al., (2017).

The results showed that the involvement of nurses in the Emergency Department (IGD) had a significant relationship with their performance, with a p-value = 0.015. This suggests that the higher the level of nurses' engagement in their work, the better the performance they show. High nurse engagement can influence their motivation and commitment to duty, which has a positive impact on patient care. Previous research also supports these findings, indicating that more engaged nurses tend to provide better services and be responsive to patient needs (Wijayanti & Aini, 2022). High engagement not only improves individual performance but also contributes to the overall quality of service in the hospital (Lebni et al., 2021).

However, not all QWL dimensions had a significant relationship with nurse performance. Job security, although generally considered important for employee well-being, also showed no significant relationship with nurses' performance (p = 0.644). In the ED work environment, work pressure and urgent healthcare demands may be more relevant to nurses than job security factors (Sani et al., 2024).

Work environment safety, which is often considered an important component of QWL, also had no significant impact on nurses' performance (p = 0.304). Although safety is very important, in the ED, safety is often considered a pre-existing prerequisite, so there is not considerable variation in its effect on nurse performance (Alharazi et al., 2023).

A sense of pride in the institution also did not show a significant relationship with nurse performance (p = 1.000). Although a sense of pride in the workplace may influence long-term job satisfaction, in the ED environment, the high demands of the job mean that this factor does not directly influence nurses' daily performance (Nursalam et al., 2018).

Lastly, available facilities also showed no significant association with nurse performance (p = 0.603). In the emergency department, where the provision of basic facilities is considered standard, the availability of facilities may not vary enough to significantly affect nurses' performance. This suggests that facilities are not the main factor influencing nurses' performance in

this work environment (Wibowo et al., 2024).

Comparisons with theory and recent evidence. Our finding that balanced compensation is linked to better performance aligns with the JD-R proposition that tangible resources buffer high demands and enhance in-role performance. Contemporary healthcare studies confirm that when resources are insufficient, burnout rises and quality/safety suffers an inverse of our observed pattern where better resource provision coincides with higher performance (Li et al., 2024).

The significance of career development mirrors empowerment pathways: access to opportunity and support fosters thriving and performance. Recent studies show structural empowerment enhances resilience, intent to stay, and performance-related thriving among nurses and midwives, reinforcing Kanter's mechanisms that organizations can actively shape (Al-Otaibi et al., 2024).

The importance of problem-solving and communication is consistent with ED literature emphasizing team coordination and decision quality as performance drivers. Systematic evidence in emergency nursing shows that strengthening nursing processes and team communication improves quality outcomes conceptually congruent with our results that these process resources map to better performance categories (Ouellet et al., 2025).

Interestingly, job security and work environment safety were not significant in our data, diverging from common assumptions that these universal hygiene factors always predict performance. One interpretation is that, in EDs where a minimum safety baseline is already present, performance variance hinges more on activation resources than on relatively non varying hygiene conditions. This reading is compatible with JD-R (performance tracks available, actionable resources) and Kanter. It also echoes recent work showing that differences in staffing and operational supports not merely general safety climate are what most strongly shift ED care timeliness/quality (Drennan et al., 2024).

Our position. In post-upgrade hospitals like RSUD Karsa Husada (type B), rising service complexity likely increases cognitive and coordination demands. Under such pressure, resource levers that directly enable performance competitive pay to retain focus, clear development ladders to sustain motivation/skills, structured problem-solving (protocols, simulation), and communication routines (briefings, huddles, SBAR) will yield more measurable performance gains than broad, less variable hygiene assurances. This explains why our sub-dimension pattern differs from generic QWL correlations in mixed settings.

Implications. Grounded in Kanter and JD-R, we recommend prioritizing: (1) compensation policies tied to ED acuity/complexity, (2) formal career ladders and certification pathways (ED/trauma), (3) routine problem-solving drills and (4) standardized communication tools (SBAR, huddles). These map directly onto the significant QWL levers identified in our data and are supported by current evidence as feasible, high-yield strategies in ED environments (Ouellet et al., 2025).

CONCLUSIONS

This study confirms that some dimensions of QWL, such as fair compensation, career development, problem-solving ability, and effective communication, play an important role in improving nurses' performance in the Emergency Department (ED). However, other dimensions such as nurse engagement, a sense of job security, the safety of the work environment, a sense of pride in the institution, and available facilities did not directly influence performance in the

stressful ED environment. These findings provide important insights for hospital management in designing more effective strategies to improve nurses' performance through QWL improvements focused on the key significant factors of nurse engagement, balanced compensation, career development, problem-solving and communication.

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Ethical Consideration

Ethical approval was obtained from the Health Research Ethics Committee with ethical number 139/FTMK/EP/IV/2022.

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Conflict of Interest Statement

The authors declared that there is not any conflicting interest in this study

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FACTORS ASSOCIATED WITH DEPRESSION AMONG CHRONIC KIDNEY DISEASE PATIENTS RECEIVING HEMODIALYSIS

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ABSTRACT

Chronic kidney disease (CKD) is one of the therapies for CKD is hemodialysis. Hemodialysis can have psychological effects, one of which is depression. The purpose of this study was to identify factors associated with depression in patients with chronic kidney failure undergoing hemodialysis. This is a quantitative study with a descriptive correlational design using a cross-sectional design on 52 samples with purposive sampling. The study was conducted using the Beck Depression Inventory II questionnaire, Fatigue Severity Scale, Pittsburgh Sleep Quality Index, and data were tested using Kendall's Tau b and c tests and Ordinal Logistic Regression. The study found that 46.2% of CKD patients experienced severe depression. Depression was more prevalent among CKD patients aged 41–55 years (40.0%), females (61.5%), married individuals (65.4%), those with a high school education (40.4%), those who had undergone hemodialysis for 13–36 months (44.2%), respondents with poor sleep patterns (55.8%), and those with comorbid conditions (hypertension) (34.6%). The results of Kendall's tau analysis showed that factors associated with depression include age, gender (p=0.001), marital status (p=0.001), duration of hemodialysis (p=0.016), education (p=0.001), sleep patterns (p=0.001), fatigue (p=0.001), and comorbidities (p=0.001), while age did not show a significant association (p=0.057). Among the factors analyzed using the partial test, no single factor was dominant in influencing depression levels in CKD HD patients. The odds ratio for education was the highest, with a value of 603,801.0287. Clinically, the odds ratio results indicate that education is the dominant factor, with a 60-fold influence on depression in CKD HD patients.

Keywords

Depression, Chronic Kidney Disease, Hemodialysis

INTRODUCTION

Chronic kidney disease (CKD) is one of the diseases that increase disease and death rates from non-communicable diseases worldwide (Muzaenah et al., 2022;Kovesdy, 2022). According to the Global Burden of Disease Study (GBDS) (2017), CKD ranks as the 12th leading cause of death. The disease directly causes approximately 1.23 million deaths, with an additional 1.36 million deaths associated with cardiovascular disease due to decreased kidney function (Institute for Health Metrics and Evaluation, 2020). CKD requires long-term treatment and renal replacement therapy, such as hemodialysis (HD), peritoneal dialysis, or transplantation (Costantinides et al., 2018). The most common therapy for CKD is hemodialysis, HD is a procedure by removing blood from the patient's body and then circulating it in a machine called a dialyzer that is outside the patient's body. According to data from the Indonesian Renal Registry (IRR) (2019) the prevalence of CKD patients undergoing hemodialysis in 2018 was 66,433 new patients and 135,486 active patients, while in 2019 there were 69,124 new patients and 185,901 active patients. This shows an increase in new patients and active patients in 2019. According to the results of the Indonesian Health Survey (IHS) the prevalence of patients (Munira et al., 2023) diagnosed with chronic kidney failure in Indonesia was 638,178 patients out of 877,531 people surveyed, where in Central Java province there were 73,358 patients diagnosed with chronic kidney failure out of 88,180 surveyed (Munira et al., 2023).

End-stage renal disease affects various aspects of patients' lives and is considered one of the diseases with a significant impact on patients' physical condition, social status, and psychology (Qawaqzeh et al., 2023) One of the frequent psychological disorders in patients undergoing dialysis is depression, which is a common mental health problem in this group (Zegarow et al., 2020). Research conducted by Qawaqzeh et al. (2023) in Jordan on 230 respondents showed that 22 patients (9.6%) had mild depression, 81 patients (35.2%) had moderate depression, and 127 patients (55.2%) had severe depression. Furthermore, research conducted by Maulana et al. (2020) in the Hemodialysis room of RSUD Dr. Slamet Garut to 40 respondents revealed that 24 patients (60%) had severe depression, 12 patients (30%) had moderate depression, and 4 patients (10%) had mild depression. Research conducted by Mane (2023) at the Maumere Hemodialysis Unit, Sikka Regency, on 86 respondents showed that 52 patients (60%) had mild depression, 25 patients (29%) had moderate depression, and 9 patients (10%) had severe depression. Meanwhile, research conducted by Wakhid et al. (2018) in the Hemodialysis Unit of Semarang Regency Hospital on 85 respondents showed that 14 patients (16.5%) did not experience depression, 41 patients (48.2%) experienced moderate depression, and 30 patients (35.3%) experienced mild depression.

According to Maulana et al. (2020), factors that influence the level of depression in patients with chronic kidney disease include age (p-value = 0.000), education level (p-value = 0.000), gender (p-value = 0.003), duration of undergoing hemodialysis (p-value = 0.000), and sleep patterns (p-value = 0.000). The results of the study Musa et al. (2018) depression is influenced by marital status ($p < 0.20$), research Syafira et al. (2024) depression is influenced by fatigue (p- value <0.005), zafira, (2024) explained that depression is influenced by comorbid diseases DM (p value 1.000) and hypertension (0.692).

Based on previous research findings, it can be concluded that PGK patients undergoing HD experience mild to severe depression. From previous research findings, it was found that the factors causing depression in hemodialysis patients vary, prompting the author to conduct research by combining the factors related to depression, including age, gender, marital status, sleep, education, duration of hemodialysis, fatigue, and comorbidities. Additionally, the study aims to identify the dominant factors most influential in depression among patients with chronic kidney disease.

METHOD

The type of research used was quantitative and descriptive correlational with a cross-sectional analysis method on 52 respondents using purposive sampling techniques. The instruments used in this study were the Beck Depression Inventory (BDI), The Pittsburgh Sleep Quality Index (PSQI), and Fatigue Severity Scale (FSS) questionnaires, which had been tested for validity and reliability as follows: BDI validity test (range 0.369–0.739), reliability (Cronbach's alpha of 0.883 ≥ 0.361), PSQI validity test (range 0.394–0.623), reliability (Cronbach's alpha of 0.469) and FSS validity test (0.349), reliability (Cronbach's alpha >0.5) Bivariate analysis using Kendall's Tau b and c tests, multivariate analysis using ordinal logistic regression tests.

RESULTS

Table 4.1 Characteristics of Respondents Based on Age, Gender, Marital Status, Education, Length of Hemodialysis, Sleep Patterns, Fatigue, Cormobid Disease, and Level of Depression in CKD patients at Gondo Suwarno Ungaran Hospital (n=52)

Respondent characteristics		Frequency	Percentage (%)
Age	18-25 years	2	3,8
	26-40 years	12	23,1
	41-55 years	21	40,0
	56-64 years	16	30,8
	>65 years	1	1,9
Gender	Male	20	38,5
	Female	32	61,5
Marital status	Not married	3	5,8
	Marry	34	65,4
	Widow	14	26,9
	widower	1	1,9
Education	Not in school	0	0
	Elementary school	5	9,6
	Middle school	13	25,0
	High school	21	40,0
	College	13	25,0
Length of hemodialysis	≤12 months	18	34,6
	13-36 months	23	44,2
	>36 months	11	21,2
Sleep patterns	Good sleep patterns	23	44,2
	Poor sleep patterns	29	55,8
fatigue	No fatigue	30	57,7
	Experiencing fatigue	22	42,3
Comorbid disease	None	7	13,5
	hypertension	18	34,6
	Diabetes mellitus	16	30,8
	Urinary tract infection	11	21,2
	Total	**52**	**100**

Based on table 4.1, it is known that CKD patient respondents in the hemodialysis room of RSUD dr. Gondo Suwarno Ungaran are in the age range of 41-55 years with a frequency of 21 (40.4%) respondents, the majority of CKD patient respondents are female with a frequency of 32 (61.5%) respondents. Respondents of CKD patients were married with a frequency of 34 (65.4%) respondents. CKD patients have high school education with a frequency of 21 (40.4%) respondents. CKD respondents who have undergone hemodialysis for 13-36 months with a frequency of 23 (44.2%) respondents. Respondents had poor sleep patterns with a frequency of 29 (55.8%). CKD patients who do not experience fatigue with a frequency of 30 (57.7%) respondents. Respondents with comorbid hypertension amounted to 18 (34.6%) respondents.

Table 4.2 Respondents' Depression Level in CKD patients at RSUD Gondo Suwarno Ungaran (n=52)

Depression level	Frequency	Percentage (%)
Not depressed	17	32,7
Mild depression	2	3,8
Moderate depression	9	17,3
Severe depression	24	46,2
Total	52	100

Based on table 4.2, it is known that the respondents of CKD patients in the hemodialysis room of RSUD dr. Gondo Suwarno Ungaran experienced severe depression with a frequency of 24 (46.2%) respondents, who were not depressed 17 (32.7%) respondents.

Table 4.3 Test Results of Bivariate Analysis of Factors Associated with Depression Level in CKD Patients in the Hemodialysis Room at Gondo Suwarno Ungaran Hospital (n=52)

No	Independent variable	Dependent variable	Correlation coefficient	p-value	Correlation direction
1.	Age	Depression	0,198	0,057	+ (positive)
2.	Gender	Depression	0,510	<0,001	+ (positive)
3.	Education	Depression	-0,367	<0,001	-(negative)
4.	Duration of hemodialysis	Depression	0,273	0,016	+ (positive)
5.	Sleep patterns	Depression	0,908	<0,001	+ (positive)
6.	Fatigue	Depression	0,765	<0,001	+ (positive)
7.	Marital status	Depression	0,366	<0,001	+ (positive)
8.	Comorbid disease	Depression	0,677	<0,001	+ (positive)

Based on the results of the bivariate analysis test in table 4.3, it can be seen

Age shows no significant correlation with the level of depression, where the *p- value* = 0.057 which indicates that age is not related to the level of depression, the value of the Kendall's Tau coefficient (τ) = 0.198 so that the relationship between age and the level of depression is very weak and with the direction of correlation + (positive) called a unidirectional relationship which means that the younger the patient's age, the higher the level of depression.

Gender shows that there is a significant correlation with the level of depression, where the p-value = 0.001 which indicate that gender is related to the level of depression, the value of the Kendall's Tau coefficient (τ) = 0.510 so that gender has a strong relationship with the level of depression and with the direction of correlation + (positive) called a unidirectional relationship which means that gender is related to the level of depression, with the potential for depression being higher in the female gender.

Marital status shows there is a significant correlation with the level of depression, where the p-value = 0.001 which indicates that gender is related to the level of depression, the value of the Kendall's Tau coefficient (τ) = 0.366 so that the relationship between marital status and the level of depression is sufficient and with the direction of correlation + (positive) called a unidirectional relationship which means that patients who are married tend to experience higher depression than those who are not married or widowed or widowed.

Education shows that there is a relationship between gender and depression level which is proven to be significant, with a p value of 0.001 which indicates that education is related to the level of depression, the Kendall's Tau coefficient value (τ) = -0.367 so that the relationship between education and depression level is sufficient and with the direction of correlation - (negative) called a meaningful opposite direction relationship, which indicates that the higher the patient's education level, the lower the level of depression experienced.

The length of hemodialysis shows that there is a relationship between the length of hemodialysis and the level of depression which is proven to be significant, with a p value of 0.016 which indicates that the length of hemodialysis is related to the level of depression, the value of the Kendall's Tau coefficient (τ) = -0.273 so that the relationship between the length of hemodialysis and the level of depression is very weak and with the direction of correlation + (positive) called the opposite direction relationship which means that the longer the patient undergoes hemodialysis, the higher the level of depression felt.

Sleep patterns show that there is a relationship between sleep patterns and depression levels, with a p value of 0.001 which indicates that sleep patterns are related to depression levels, the Kendall's Tau coefficient value (τ) = 0.908 so that the relationship between sleep patterns and depression levels is very strong and with a correlation direction + (positive) called a unidirectional relationship which means that patients with poor sleep patterns tend to experience higher levels of depression.

Fatigue shows that there is a relationship between fatigue and depression level proved significant, with a p value of 0.001 which indicates that fatigue is associated with depression level, Kendall's Tau coefficient value (τ) = 0.765 so that the relationship between fatigue and depression level is very strong and with the direction of correlation + (positive) called unidirectional relationship which means that

fatigue plays a major role in increasing the patient's depression level.

Comorbid diseases show that there is a significant correlation with the level of depression, where the p-value = 0.001 which indicates that comorbid diseases are related to the level of depression, the value of the Kendall's Tau coefficient (τ) = 0.677 so that the relationship between fatigue and the level of depression is strong and with the direction of correlation + (positive) called a unidirectional relationship which means that patients suffering from comorbid diseases such as hypertension or diabetes mellitus tend to experience higher depression.

Table 4.4 Partial Test Results

	Step	B	p-value	Results
1	Not depressed	-40,267	0,871	Not significant
	Mild depressed	-38,962	0,875	Not significant
	Moderate depressed	-16,005	0,945	Not significant
	Male	-0,867	0,526	Not significant
	Female	0[a]		
	Not married	5,277	0,981	Not significant
	Marry	11,998	0,956	Not significant
	Widow	2,112	0,992	Not significant
	Widower	0[a]		Not significant
	Elementary school	13,311	0,685	Not significant
	Middle school	12,879	0,695	Not significant
	High school	1,885	0,319	Not significant
	College	0[a]		
	≤12 months	-10,820	0,741	Not significant
	13-36 months	1,237	0,431	Not significant
	>36 months	0[a]		Not significant
	Good sleep patterns	-11,997	0,715	Not significant
	Poor sleep patterns	0[a]		
	No fatigue	-12,316	0,708	Not significant
	Experiencing fatigue	0[a]		Not significant
	No comorbidities	-18,545	0,841	Not significant
	Hypertension	-31,195	0,774	Not significant
	Diabetes mellitus	-17,969	0,846	
	Urinary tract infection	0[a]		

Based on the results in the partial test table statistically shows that none of the eight variables significantly affect the level of depression in HD CKD patients because the p-value > α (0.05).

The coefficient value of the gender variable is -0.867, which when exponentiated by Exp (-0.867), the oods ratio value is 0.42021, meaning that men have a lower tendency to experience depression.

The coefficient value of the marriage variable is 5.277, which when exponentiated by Exp (5.277), the oods ratio value is 195.78164, meaning that if you are not married, you have a lower tendency to experience depression.

The coefficient value of the Education variable is 13.311, which when exponentiated by Exp (13.311), the oods ratio value is 603801.0287, meaning that if you do not go to school, you have a higher tendency to experience depression

The coefficient value of the variable length of hemodialysis is 10.820, which when exponentiated Exp (10.820) obtained an oods ratio value of 1.99956, meaning that if the length of hemodialysis ≤12 months has a lower tendency to experience depression.

The coefficient value of the sleep pattern variable is -11.977, which is good when exponentiated Exp (-11.977), the oods ratio value is 6.16267, meaning that if the sleep pattern is good, there is a lower tendency to experience depression.

The coefficient value of the fatigue variable is obtained at -12.316 which, when exponentiated Exp (-12.316), gets an oods ratio value of 4.4795, meaning that if you experience fatigue, you have a tendency to experience higher depression.

The coefficient value of the comorbid disease variable is -18.545, which

when exponentiated by Exp (-18.545), the oods ratio value is 8.83098, meaning that if you have comorbid disease (hypertension) you have a higher tendency to experience depression.

DISCUSSION

Relationship between Gender and Depression in CKD Patients

Based on gender, the majority of CKD patient respondents in the hemodialysis room at RSUD Dr. Gondo Suwarno Ungaran were female, with a frequency of 32 (61.5%) respondents. The results of the bivariate analysis test using the Kendalls Tau B and C test showed that gender had a significant positive correlation with the level of depression (Kendall's Tau (τ) = 0.510, p-value = <0.001), which indicates that gender can be related to the level of depression, with a higher potential for depression in the female gender. The results of the study are in line with research conducted by Riskal and Annisa, (2020) with the highest incidence in the female gender (56.8%). Based on the results of research by Anita and Husada, (2020) it was found that the relationship was equally significant between the level of depression and gender with a p-value = 0.013. However, unlike the findings of Maulana et al. (2020), the level of depression in this study appears to be higher in men than in women, possibly because the sample size was dominated by men.

The results of this study reveal that the incidence of depression in women is higher than in men. Several factors underlie this difference, namely biological factors and differences in emotion control mechanisms. Biologically, women show higher genetic vulnerability and experience significant fluctuations in hormone levels. In addition, the emotion control mechanism in women emphasizes stress hormones, namely corticotropin releasing factor (CRF), which has a higher affinity for stress proteins in brain cells, making them more sensitive; whereas the male brain can reduce stress protein levels to reduce binding with CRF hormones.

From the results of this study and previous research, it can be concluded that the majority of chronic kidney disease patients who undergo hemodialysis and experience depression are female. This condition is influenced by the effect of CRF hormone that increases the risk of anxiety and depression.

Relationship between Marital Status and Depression in CKD Patients

Based on marital status, the majority of respondents of CKD patients in the hemodialysis room of Dr. Gondo Suwarno Ungaran Hospital were married, with a frequency of 34 respondents (65.4%). The results of the bivariate analysis test using the Kendalls Tau B test showed that marital status has a significant positive relationship with the level of depression in CKD patients undergoing hemodialysis (Kendall's Tau (τ) = 0.366, p-value = <0.001), which indicates that married patients tend to experience higher depression than those who are unmarried or widowed. These results are in line with the research of Riyadi et al. (2023) where the distribution of married respondents was 53 (88.3%) respondents and there was a significant relationship between marital status and depression with a p-value = 0.000.

Research by Hawamdeh et al. (2017) shows that marital status has a significant relationship with the incidence of depression, where patients who are married more often experience depression compared to those who are not married. A disharmonious marriage can trigger symptoms of depression and anxiety. In addition, chronic diseases such as chronic renal failure (CKD) have the potential to cause tension in marital roles, especially in terms of division of duties and responsibilities. The patient's inability to work due to their health condition can change the dynamics of the husband-wife relationship.

From the results of this and previous studies, it can be concluded that disharmonious marriages can trigger symptoms of depression and anxiety to emerge as clinical responses.

Relationship between Education and Depression in CKD Patients

Based on education, the majority of CKD patient respondents in the hemodialysis room at RSUD Dr. Gondo Suwarno Ungaran had a high school education, with a frequency of 21 respondents (40.4%). The results of the bivariate analysis test using the Kendalls Tau C test showed that education has a significant negative correlation with the level of depression (Kendall's Tau (τ) = -0.367, p- value = <0.001), which indicates that the higher the patient's education level, the lower the level of depression experienced. This study is in line with the results of research from Mane, (2023) research results, obtained data that the most respondents had a high school education level as many as 19 respondents (22%). In research from Sisy Rizkia, (2020) showed a significant relationship between education level and depression, with a p value of 0.005.

Patients who have a high level of formal education show a deeper understanding of the disease and dialysis procedures. Such patients tend to be more adherent to dialysis therapy, adopt a recommended diet, and use medications as directed, which positively affects their physical and mental health. Education level is closely linked to literacy, which impacts on overall health and well-being. Previous studies have revealed that low educational attainment and literacy limitations significantly predict limited knowledge and suboptimal symptom control. Literacy plays a mediating role in the relationship between education and knowledge, so both factors have significant potential to influence health outcomes (Wang et al., 2019).

From this and previous studies, it can be concluded that patients with CKD HD who experience depression are due to the fact that patients with higher levels of education usually have better knowledge about their health conditions, so they are better able to manage their illness.

Relationship between Duration of hemodialysis and Depression in CKD Patients

Based on the length of hemodialysis, the majority of CKD patient respondents in the hemodialysis room at RSUD dr. Gondo Suwarno Ungaran had undergone hemodialysis for 13-36 months (44.2%). The results of the bivariate analysis test using the Kendalls Tau C test showed that the length of hemodialysis showed a positive relationship with the level of depression in CKD patients undergoing hemodialysis, with a Kendall's Tau value (τ) = 0.273 and p-value = 0.016, which means that the longer the patient undergoes hemodialysis, the higher the level of depression felt. The results of this study were supported by (Joses et al., 2020) with the results of the study the majority of respondents underwent hemodialysis for more than 12 months as many as 41 (66.1%). The length of time hemodialysis affects the level of depression in patients, as evidenced by research conducted by (Deswima et al., 2021) stating that there is a significant relationship between length of HD with depression with a p-value = 0.005.

Research conducted by Maulana et al. (2020) shows that patients who have undergone hemodialysis for a long period of time tend to experience higher levels of depression. This condition is caused by hemodialysis therapy that is carried out 2 to 3 times a week, which can affect the physical and psychological aspects of the patient. Dependence on this therapy often leads to fear and anxiety about the future, as patients feel they have to undergo this medical procedure for life.

In patients with chronic renal failure, the long duration of hemodialysis significantly affects their psychological state. Feelings of fear are one of the most common forms of emotional expression expressed by patients, especially related to uncertainty about the future and feelings of anger towards the conditions they experience (Baeti and Heni Maryati, 2016).

From this and previous studies, it can be concluded that patients with CKD HD who experience depression tend to feel fear because patients depend on hemodialysis medical procedures for a long time, giving rise to emotional feelings that result in depression.

Relationship between Sleep Patterns and Depression in CKD Patients

Based on sleep patterns, the majority of CKD patient respondents in the

hemodialysis room of Dr. Gondo Suwarno Ungaran Hospital have poor sleep patterns (55.8%), The results of the bivariate analysis test using the Kendalls Tau C test show that sleep patterns also have a very strong positive correlation with the level of depression in CKD patients undergoing hemodialysis (Kendall's Tau (τ) = 0.908, p-value = <0.001), which indicates that patients with poor sleep patterns tend to experience higher levels of depression. These results are in line with the research of Dewi and Hendrati, (2022) respondents with poor sleep patterns as many as 41 (68.3%) respondents and the results of the analysis of the relationship between sleep patterns and depression showed a relationship with a p-value = 0.006.

According to research Al Naamani et al., (2021) and Wulansari and Chatarina, (2020) that sleep disturbances are closely related to the level of depression in patients with chronic diseases, including kidney failure, poor sleep patterns which are often accompanied by insomnia or intermittent sleep, can exacerbate symptoms of depression and cause more severe physical and mental fatigue.

From this and previous studies, it can be concluded that CKD HD patients who experience depression are mostly accompanied by poor sleep patterns, because sleep disorders in CKD HD patients accompanied by insomnia cause physical fatigue and can worsen the patient's psychological condition.

Relationship between Fatigue and Depression in CKD Patients

Based on the level of fatigue, the majority of CKD patient respondents in the hemodialysis room of Dr. Gondo Suwarno Ungaran Hospital did not experience fatigue 30 (57.7%) respondents. The results of the bivariate analysis test using the Kendalls Tau C test showed that fatigue showed a significant positive correlation with the level of depression in CKD patients undergoing hemodialysis (Kendall's Tau (τ) = 0.765, p-value = <0.001), which indicates that fatigue plays a major role in increasing the level of patient depression. However, the results of this study with previous results obtained different results where in the research of Syafira et al., (2024) showed that 65.1% of hemodialysis patients experienced fatigue, especially in the first six to eight months, which was associated with uremia and uremic neuropathy that caused peripheral fatigue. However, there was a significant association p-value = 0.000 between fatigue and depression in CKD HD patients in the study (Syafira et al., .2024).

According to Supriyadi et al., (2021) low hemoglobin levels can exacerbate fatigue symptoms and cause more severe fatigue. This physical fatigue often hampers patients' ability to perform their bodily functions optimally, resulting in a significant impact on their obligations in family, work, and social life. Finally, this condition increases the risk of depression in hemodialysis patients.

From this and previous studies, it can be concluded that fatigue is a common side effect experienced by patients with chronic diseases as low hemoglobin levels can exacerbate fatigue symptoms resulting in a significant impact on their obligations in daily life.

Relationship between Comorbid Diseases and Depression in CKD Patients

Based on comorbidities, the majority of CKD patients in the hemodialysis room of Dr. Gondo Suwarno Ungaran Hospital had hypertension 18 (34.6%) respondents. The results of the bivariate analysis test using Kendalls Tau B test showed that comorbid diseases, such as hypertension, showed a very strong positive relationship with the level of depression in CKD patients undergoing hemodialysis (Kendall's Tau (τ) = 0.677, p-value = <0.001), which indicates that patients suffering from comorbid diseases tend to experience higher depression. The results of this study are in line with research Aditama, Kusumajaya, (2023) that CKD patients who have comorbid diseases amounted to 52 (59.8%) patients and the relationship between comorbid diseases and depression is significantly related, obtained p-value = 0.000.

Hypertension is a comorbid disease that can exacerbate kidney damage by increasing intraglomerular pressure. This increase in pressure triggers structural and

functional disturbances in the renal glomerulus. High intravascular pressure flows into the glomerulus, causing constriction of afferent arteries as well as damage to renal blood vessels, which ultimately disrupts the renal filtration process (Artiany & Aji, 2021). This uncontrolled hypertension, in addition to worsening kidney function, also increases the risk of cardiovascular disease, which can lead to increased anxiety and stress in patients, contributing to the onset of depression. The incidence of high blood pressure in can be caused by depression (Agustiningsih, 2018)

From this and previous studies it can be concluded that HD CKD patients who experience depression are mostly accompanied by comorbid diseases (hypertension), comorbid diseases can worsen kidney damage by increasing intraglomerular pressure, thus triggering structural and functional disorders in the glomerulus.

Depression level of CKD HD patients

Based on the level of depression, the majority of respondents with Chronic Kidney Disease (CKD) in the hemodialysis room at RSUD Dr. Gondo Suwarno Ungaran experienced severe depression, with a frequency of 24 respondents (46.2%). The results of this study support the results of research showing that patients undergoing hemodialysis tend to experience mental disorders, especially depression, due to long- term dependence on therapy and major changes in their quality of life. Major depression in hemodialysis patients often results from various factors, such as physical stress, the body's inability to function normally, as well as psychosocial stress caused by dependence on the dialysis machine.

Multivariate Analysis

Based on the results of multivariate analysis conducted, the factors associated with the level of depression in CKD patients in the hemodialysis room of RSUD dr. Gondo Suwarno Ungaran are age, gender, marital status, education, length of hemodialysis, sleep patterns, fatigue, and comorbid diseases. Of all the factors analyzed by the partial test statistically showed that none of the eight variables significantly affected the level of depression in CKD HD patients because the p-value> α (0.05). However, clinically, the results of the oods ratio value show that the factor variable is education which has a 60-fold influence on depression in CKD HD patients, then the gender variable has 19-fold influence on depression in CKD HD patients, and the comorbid disease variable has 8-fold influence on depression in CKD HD patients, so it can be concluded from the results of the oods ratio value that the most dominant factor is the education factor. The level of education has an influence on the incidence of depression, as found in research by Musa et al., (2018) and (Semaan et al., 2018). Based on previous studies, the incidence of depression tends to be higher in individuals who have a secondary education level. In contrast, patients with higher education generally have more in-depth knowledge about their health condition and are therefore better able to manage their illness. In contrast, patients with low education levels may not have enough information about their illness, which in turn may worsen their mental state

CONCLUSIONS

Among all the factors analyzed using partial tests, there is no factor that is associated (dominant factor) with the level of depression in CKD HD patients. However, clinically, the results of the oods ratio value show that the factor variable is education has a 60-fold influence on depression in CKD HD patients, then the gender variable is 19 times the influence on depression in CKD HD patients, and the comorbid disease variable is 8 times the influence on depression in CKD HD patients, so it can be concluded from the results of the oods ratio value that the most dominant factor is the education factor.

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ORIGINAL RESEARCH

THE EFFECT OF DASH DIET EDUCATION USING THE PEER GROUP METHOD ON THE EATING PATTERNS OF DIABETES MELLITUS PATIENTS IN KALIBUNTU VILLAGE

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ABSTRACT

The management of diabetes mellitus (DM) includes diet management as an important component in maintaining blood sugar stability. The DASH diet helps maintain electrolyte balance and cardiovascular health through calcium, potassium, and magnesium intake. Dietary education using the peer group method is useful for sharing experiences, exchanging information, and providing and receiving emotional support.. This study aimed to determine the effect of DASH diet education using the peer group method on the eating patterns of Diabetes Mellitus (DM) patients. The research design was pre-experimental with a one-group pretest-posttest approach. The study population consisted of 40 respondents, with a total sampling technique, and the data were analyzed using the Wilcoxon Sign Rank Test. After receiving DASH diet education, most patients had good eating patterns. The study results showed that DASH diet education using the peer group method had an effect on the eating patterns of Diabetes Mellitus patients. Based on the study findings, it was expected that community nurses could use DASH diet education interventions to improve blood sugar levels, lipid profiles, and blood pressure in diabetes mellitus patients.

Keywords

Diabetes Mellitus, Eating Patterns, Education, DASH Diet

INTRODUCTION

Diabetes mellitus (DM) remains one of the main focuses of national research in the category of degenerative diseases, following cardiovascular, cerebrovascular, and geriatric diseases. The WHO estimates that by 2030, the number of DM patients will reach 300 million worldwide. This disease is chronic and characterized by an increase in blood sugar levels. The management of DM can be carried out through four main pillars: health education, dietary regulation,

physical activity, and the use of antidiabetic medications. Regular health monitoring, especially blood sugar level checks, plays a crucial role in the successful implementation of these four pillars (Anugerah, 2020; Oktaviana et al., 2024).

In the management of diabetes mellitus (DM), one of the essential components in maintaining blood sugar stability is diet management. The DASH diet was initially designed to lower blood pressure but has also been effective in controlling diabetes mellitus (DM) and other chronic diseases (Dwika & Kusuma, 2022). This dietary pattern emphasizes the consumption of fruits, vegetables, low-fat dairy products, whole grains, and lean proteins while limiting salt, added sugars, and saturated fats. This diet helps maintain electrolyte balance and cardiovascular health through the intake of calcium, potassium, and magnesium (Dwika & Kusuma, 2022; Rajpal & Ismail-Beigi, 2020).

The prevalence of Diabetes Mellitus patients in Kalibuntu Village has been increasing year by year. According to data from the local community health center, more than 10% of the adult population in the village has been diagnosed with diabetes. This fact is a major concern, considering the complications that DM can cause, such as cardiovascular disease, kidney failure, neuropathy, and even blindness (Mediarti et al., 2020; Praythiesh Bruce & Vasantha Mallika, 2019).

Health education is one of the ways to prevent complications by increasing patients' understanding of Diabetes Mellitus (DM) management. This includes adherence to dietary patterns and encourages patients' independence in managing their health and performing self-care (Oktaviana et al., 2024).

Several factors influence patients' eating patterns as part of Diabetes Mellitus management, including knowledge and understanding of dietary guidelines, interaction with healthcare professionals in diet planning, self-confidence, personality, attitude, and support from family and peers with similar conditions (Khasanah et al., 2021; Kshanti et al., 2019; Simbolon et al., 2019). Providing information through education delivered by peers in a group setting fosters a sense of togetherness, which correlates with the patient's psychological well-being (Guntur Alfianto et al., 2022; Roberts et al., 2017).

The peer group is a community for Diabetes Mellitus (DM) patients to share experiences, exchange information, and provide and receive emotional support (Fatmawati & Wahyudi, 2021; Rahmadina et al., 2022). Through this forum, they can openly discuss their challenges and experiences. Education from peers helps improve patients' understanding of DM management instructions and provides additional motivation through the support given. This study presents a novelty in the application of the peer group method in DASH diet education for patients with diabetes mellitus in rural areas, particularly in Kalibuntu Village, which has rarely been studied. It is expected to provide a more contextual, participatory, and effective educational approach to improving dietary patterns. This study aims to determine the effect of DASH diet education using the peer group method on the eating patterns of Diabetes Mellitus (DM) patients.

METHOD

This study used a pre-experimental design with a one-group pretest-posttest approach. The independent variable in this study was DASH diet education using the peer group method, while the dependent variable was the eating patterns of Diabetes Mellitus patients. The study population consisted of 40 respondents, with a total

sampling technique, and the data were analyzed using the Wilcoxon Sign Rank Test. The authors have obtained ethical approval with number 678/KEPK-UNHASA/VIII/2025, and the results will be presented based on the research conducted on patients with Diabetes Mellitus.

RESULTS

Table 1. Respondents' Characteristics Based on Age, Gender, Education, Occupation, and Duration of Diabetes Mellitus (n = 40)

Variable	Frequency	Precentage (%)
Age		
40-45 years	7	17,5
46-50 years	20	50
>51 years	13	32,5
Gender		
Male	25	62,5
Female	15	37,5
Education		
Low education	5	12,5
Middle education	30	75
Higher education	5	12,5
Occupation		
Unemployed	6	15
Civil servant (ASN)	4	10
Entrepreneur	20	50
Retired	10	25
Duration of having DM		
>1 years	30	75
>2 years	10	25

Based on Table 1 above, the results showed that most respondents were aged between 46-50 years (50%), male (62.5%), had a middle education level (junior/senior high school) (75%), worked as entrepreneurs (50%), and had been suffering from diabetes mellitus for more than one year.

Table 2. Analysis of Diabetes Mellitus Patients' Eating Patterns Before and After DASH Diet Education

Pola Makan	f	%	Mean	SD	P value
Before Intervention					
Good	8	20	1,35	0,25	0,001
Poor	32	80			
After Intervention					
Good	34	85	2,25	0,45	
Poor	6	15			

Based on Table 2 above, the results showed that most patients had poor eating patterns (80%) before receiving DASH diet education. However, after receiving DASH diet education, the majority of patients had good eating patterns (85%). The Wilcoxon Sign Rank Test results showed a p-value of 0.001 < 0.005, indicating that DASH diet education using the peer group method had an effect on the eating patterns of Diabetes Mellitus patients.

DISCUSSION

Before receiving the DASH diet education intervention using the peer group method, most respondents had poor eating patterns. According to behavioral change theory, an action such as eating patterns will be established when individuals understand and comprehend the behavior. This indicates that knowledge has a strong correlation with the success of behavioral change. In relation to the general data in this study, the majority of respondents (75%) had a middle education level. This condition influenced their critical thinking skills, understanding of received information, and access to information through mass media and social media related to eating patterns in Diabetes Mellitus patients (Ardiani et al., 2021; Yudhistina et al., 2021). Therefore, before the intervention was given, respondents' eating patterns were categorized as poor (Mediarti et al., 2020; Sahwa & Supriyanti, 2023).

The lack of information received by Diabetes Mellitus (DM) patients regarding the DASH diet remains one of the challenges in following the diet correctly and consistently. This is in line with the study by Arini et al. (2020), which stated that there is a significant correlation between respondents' level of knowledge and their eating patterns in adhering to the established DM diet program (Raden Vina Iskandya Putri1, 2023). Non-compliance with dietary patterns among DM patients is also related to a lack of support, both in terms of information and social support from peers who can listen to their concerns and help overcome challenges in following the diet (Ma et al., 2022; Mediarti et al., 2020; Qodir, 2022). Research conducted by Sugiharto (2020) also revealed that informational support from healthcare professionals and social support from friends or family are crucial strategies in improving dietary adherence as a treatment approach. Therefore, DASH diet education involving fellow diabetes patients (peer group method) is needed to support the success of the diet and treatment (Hendra et al., 2022).

After receiving the DASH diet education intervention using the peer group method, the eating patterns of the majority of respondents improved. Most respondents who received peer group education, previously trained by the researcher, were able to manage their eating patterns with the DASH diet more effectively. They adhered better to the types and amounts of food consumed, ensuring a high intake of fruits, vegetables, low-fat dairy products, whole grains, and lean proteins while reducing salt, added sugars, and saturated fats as recommended. The results of this study showed an improvement in eating patterns after the intervention. Statistically, DASH diet education using the peer group method was proven to have an impact on the eating patterns of Diabetes Mellitus (DM) patients (Ardiani et al., 2021; Qodir, 2022). These findings align with the study by Ilkafah (2011), which demonstrated that the DASH diet education intervention using the peer group method could improve the eating patterns of DM patients. This indicates that individuals who receive education from their peer group tend to have higher self-confidence in managing DM through independent dietary regulation (Oktaviana et al., 2024).

A person's behavior is influenced by intention and motivation, which are obtained through support from peers (peer groups), including informational and social support (Sahwa & Supriyanti, 2023). Changes in respondents' behavior regarding their eating patterns resulted from the education provided about the DASH diet, which is recommended for Diabetes Mellitus (DM) patients, as well as the exchange of experiences among respondents regarding challenges and strategies for maintaining

diet discipline. Additionally, the peer group education method allows individuals to provide mutual support and reinforcement, further increasing their motivation to adhere to the diet. This study applied the Health Promotion Model with the peer group method to strengthen the motivation of patients with diabetes mellitus in adopting the DASH diet. Most previous studies were conducted in urban areas using conventional education, so the effectiveness of peer groups in rural settings had been rarely explored. The findings of this study showed that peer group–based DASH diet education was effective in changing the dietary patterns of patients in Kalibuntu Village in a participatory and sustainable manner. As a result, they can better control blood sugar levels and reduce the risk of more severe DM complications (Ojo et al., 2022).

CONCLUSIONS

DASH diet education using the peer group method has an impact on the eating patterns of Diabetes Mellitus patients. This method can be used as a patient care approach for Diabetes Mellitus both in clinical and community settings. Community nurses are expected to implement DASH diet education interventions to help improve blood sugar levels, lipid profiles, and blood pressure in Diabetes Mellitus patients.

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