p-ISSN: 2338-5324
e-ISSN: 2442-7276

JKP

JURNAL KEPERAWATAN PADJADJARAN

OPEN ACCESS

p-ISSN : 2338-5324 e-ISSN: 2442-7276

Jurnal Keperawatan Padjadjaran

Volume 11 Issue 3: December 2023

OPEN ACCESS

Jurnal Keperawatan Padjadjaran Volume 11 Issue 3
E-ISSN: 2442-7276; P-ISSN: 2338-5324
http://jkp.fkep.unpad.ac.id

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p-ISSN : 2338-5324 e-ISSN: 2442-7276
Jurnal Keperawatan Padjadjaran

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p-ISSN : 2338-5324 e-ISSN: 2442-7276

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p-ISSN : 2338-5324 e-ISSN: 2442-7276

Jurnal Keperawatan Padjadjaran

JKP

Research Article
Volume 11 Issue 3
https://doi.org/10.24198/jkp.v11i3

Roles of clinical faculty in promoting the practice of patient safety by nursing students

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Abstract

Patient safety is a major concern in nursing and healthcare delivery. It is related to the quality of care and is the responsibility for all healthcare professionals. As the users of healthcare services for educational purposes, nursing faculty and nursing students practicing in the hospital carry the responsibility of their practice for the sake of patient safety. While patient safety has been taught in nursing school, it is important to ensure that this topic is well practiced by nursing students in their clinical practicum. The nursing faculty plays an important role in this regard. This editorial proposes the roles of clinical faculty in promoting the practice of patient safety by nursing students through various teaching modalities. By understanding and implementing the roles, clinical faculty is expected to ensure that nursing students are able to promote patient safety during their clinical practice.

Keywords: clinical faculty role; clinical practice; nursing students; patient safety

A patient safety is a top priority in healthcare delivery with the responsibility to maintain patient safety weighted to all healthcare professionals. Due to 24-hour patient care, nurses are vital to ensuring patient safety. Hence, nursing education plays a key role in preparing nursing students to possess essential competences to ensure the security of their practice for the sake of patient safety.

Although topics regarding patient safety have been taught in nursing schools, patient safety incidents and adverse events have been reported among nursing students (Bickel et al., 2020; Noviyanti et al., 2018; Stolic et al., 2022). It was found that nursing students commit 6-1.1% of medical errors in their clinical placement, such as errors in medical calculation, administering wrong medication, omission of medical administration, and incorrect patients' name (Stolic et al., 2022). Moreover, about 94.2% of error types committed by nursing students was associated with medication administration (Bickel et al., 2020). An interesting piece of evidence is that the incidence of errors committed by nursing students often occur in the absence of a clinical instructor (Noviyanti et al., 2018). This calls attention to reconsidering teaching-learning methods on patient safety in the undergraduate nursing curriculum. In this editorial, we propose roles for nursing faculty staff in promoting nursing students' patient safety competencies.

First, nursing faculty staff can enhance their students' patient safety competence through applying innovative teaching and learning approach. Students should undergo clinical simulation in a nursing laboratory before their clinical placement to confirm that they possess adequate skills before their clinical placement. Simulation-based education can help to improve students' confidence regarding patient safety (Brown et al., 2020). In addition, it is highly recommended to arrange the nursing laboratory to be somehow near to a real-life setting with the necessary equipment and supplies in order to facilitate students to confidently perform correct nursing procedures in the actual setting (Relloso et al., 2021).

Secondly, nursing faculty staff should create a psychologically safe

OPEN ACCESS

Jurnal Keperawatan Padjadjaran (JKP)

Volume 11(3), 167-168

http://dx.doi.org/10.24198/jkp.v11i3.2355

Article Info

Received : August 11, 2023
Revised : Sept 04, 2023
Accepted : Sept 07, 2023
Published : December 01, 2023

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Citation

Betriana, F., & Nilmanat, K. (2023). Role of clinical faculty in promoting the practice of patient safety by nursing students. *Jurnal Keperawatan Padjadjaran, 11*(3), 167-168. http://dx.doi.org/10.24198/jkp.v11i3.2355

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

learning environment during clinical supervision. This empowers students to express concerns, present ideas for improvements, or raise issues to protect patient safety (Hardie et al., 2022).

Thirdly, nursing faculty staff need to provide a standardized checklist for nursing procedures that are practiced by students in both the nursing laboratory and hospital. A well-designed standardized checklist that includes information on what, when, how, and by whom interventions are performed contributes to reducing errors in routine and emergency (Relloso et al., 2021).

Fourthly, interprofessional education on patient safety should be developed. As teamwork is an essential component of patient safety competence, the nursing faculty should encourage nursing students to be part of a patient-care team and work collaboratively with the team. Consequently, students will be socialized and engaged in a patient safety culture.

In conclusion, ensuring patient safety is the responsibility of all personnel, not only hospital staff, but also users from educational institutions. Nursing faculty staff take key roles in promoting nursing students' patient safety competences by applying various teaching modalities. When students are able to ensure patient safety during their clinical practice, it is expected that they will continue promoting patient safety after they graduate and become a nurse.

Declaration of Interest
None to declare

Acknowledgment
None

Funding
None

Data Availability
Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.

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Self-Measure Office Blood Pressure (SMOBP) and Home Blood Pressure Monitoring (HBPM) for white coat effect diagnosis among hypertension patients

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Abstract

Background: Hypertension is a critical factor in the deaths over the world among those who have cardiovascular diseases such as coronary artery disease, stroke, and chronic kidney disease.
Purpose: This study aims to investigate the diagnosis capability of the white coat effect in hypertensive patients whose blood pressure was not on target.
Methods: This study is an analytical study. Data were collected from 19 uncontrolled hypertension patients at Bang Si Thong health promoting hospital from August to December 2022. The geographic data are presented in the descriptive statistic terms of mean, difference, and standard deviation. The research outcome was analyzed by paired t-test.
Results: The research results showed blood pressure measurement by SMOBP was more valuable in terms of statistical significance than Daytime HBPM (134±8.21 vs 125.5±6.74 p<0.001), while it was statistically significantly lower than Office-measured (148.15±10.33 vs 134±8.21 p<0.001), and there were participants whose blood pressures were going as a targeted by SMOBP 55% and HBPM 80%.
Conclusion: Self-Measure Office Blood Pressure [SMOBP] can eliminate some of the white coat effect, but it could not be used instead of Home Blood Pressure Monitoring [HBPM] for the diagnosis of white coat hypertension. The SMOBP might be a choice for patients who have the white coat effect in socioeconomically disadvantaged areas.

Keywords: home blood pressure monitoring, self-measure office blood pressure, white coat effect, white coat hypertension

Jurnal Keperawatan Padjadjaran (JKP)

Volume 11(3), 169-175

http://dx.doi.org/10.24198/jkp.v11i3.2343

Article Info

Received : August 02, 2023
Revised : September 09, 2023
Accepted : September 14, 2023
Published : December 01, 2023

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Citation

Burimsittichai, P., Bosittiphichet, T., & Leesri, T. (2023). Self-Measure Office Blood Pressure (SMOBP) and Home Blood Pressure Monitoring (HBPM) for white coat effect diagnosis among hypertension patients. *Jurnal Keperawatan Padjadjaran, 11*(3), 169-175. http://dx.doi.org/10.24198/jkp.v11i3.2343

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

Introduction

Hypertension is a critical factor in the deaths of more than 8.5 million people all over the world who have cardiovascular diseases such as coronary artery disease, stroke, and chronic kidney disease (Zhou et al., 2021). The current situation in countries of high socioeconomic status is that the prevalence of controlled blood pressure patients has drastically decreased, while in low to moderate socioeconomic status countries, such as those in South Asia, East Asia, and Southeast Asia, it is found that there is higher prevalence (Zhou et al., 2021). The most common type of hypertension is isolated systolic hypertension (The SPRINT Research Group, 2015; Stanaway et al., 2018; Tsai et al., 2021). This systolic blood pressure is an important factor in predicting complications from high blood pressure (The SPRINT Research Group, 2015; Flint et al., 2016; Tsai et.al., 2021).

The prevalence of hypertensive patients in Thailand in 2021 according to the Ministry of Public Health database is 6,623,048 people out of the population of 65,083,814, which equals 10.17% (Health Data Center, 2021). The major problem with hypertension treatment in Thailand has to do with the number of patients who cannot control their high blood pressure, which totals

2.5 million people, or 37.74% of the hypertensive patients in the country (Sukonthasarn et al., 2019). The patients cannot control their blood pressure well for many reasons, such as lack of awareness of how important it is to know about this disease, as well as non-adherence. Another important reason is the white coat effect which is found in 30% of hypertension patients (Ramli, Halmey and Teng, 2008).

The white coat effect is a status where blood pressure is higher than normal, but only when the patients come to the healthcare office, after which it will return to normal. This occurred in 15% to 30% of subjects with an elevated office blood pressure (O'Brien et.al, 2000; 2013). The important predictor for white coat effect was perceived level of stress (MacDonald et al., 1999; Bolade Dele-Ojo et al., 2019). This leads to blood pressure interpretations that are false positives. A recent study found that the protocol might come from a mind factor between the patients and medical personnel during blood pressure measurement (Pickering, Gerin and Schwartz, 2002). The process used to diagnose the white coat effect was home blood pressure monitoring (HBPM) for 3–7 days (8) or 24hr ambulatory blood pressure monitoring (ABPM) (Unger et al., 2020). However, due to the socioeconomic status of some patients, they could not afford to buy a sphygmomanometer to be used at home so if they have not received a diagnosis they will receive the medicine according to need and there may be more side effects of antihypertensive drugs, and it did not worth the health economics (Salazar et al., 2018). As the retrospective study found, blood pressure measurements taken in healthcare offices without any medical controller by automated office blood pressure (AOBP) of BpTRU ® (an automatic blood pressure monitor and average calculation) can eliminate the white coat effect and blood pressures were not different from blood pressure measurements by 24-hour ambulatory blood pressure monitoring (Myers et al., 2012).

In the primary care context of the Sub District Health Promoting Hospital in Thailand, which serves a population group of lower socioeconomic status, some of the patients do not have blood pressure monitors at home and they would not receive any diagnosis of white coat effect. So, if the patients can do blood pressure measurements by themselves when they do not have any appointments at the hospital and do not have any healthcare providers to observe by using the BpTRU ®, they will eliminate the white coat effect, but there is limited information on this blood pressure. Thus, there is a question whether self-blood pressure measurement or self–measured office blood pressure (SMOBP) can help diagnose the white coat effect in hypertension patients.

Research Objectives

To compare the difference in SBP mean between SMOBP and Daytime HBPM

To search for the capability of HBPM to diagnose white coat effect

Materials and Methods

Design

This study is an analytical study.

Sample and setting

The target population was hypertension patients who took medical care at Bang Si Thong Sub District Health Promoting Hospital. The sample determination used SBP mean and SMOBP standard deviation compared with HBPM. Data were collected from 17 populations in the pilot study, and were replaced according to a formula of two dependent means comparison and found that SBP means of SMOBP was 134.52 mmHg SD ±8.87 mmHg SBP, Daytime HBPM mean was 125.52 mmHg SD ±7.22 mmHg and tested two-sided with significance equal to 0.05 and power was equal to 0.90, the ratio of SMOBP and HBPM was 1:1, calculated total patients were 17 people, loss to follow up determination increased 10% which included 19 people. Essentially, the population is too small because of the limitation of economic status and availability of the hypertension patients, all populations willing to participate and having to use their own equipment such as sphygmomanometer for measuring their blood pressure. Therefore, there are only 19 persons who can participate in the whole process of this study.

The inclusion criteria consisted of hypertension patients whose blood pressure did not meet the target of the 2019 Thai guidelines on the treatment of hypertension. Criteria also included those who could communicate, read, and write in Thai, were willing to participate in this research, and were age 18 or older.

The exclusion criteria consisted of those patients who were in a state of hypertensive urgency or emergency, those with secondary hypertension such as chronic kidney disease, hyperthyroidism, pregnancy, and patients who do not have the white coat effect.

Variable

Independent variable

Self-Measure Office Blood Pressure (SMOBP) and Home Blood Pressure Monitoring

Dependent variable

White Coat Effect Diagnosis

Instruments

The blood pressure monitoring was Omron® of HEM-7117

Ethical consideration

This research was considered and approved by the Ethics Committee, Nonthaburi Provincial Public Health Office, certificate no. 8/2565 on July

Table 1. General Information (n=20)

Topic	n (%)
Sex	
Male	9 (45)
Female	11 (55)
Age (years old), mean (±SD)	60.55±10.72
Body weight (kilogram), mean (±SD)	69.44±14.80
Height (centimeters), mean (±SD)	159.90±11.59
Body Mass Index (kilogram/meter2), mean (±SD)	26.89±3.47
Smoking	1 (5)
Hypertension Medication	20 (100)
Diabetes Mellitus	2 (10)
Hyperlipidemia	16 (80)

**Significant level p<0.01

Table 2. Office-measured, SMOBP, Daytime HBPM mean, mean difference

	Office – measured	SMOBP	Daytime HBPM
SBP (SD)	148.15±10.33	134.00±8.21	125.50±6.74
DBP (SD)	85.05±10.37	79.45±6.52	75.60±7.93
Mean difference (SBP)(±SD)			
Office – SMOBP	14.15±8.85 [5.93,11.07]		p<0.001**
SMOBP – HBPM	8.50±5.48 [10.24,18.06]		p<0.001**
Office – HBPM	22.65±9.23 [18.33,26.96]		p<0.001**
Mean difference (DBP)(±SD)			
Office – SMOBP	5.60±7.62 [2.03,9.17]		p=0.004**
SMOBP – HBPM	3.85±5.66 [1.19,6.50]		p=0.007**
Office – HBPM	9.45±10.39 [4.58,14.31]		p<0.001**

Table 3. Number of the Participants who achieved the Goal by Hypertension Measurement

	Office – measured	SMOBP	Daytime HBPM
Number of the Participants who achieved Goal (%)	0 (0)	11* (55)	16 (80)

* Participants who achieved Goal by SMOBP with Daytime HBPM

25th, 2022. The sample population consisted of 20 individuals above age 18, who were hypertension patients and whose blood pressure had not achieved the target, and who were in the control area of Bang Si Thong Sub District Health Promoting Hospital. The researcher informed the participants about the rationale of the study before the research and asked for written consent. Information about the participants will remain secure and undisclosed. Finally, the researcher recorded the participant's data, which were then saved in a locked cabinet for a year, at which time it will be destroyed.

Data collection

Data collection for this research was done in two parts. The first part was for general information, which included gender, age, weight, height, BMI, underlying disease (diabetes, hyperlipidemia), smoking, and alcohol consumption history. The second part included the blood pressure of SMOBP, HBPM, and Office-measured.

The process of data collection began with 1) the researcher wrote a letter to ask for a space to be used courtesy of Bang Si Thong Sub District Health Promoting Hospital. 2) The process involved knowledge sharing and training on correct blood

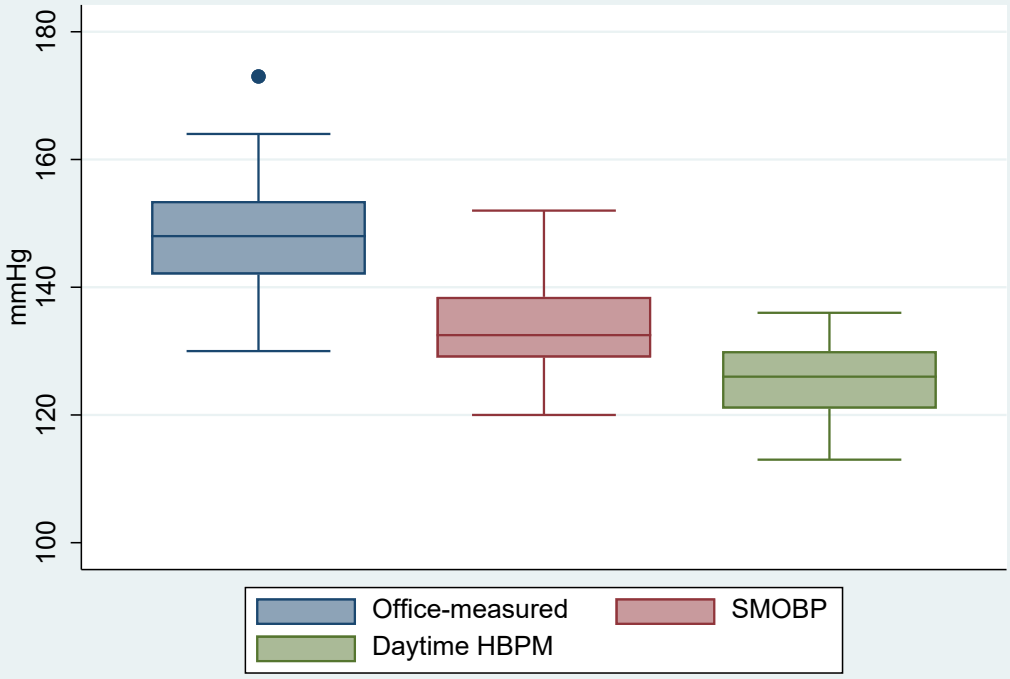

Fig1. Box plot for SBP of Office-measued, SMOBP, and Day-time HBPM

pressure measurement by nurses and to include patients who met the criteria of this research and give a recommended brochure of blood pressure measurement.

Data analysis

This research data were analysed using version 16.1 of Stata/MP. The general data were presented by frequency distribution, percentage, mean determination, and standard deviation. The comparison of the difference in blood pressure means used the statistic of paired t-test and set the statistical significance at $p<0.05$.

Intervention

The participants had to do HBPM two times per period and record their results on a document in the morning and before going to bed. Before doing their blood pressure measurement, the participants were instructed to sit for rest for at least five minutes, wear comfortable clothes, urinate before the measurement, use their non-dominant arm for the measurement, and not speak during the measurement either. This included making an appointment for the participants to continually do blood pressure measurements at Bang Si Thong Sub District Health Promoting Hospital in the daytime for four days and follow up to gather data. The blood pressure monitoring was using Omron® of HEM-7117.

Results

This research involved 20 participants and took place from August 2022 to December 2022. The characteristics of the participants' data (Table 1) showed a male:female radio of 1:1.22, the average age was 60.55±10.72 years old, the body mass index (BMI) was obese, 95% were non-smokers, and the average blood pressure by each method and the corresponding result are shown on Table 2. In comparing the difference of SBP mean measured by three methods, it was found that Office-measured was more statistically significant than SMOBP (148.15±10.33 vs 134±8.21 $p<0.001$), and SMOBP was more statistically significant than Daytime HBPM (134±8.21 vs 125.5±6.74 $p<0.001$). When comparing the difference of DBP mean measured by the three methods it was found that Office-measured was more statistically significant than SMOBP (85.05±10.37 vs 79.45±6.52 $p=0.004$), and SMOBP was more statistically significant than Daytime HBPM (79.45±6.52 vs 75.6±7.93 $p=0.007$). Moreover, participants who measured blood pressure by SMOBP got blood pressure that was going as target(8) were 11 people (55%) and of those who measured blood pressure by Daytime HBPM there were 16 people (80%) from all participants whose blood pressure was not going as target (Table 3).

Discussion

This research showed that SMOBP was more statistically significant than Daytime HBPM which was different from previous research (Myers et al., 2012; Filippovsky et al., 2016) because of the type of sphygmomanometer and the limitation of place. The

sphygmomanometer used for previous research was a blood pressure monitor that could continuously measure blood pressure five times and automatically determine the mean. The participant was also alone in a private room while data for this research were collected from an automatic blood pressure monitor. The patient had to press a start button before measurement each time. The participants also had to measure their blood pressure in an area provided by the Sub District Health Promoting Hospital which was nearby an open area with some external disturbance. Meanwhile, it was found that SMOBP got statistically significant blood pressures that were lower than Office-measured blood pressures because this method could eliminate interfering factors, such as worry or excitement about medical services, venepuncture, talking about treatment plans with healthcare providers, and because SMOBP requires no observation from any healthcare providers, which conformed to the previous research (Myers et al., 2012; Franklin et al., 2013; Filipovský et al., 2016; Salazar et al., 2018). Since the COVID-19 pandemic, there has been an increase in the use of telemedicine, where the results may be automatically sent to clinicians for review and inform treatment strategies for managing hypertension. Therefore, self-monitoring of blood pressure into digital health technologies has been potential to enhance the delivery of healthcare for the individual patients (Patrizia et al., 2023).

In conclusion, this research revealed that three methods of blood pressure measurement were statistically significant and resulted in different blood pressures ($p < 0.01$). The cause is likely due to different perceived level of stress, and this condition is least common in HMPM, SMOPM, and Office-measured BP, respectively. Office-measured was associated with the highest blood pressure level and next was SMOBP and Daytime HBPM, respectively. Both SBP and DBP showed the result that SMOBP cannot be used instead of HBPM for the diagnosis of white coat hypertension because it cannot reduce all white coat effects. This is because, within this process of blood pressure measurement, the participants must press a start bottom each time by themselves, which was different from BpTRU®, and the place of measurement might also be a factor in the white coat effect. For research accuracy, the researcher trained all hypertension patients to measure their own blood pressure by digital sphygmomanometer before allowing them back home and monitoring by themselves. The patients' blood pressure checks for with the standard and hypertension guidelines included identifying their name, the same position in the several times, take while relaxed, and not immediately self-measure after activity.

In addition, this research was a cross-sectional study which utilized a short-period blood pressure measurement, and it cannot see the clear blood pressure trend over the long term. Although the SMOBP cannot eliminate all surplus blood pressure when using blood pressure to consider the fixed target in the guidelines on the treatment of hypertension (8), it was found that there were 11 people (55%) whose blood pressure was at target from all 20 of the participants and of those whose blood pressure was not at the target when measured by Office-measured, 11 participants were in the Daytime HBPM group and 16 people (80%) were as per target; this method might be a useful choice for hypertension patients in the area that has socioeconomic status problem.

This study has a strong point that it is a compared study in the same population group, so it is proper in comparison, decreasing bias and confounder between the study group and it is a study of Sub District Health Promoting Hospital context which was easy to access by the population in the area and it might be useful for the area that has a socioeconomic status problem. One limitation of this study is that the place of the blood pressure measurement was separated and as the limitation of place, it might have had an external confounder, the period to follow up with the participants was short, and the data were collected from only one area, so it cannot be generalised across the wider population. However, the study showed that SMOBP can reduce some white coat effects, so the results of this study support blood pressure measurement by SMOBP to for the populations in areas of low socioeconomic status in the primary care context. Moreover, if there is more external confounder control, extending the period to follow up with the participants, and increasing the area for data collection might help this blood pressure measurement method decrease the white coat effect.

Conclusion

The self-measure office blood pressure (SMOBP) method can reduce the white coat effect but is not equivalent to the home blood pressure measurement (HBPM). The conclusion of this study is, therefore, not to recommended use of this blood pressure method instead of HBPM. However, SMOBP may be considered in areas with economic constraints. Further studies may clarify the benefits of this method of measuring blood pressure.

Declaration of Interest

The authors have no conflicts of interest associated with the material presented in this paper.

Funding

None

Acknowledgment

None

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Mental health and decision-making participation of adolescent orphans: A pilot study

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Abstract

Background: Mental health has been brought to attention lately, with the increase of mental health problems during adolescence. In Indonesia, it is reported that one-third of adolescents develop mental health disorders. Childhood grief, separation from the family, child labor, or abuse affect the orphans' mental health, including their decision-making participation.
Purpose: As a pilot study, this study would like to investigate the mental health conditions and decision-making participation among orphans in one orphanage in Mojokerto district, East Java, Indonesia.
Methods: This cross-sectional study utilizes the Depression Anxiety Scale Youth version (DASS-Y) and Child and Adolescent Participation in Decision Making Questionnaire (CAP-DMQ). Thirty-five adolescent orphans of one orphanage in Mojokerto were recruited using convenience sampling. The frequency of respondents' mental health and decision-making participation were measured, and the mean differences between each group of sociodemographic factors were measured using the Mann-Whitney U test or the Kruskal Wallis test. Association between mental health and decision-making participation was calculated using Chi-square test.
Results: The results show that 40% of respondents were categorized as having mild mental health problems, including depression, anxiety, and stress. Mental health problems are mostly found in males (22.90%) and elementary school (20%). The participation of the orphans in decision-making is considered good, with a median of 25.5. The bivariate analysis concludes the association between anxiety, age, grade, and decision-making participation (p= 0.024, p= 0.029, p=0.029, respectively).
Conclusion: Taken together, attention to orphans, especially adolescents, and their problems are necessary to reduce the health discrepancies within these vulnerable groups. Broader respondents are needed to understand the complete picture of mental health conditions among Indonesian adolescent orphans, including late adolescents.

Keywords: anxiety, decision-making, depression, mental health, stress

OPEN ACCESS

Jurnal Keperawatan Padjadjaran (JKP)

Volume 11(3), 176-183

http://dx.doi.org/10.24198/jkp.v11i3.2358

Article Info

Received : August 15, 2023
Revised : October 13, 2023
Accepted : October 20, 2023
Published : December 01, 2023

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Citation

d'Arqom, A., Nurdiansyah, F., Indiastuti, D.N., Nasution, M.Z., Fatimah, N., Purwaningsih, S., Setiawati, Y., & Purwantari, K.E. (2023). Mental health and decision-making participation of adolescent orphans in Mojokerto, East Java, Indonesia: A pilot study. *Jurnal Keperawatan Padjadjaran, 11*(3), 176-183. http://dx.doi.org/10.24198/jkp.v11i3.2358

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

Introduction

The World Health Organization defines mental health as "a state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community. It is an integral component of health and well-being that underpins our individual and collective abilities to make decisions, build relationships and shape our world. Mental health is a basic human right. And it is crucial to personal, community, and socio-economic development "(WHO, 2022). In Indonesia, it was reported that 6% of the Indonesian population have mental health disorders, such as emotional and mood disorders, with only 10% of them

having access to health facilities (Arjadi et al., 2016; ASEAN, 2016).

Mental health issues have become a main concern worldwide, as reported by UNICEF in 2019 that 166 million adolescents have mental health problems, including depression, anxiety, bipolar, eating, autism spectrum, conduct, substance use, idiopathic intellectual disability, attention deficit hyperactivity disorder (ADHD) and a group of personality disorders (UNICEF, 2021). It is reported that one-third of Indonesian adolescents (15.5 million) had mental health problems in 2022 (UGM, 2022).

During adolescence, changes in emotional, physical, and social conditions might affect the mental health of adolescents. This period is important for social and emotional development, which affects their ability for problem-solving, coping, personal relations decision-making, etc. There are four elements in decision-making participation, which are space, voice, audience, and influence. Every child and adolescent has a right to form and express their views, to be listened to, and if appropriated, their view can be acted upon (Lundy, 2007). Therefore, support from the environment, such as family and school, is important. However, some children and adolescents might not have this support, including orphans.

Humanitarian Relief Foundation reports that 140 million children are orphans, either paternal, maternal or double orphans. This number is estimated to increase by 10,000 children per day, with the highest number of orphans in Africa, Asia, Latin America, Eastern Europe and Central Asia (Nar, 2021). The number of orphans in Indonesia is still not well-recorded. In 2021, 191,696 children stayed in orphanages, with 8,882 paternal orphans; 40,321 maternal orphans, and 5,048 double orphans as reported by the Ministry of Social Affairs Republic of Indonesia (MoSA, 2021b). However, this number increased due to the COVID-19 pandemic. In 2021, the Minister of Social Affairs of Republic of Indonesia reported 4,043,622 orphans (paternal, maternal, and double orphans) received the social endowment fund (MoSA, 2021a). Unfortunately, there are several problems reported regarding orphanages, such as the physical building, the nanny or the mentor, lack of funding, physical and sexual abuse, etc. (Disassa & Lamessa, 2021; Rohta, 2021; Yousif, 2020). Indonesia Statistic Bureau (BPS) reported that there are 47 orphanages in Kabupaten Mojokerto with 2,472 orphans (Mojokertodistrict, 2022).

Orphans are related to mental health problems, emotional, and psychological distress. A study of 83 orphans in India showed that almost one-fifth of the respondents had behavioral and mental distress, one-third of them had emotional problems, and almost one-fourth of the respondents had poor conduct problems (Mahanta et al., 2022). Lack of affection is commonly faced by orphans; this can lead to attachment issues, low self-esteem, poor decision-making, and lack of decision-making participation. The decision-making process is an important step in human life and can affect current and future life, thus participation in decision-making is part of human rights, including orphans. A study shows that poor decision-making at ages 10-11 is related to future behavioral problems. A study of 150 orphans and 150 non-orphans in Pakistan showed poor decision-making participation correlates with anxiety (Shafiq et al., 2020).

Unfortunately, there are no data regarding mental health and decision-making participation in Indonesian orphan adolescents. Therefore, this pilot study aimed to measure mental health conditions, especially depression, anxiety, and stress disorders, and decision-making among orphans in Mojokerto district, East Java, Indonesia. Its association with several sociodemographic factors such as age, sex, and education were measured to find predictive factors of mental health problems and decision-making participation.

Materials and Methods

Design

This cross-sectional study was conducted in June 2023, using the self-administered Depression Anxiety Scale Youth version (DASS-Y) and Child and Adolescent Participation in Decision Making Questionnaire (CAP-DMQ). This study was a pilot project for future investigation of orphans' mental health conditions.

Sample and setting

The respondents of this pilot study were 35 early and middle adolescent orphans, aged 10-17 years old at one orphanage in Mojokerto district. This number was considered appropriate as a pilot study, where the sample size usually is not calculated (In, 2017). The information for consent was explained to the orphans and the head of the orphanage prior to the questionnaire distribution, moreover, informed consent was granted by the head of the orphanage as their guardian. The exclusion criteria were incomplete submission and orphans who rejected consent.

Variable

The dependent variables of this study were mental health status (depression, anxiety, stress) and participation in decision-making. The independent variables included age, sex, grade, and stage of education.

Instruments

The mental health problems, depression, anxiety, and stress were measured using Depression, Anxiety, and Stress Scale Youth version (DASS-Y) consisted of 21 questions with options in the Likert scale from not true to very true (0-3) with the score range 0-63 (Szabo & Lovibond, 2022). Child and Adolescent Participation in Decision Making Questionnaire (CAP-DMQ) consisted of 10

Table 1. Mann-Whitney U and Kruskal-Walis Test on Decision-Making Participations Based on Age, Sex, Education, and Grade

CAP-DMQ Items	Lundy, 2007	Median (Interval)	Age H (p)	Sex Z (p)	Education H (p)	Grade H (p)
Information to make a decision is presented to me in a way I understand	Voice	2 (1-6)	7.099 (0.419)	-0.452 (0.651)	7.765 **(0.021)**	11.605 (0.170)
I am given the full information to make a decision	Voice	3 (1-5)	5.902 (0.551)	-0.802 (0.423)	0.570 (0.752)	6.848 (0.553)
I feel involved in making decisions in my life	Space	2 (1-6)	8.972 (0.255)	-0.209 (0.835)	0.567 (0.753)	10.981 (0.203)
I am given the opportunity to weigh up the pros and cons to make a decision	Space	2 (1-6)	6.663 (0.465)	-0.753 (0.451)	0.201 (0.905)	7.161 (0.519)
I have the ability to weigh up the pros and cons to make a decision	Voice and Space	2 (1-6)	15.940 **(0.026)**	-0.424 (0.671)	3.924 (0.141)	19.2 **(0.014)**
I can gather the right information to make a decision	Voice and Space	3 (1-5)	6.091 (0.529)	-2.102 **(0.036)**	5.390 (0.068)	8.821 (0.358)
Others ask my opinions when making decisions	Audience	3 (1-5)	13.172 (0.068)	0.000 (1.000)	4.154 (0.125)	14.988 (0.059)
Young people should be involved in the decision-making process	Audience	3 (1-4)	9.051 (0.249)	-0.870 (0.384)	8.0 **(0.018)**	12.916 (0.115)
When I make a decision, this is followed through by action that I want	Influence	3 (1-5)	10.285 (0.173)	-1.767 (0.077)	7.332 **(0.026)**	15.448 (0.051)
I make decisions on big things	Influence	2 (1-5)	6.279 (0.508)	-1.416 (0.157)	3.015 (0.221)	14.673 (0.066)
TOTAL		25 (17-40)	7.346 (0.394)	-0.349 (0.727)	5.345 (0.069)	16.729 **(0.033)**

Notes: bold indicates p value < 0.05.

Table 2. Association between Sociodemographic Factors with Depression, Anxiety, Stress, and Decision-Making Participation

Sociodemographic Factors	Depression X^2 (p-value)	Anxiety X^2 (p-value)	Stress X^2 (p-value)	Decision-making participation X^2 (p-value)
Age	16.252 (0.914)	26.334 **(0.024)**	14.606(0.571)	100.945 (0.914)
Sex	1.664 (1.000)	1.438 (0.943)	1.144 (1.000)	10.809 (0.943)
Education	3.845 (0.600)	9.724 (0.086)	2.691 (0.943)	24.400 (0.771)
Grade	20.823 (0.543)	29.461 **(0.029)**	15.765 (0.943)	119.389 (0.600)
Decision-making participation	47.900 (0.114)	53.490 **(0.029)**	40.963 **(0.029)**	-

Notes: bold indicates p value < 0.05. P-values were calculated using Monte Carlo.

questions and was used to measure the decision-making participation of children and adolescents with options in the Likert scale from strongly agree to strongly disagree (1-6) with the score range 10-60 (O'Hare et al., 2016). The questionnaires were translated by two medical doctors and one social science expert. The reliability for depression was 0.709, anxiety 0.766, stress 0.655, and decision-making participation 0.613.

Intervention

No intervention was performed prior data collection.

Data collection

Data were collected at one orphanage in Mojokerto district. The election of the orphanage and the respondents used convenience sampling. Six medical doctors explained the questions to the small groups of respondents (4-5 respondents) before the respondents filled in the survey independently.

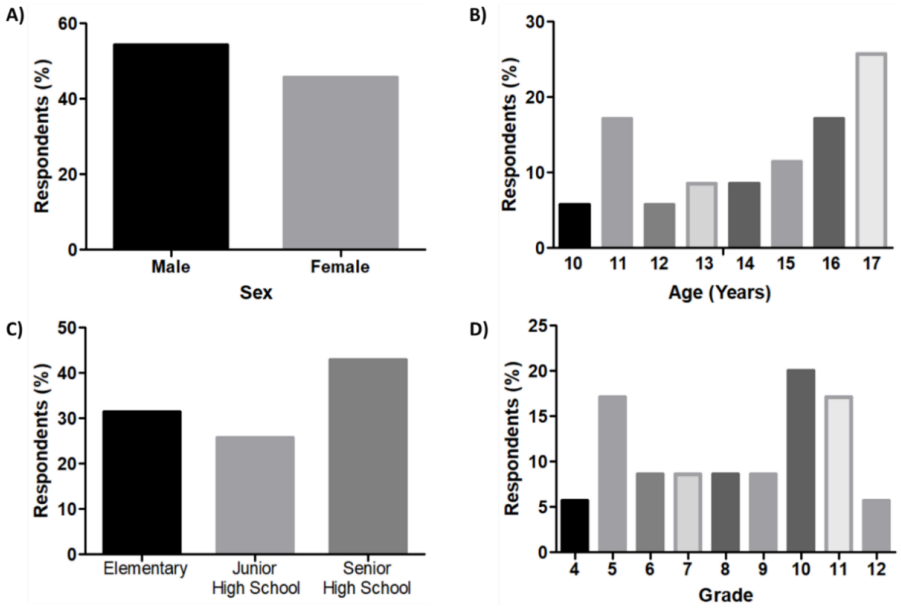

Figure 1. Characteristic of respondents. (A) Sex, (B) Age, (C) Education, (D) Grade

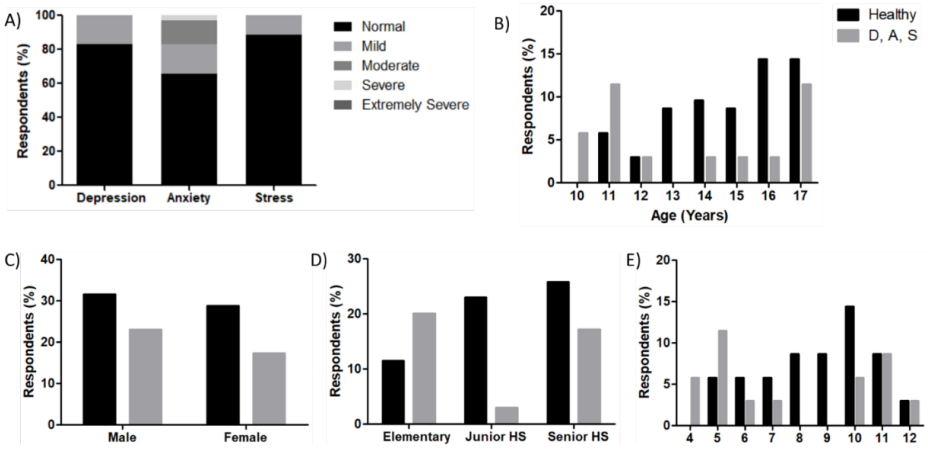

Figure 2. Mental Health (Depression (D), Anxiety (A), and Stress(S)) Condition. (A) Overall mental health status, (B) Incidence of mental health problems based on age, (C) Incidence of mental health problems based on sex, (D) Incidence of mental health problems based on education, (E) Incidence of mental health problems based on grade

Data analysis

Only the complete submission was used for data analysis. The DASS-Y responses were calculated following the guidelines for each category, which were depression, anxiety, and stress. Total scores for each category were further obtained and divided into five groups of severity: normal, mild, moderate, severe, and extremely severe. The total score of CAP-DMQ was calculated, with a lower score indicating good decision-making participation. To understand the components of decision-making participation, CAP-DMQ was broken down into four elements of decision-making participations, space, voice, influence, and audience. The median of each question in CAP-DMQ was further compared for each sociodemographic factor using Mann-Whitney U or Kruskal-Walis test. The association between mental health with sociodemographic factors and decision-making participants was analyzed using SPSS 25.00 (IBM, Chicago, IL). Data were visualized using GraphPad Prism 5.0 (GraphPad Software Inc., La Jolla, CA).

Ethical consideration

This study followed the declaration of Helsinki and was approved by the Ethical Committee of Faculty of Medicine, Universitas Airlangga number 127/EC/KEPK/FKUA/2023.

Results

Characteristic of Respondents

Thirty-seven responses were received and only 35 responses were valid and analyzed. Two responses were not included due to incomplete submission. The majority of the respondents were male (Figure 1A), with median age of 15 (10-17) years old (Figure 1B). During the study period, the median of respondents' education was junior high school (Figure 1C) at grade 9 (4-12, Figure 1D).

Mental Health Status, Decision-Making, and Its Determinant Factors

The results showed that 40% of the respondents were categorized to have depression, anxiety, and stress, with anxiety being the most frequent mental disorder among the orphans (34.29%). The severity of anxiety was varied from mild to severe, while mild depression occurred in 17.14% of the respondents, and 11.43% of them had mild stress (Figure 2A). This finding was in a similar trend, with higher percentage in the current study, with WHO and I-NAHMS that found anxiety was the most prevalent mental health disorders among adolescents, with the most common symptoms including panic, worry, changes in mood, social phobia, etc. (UGM, 2022; WHO, 2021).

Moreover, the mental health problem was found highest at 11 and 17 years old (11.40 and 11.40, respectively), with males (22.90%) having a higher incidence compared to females (17.10%) (Figure 2B-C). Orphans in elementary school showed the highest incidence to have depression, anxiety, or stress, followed by senior high school and junior high school orphans (20%, 17.10%, and 2.90%, respectively, Figure 2D). In addition, based on the grade school, orphans in the grades 5th (11.40%) and 11th (8.60%) were found to have the highest incidence compared to other grades (Figure 2E). This finding was in a different trend as reported by WHO which concluded older adolescents were more likely to get mental disorders compared to the younger adolescents (WHO, 2021), while , I-NAHMS did not find any differences between younger and older adolescents (UGM, 2022). This difference may be caused by the different status of respondents.

The total score of CAP-DMQ was from 17 to 40, with a median of 25, and a mean of 25.5. This indicated that the participation in decision-making of the orphans was good, with only three respondents having a total score of more than 30. When the CAP-DMQ was broken down into four elements of decision-making participations, namely space, voice, influence, and audience, the median ranged from agree (2) to somehow agree (3) which showed that the respondents' right to be listened, to be supported, to be considered, and to be involved in decision-making process was fulfilled. Using Mann-Whitney U test and Kruskal-Walis test, there were mean differences of Q1 between orphans in elementary school, junior high school, and senior high school students ($p = 0.021$), where senior high school students more agreed that the information is presented in an understandable way. Moreover, the middle age adolescents and higher grade more agreed that they can consider both the positive and negative aspect to make a decision (Q5, $p = 0.026$ and $p = 0.014$, respectively). Interestingly, female orphan adolescents were more likely to be able to collect information to make the decision (Q6, $p = 0.036$). Orphan adolescents in senior high school and elementary school more agreed on child participation in decision-making than those in junior high school (Q8, $p = 0.018$). They also more agreed if their decision is followed with action (Q9, $p = 0.026$). Overall, there were statistical differences in total score of decision-making participations based on grade, where the students studying in grade 11 and 12 were more likely to have lower score or having good participations in decision-making (Table 1).

Moreover, its association with the sociodemographics of the respondents and decision-making participation was further analyzed using Monte Carlo simulation. The bivariate results showed that anxiety was associated with age, grade, and decision-making participation ($p = 0.024$, $p = 0.029$, $p = 0.029$, respectively), while stress was associated with decision-making participation only ($p= 0.033$). There was no association between sociodemographic factors with depression and decision-making participation (Table 2).

Discussion

Adolescence is divided into early adolescence (10 to 13 years), middle adolescence (14 to 17 years), and late adolescence/young adulthood (18 to 21 years and beyond). With this broad range of age, the problems faced by each stage might be different. During early and middle adolescence, physical changes, especially puberty, might cause anxiety among adolescents. Emotions, including the feeling of independency, curiosity, decision-making, and problem-solving, also develop during early and middle adolescence. While in late adolescence, it is more likely the physical development is completed while the emotions are still developing. Some problems during the earlier stage might affect further development (Backes & Bonnie, 2019).

Mental health disorders during adolescence are known to be correlated with impaired mental health problems in the next stage of age. It is also related to the poorer quality of life, and affects the decision-making process (Cáceda et al., 2014; Schlack et al., 2021). Changes during adolescence might give pressure to mental conditions (Backes & Bonnie, 2019), including the prone groups, such as orphans. Moreover, participation in decision-making is part of human rights, where every child and adolescent has the right to express their view, to be listened to, and if appropriate, their view taken into action. Therefore, it is important to investigate orphans' participation regarding their life, which will affect

their future (Lundy, 2007).

This study showed that anxiety was the most common mental health problem among the respondents with an incidence of 34.29%. This finding was in a similar trend, with higher percentage in the current study, with WHO and I-NAHMS finding anxiety was the most prevalent mental health disorder among adolescents, with the most common symptoms including panic, worry, changes in mood, social phobia, etc. (UGM, 2022; WHO, 2021). Interestingly, anxiety also found to be most common mental health problems among mothers in Indonesia (d'Arqom, 2021).

The incidence of mental health issues was associated with age, grade, and decision-making ability. This finding supported a study of 150 orphans and 150 non-orphans in Pakistan which showed anxiety was more common in orphans. However, our finding did not find association between sex and mental health issues, which was different from a study in Pakistan that found female orphans were more likely to develop anxiety compared to male orphans (Shafiq et al., 2020). Our findings were also in line with a study of 470 adolescent students in India that found the incidence of anxiety was higher compared with depression and stress, and it was higher in female adolescents with a peak age of 18 years old (Sandal et al., 2017). This was in line with our study that found an association between anxiety and age, but not depression and stress. This study also was in a different trend as reported by the WHO which concluded older adolescents were more likely to get mental disorders compared to younger adolescents (WHO, 2021), while I-NAHMS did not find any differences of mental health problems with age and sex (UGM, 2022). Moreover, our study was different from the finding of a study of 461 Malaysian adolescents that concluded younger age was associated with adolescent depression (Ibrahim et al., 2022).

In addition, an interesting study during the COVID-19 pandemic showed that even though depression and anxiety doubled during the pandemic, in the later pandemic phase, the incidence of two mental health problems was more common in older adolescents (Racine et al., 2021). Moreover, since the grade of the study was also in line with age, our study found an association between grade and anxiety.

Anxiety is also associated with decision-making in the general population and adolescents. Adolescents with behavioral problems are more likely to make poor decisions and delay aversion (Bentivegna et al., 2022). Moreover, a study in Pakistan found anxiety was associated with poor decision-making (Shafiq et al., 2020). Our study also found similar results, in which there was a significant association between anxiety and decision-making participation. The decision-making process is affected by several determinants, including cognitive and emotional processes, personal experience, personality, and social context (Hicks et al., 2013; Savioni et al., 2023). Losing parents in early life, childhood grief, separation from the family, new living situation, child labor, or abuse are several factors that influence the emotional experience of orphans and might affect the decision-making process among individuals (Dorsey et al., 2015). Our findings showed that middle adolescents, female, higher education level, and higher grade had better, to some extent, decision-making participations.

As a pilot study, this study described the mental health disorders, which were depression, anxiety, stress, and decision-making participation among adolescent orphans in one orphanage in Mojokerto district. Despite its limitations, including a small sample size, and no comparison with non-orphan adolescents, this study showed the incidence of mental health problems among adolescent orphans that might affect their future lives and mental health.

Conclusion

The increasing mental health problems among adolescents in the world, including Indonesia, prove that attention from policy-makers is needed for people with mental health issues. Childhood mental well-being is one of the determinant factors for good mental health during adulthood. Lack of affection among orphans might lead to poor decision-making and lack of decision-making participation. It is important to ensure orphans' right to be involved in the decision-making process that might affect their future. To reach health equity, attention to orphans and their problems is necessary to reduce the health discrepancies within this vulnerable group. Broader respondents are needed to understand the complete picture of mental health conditions among Indonesian adolescent orphans, including late adolescents.

Declaration of Interest

The authors have no conflicts of interest.

Funding

Ad'A received funding from RKAT Universitas Airlangga No. 3617/UN3.1.1/PM/2023.

Data Availability

The datasets are available upon request.

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Factors related to sexual behavior among adolescents

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Abstract

Background: One of the problems in adolescents is sexual behavior, which generally begins with the courtship process and behavior in dating.
Purpose: The study aimed to determine the factors associated with sexual behavior in adolescents.
Methods: This study used secondary data and analyzed using a cross-sectional design on a sample of 429 adolescents. Quantitative data used the chi-square test.
Results: One of the factors related to dating behavior is age, which is proven that dating behaviors such as holding hands (p=0.037), hugging (p=0.002), kissing lips (p=0.041), while touching/stimulating and having sexual relations are not related to age factor (p=0.929). Factors such as gender, education level, area of residence and information exposure were not related to dating behavior.
Conclusions: There is a relationship between age factors and dating behavior in adolescents. Cross-sectoral collaboration, the use of digital media for socialization and education, and strengthening family and religious functions are strategies used to develop youth health programs.

Keywords: adolescents, dating, family, risk factors, sexual behavior

OPEN ACCESS

Jurnal Keperawatan Padjadjaran (JKP)

Volume 11(3), 184-191

http://dx.doi.org/10.24198/jkp.v11i3.2327

Article Info

Received : July 24, 2023
Revised : September 26, 2023
Accepted : October 17, 2023
Published : December 01, 2023

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Citation

Sopacua, D.T., Sari, C.W.M., Agustina, H.S., Irza, D., & Rahayuwati, L. (2023). Factors related to sexual behavior among adolescents in West Java. *Jurnal Keperawatan Padjadjaran, 11*(3), 184-191.http://dx.doi.org/10.24198/jkp.v11i3.2327

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

Introduction

Adolescence is a period of transition from childhood to adulthood, which includes all aspects of development experienced in preparation for entering adulthood, which can be physical, psychological, cognitive, spiritual and social and economic changes. In adolescence, a person tends to have a fairly large sense of curiosity, and likes adventure and challenges but usually makes decisions without careful consideration (Ministry of Health of the Republic of Indonesia, 2018).

Adolescents are more likely to engage in dangerous behavior. According to the National Population and Family Planning Board (BKKBN), Statistics Indonesia (BPS), Ministry of Health (Kemenkes), and The International Classification of Functioning, Disability, and Health (ICF), (2018) the working age group right now is mostly made up of people from generation Y (millennials) and generation Z (youth). About 17% of Indonesia's population is between the ages of 15 and 24, and that number is expected to keep growing. Meanwhile, the World Health Organization (WHO), defines adolescents as those between 10 and 19 years of age. Adolescents need a variety of sources of information to grow and thrive in good health, including age-appropriate comprehensive sexual education, an opportunity to learn life skills, and a safe, supportive, egalitarian, and appropriate environment. In addition, they need an opportunity to actively engage in the planning and implementation of interventions aimed at preserving and improving their health. To address the unique needs and rights of adolescents, it is essential to expand this possibility.

At this time, adolescents begin to feel sexual urges and show interest in the opposite sex. Then teenagers will start trying everything related to it (Ministry

of Health of the Republic of Indonesia, 2018). The results of the Survey by National Population and Family Planning Board (BKKBN), Statistics Indonesia (BPS), Ministry of Health (Kemenkes), and The International Classification of Functioning, Disability, and Health (ICF) (2018) explained that the percentage of women and men aged 15-24 years who were unmarried and had had premarital sexual intercourse in women was 0.9% aged 15-19 years, 2.6% aged 20-24 years, while for men it was 3.6% aged 15-19 years and 14.0% aged 20-24 years (The National Population and Family Planning Board, 2018). Risky sexual behavior can have an impact on adolescent health. A study in Finland showed Chlamydia to be a diagnosed infection in 80% of the population aged 15 to 29 years (National Institute for Health and Welfare – Finland, 2016). In addition, other impacts such as cognitive, emotional, social and physical aspects also affect adolescents (Pakarinen et al., 2020). This risky sexual behavior will certainly have a physiological and psychological impact on teenagers who are the next generation of this nation.

Various studies have revealed the factors that cause the occurrence of dating behavior that comes from within and from outside of adolescents, including a lack of knowledge and high exposure to sources of sexual information (Mahmudah et al., 2016). This is reinforced by the research of Kyilleh, Tabong, and Konlaan (2018) that knowledge about reproductive health choices is low among respondents with the majority of them relying on their peers for information about sexual and reproductive health.

Other factors according to Arega et al. (2019) are sexual desire, not attending religious education, watching pornographic films and living in rural areas. Other factors that trigger sexual behavior during dating are sexual disorders, self-evaluation, and attitudes toward sexual health (Ahmadian et al., 2014). This finding was in line with the results of research by Putra et al. (2017) and Siyoto et al. (2018) that adolescents who had access to pornographic content tended to engage in sexual activity when they were dating. Another study by Ulfah (2018) in Cilacap also explained that factors that influence sexual behavior in adolescents include perceptions and knowledge regarding the value of virginity.

Based on research by Kyilleh, Tabong, and Konlaan (2018) having sexual partners and having premarital sex is common and seen as normal in Ghana. Adolescents engage in unprotected sexual practices as a way of testing their fertility, assurance of love, bait for marriage and livelihood. Abortions are performed by adolescents with local methods used identified as inserting herbs into the vagina, drinking concoctions and boiling papaya leaves. Reproductive health services are available in the community but receive low utilization due to perceived negative attitudes of health workers, confidentiality, and social norms.

Based on the literature review, the researchers concluded that there are five major factors, namely the age factor of adolescents who engage in sexual intercourse, especially in the 15-18 year range, the gender factor of adolescents, the knowledge factor about reproductive health, exposure to sexuality and reproductive health of adolescents, and the residence factor. To obtain the right treatment method, this study will analyze the factors related to dating behavior in adolescents, both non-risky and risky behavior carried out by adolescents based on data analysis of the 2019 Population Family Planning and Family Development program in Program Performance and Accountability Survey. By analyzing the factors related to dating behavior in adolescents, we can see which factors are more dominant and from these factors we can make policy strategies, design interventions or develop related programs that can prevent and reduce the adverse effects of premarital sexual behavior on adolescents.

Materials and Methods

Design

The design in this study is a cross sectional method. In a cross-sectional study, the researcher looks at both the result and the risks of the people who are taking part in the study at the same time (Setia, 2016). This study uses a quantitative approach to analyze secondary data.

Sample and setting

The survey respondents are unmarried men and women aged 15-24 years in West Java Province. The total number of adolescent respondents in this study comprised 634 adolescents, but after removing 131 missing data, the remaining population studied was 429 people.

Variables

The independent variable was background characteristics and dependent variable was dating behavior. The background characteristic variables include age, education, residence, and exposure to reproductive health information while the dating behavioral variable includes holding hands, hugging, kissing lips, stimulate/touch, and having sexual intercourse.

Instruments

The data source in this study is based on the results of the 2019 Youth Population Program Performance and Accountability Survey.

Data collection

The data collection instrument in the 2019 Program Performance and Accountability Survey used a questionnaire based on smartphone application utilization technology.

Ethical clearance

This research was approved by the Research Ethics

Table 1. Characteristics Demographic of the Respondents (n=429)

Variable		Frequency (f)	Percentage (%)
Age	15-16 years old	205	47.8
	17-18 years old	224	52.2
Education	No formal school	18	4.2
	Elementary school	402	93.7
	Junior high school	9	2.1
Residence	Urban	303	70.6
	Rural	126	29.3
Exposure to reproductive health information	Exposed	411	95.8
	Never	18	4.2

Table 2. The Bivariate Analysis of Teenagers Most Often Date and Dating Behavior

Teenagers most often date		Dating Behavior				
Variable	Explanation	Holding hands (%)	Hugging (%)	Kissing lips (%)	Stimulate / touch (%)	Having sexual intercourse (%)
Age	17-18 years old	37.8	11.4	3.0	0.5	0.2
Gender	Male	34.0	9.3	2.8	2.2	0.2
Education	Elementary school	63.9	15	3.0	0.9	0.2
Residence	Urban	48.0	12.4	2.6	0.5	0.5
Exposure to reproductive health information	Exposed	65.5	16.3	3.7	0.9	0.5

Committee of Universitas Padjadjaran with Number 454/LB.02/H4/2019. Signed written consent or verbalization of The National Population and Family Planning Board indicated willingness to allow researchers to use this data with responsibility. Any results of this study will be presented in aggregate form and for academic purposes only. In addition, there is no risk to the adolescents and The National Population and Family Planning Board in the conduct of this study.

Data analysis

Data processing is done through the help of software by utilizing an appropriate computer program, namely SPSS software. The data processing process begins with editing, coding, processing, and cleaning. The collected data were analyzed using univariate analysis, specifically focusing on percentages. In addition, the analysis included the application of the chi-square test. Univariate analysis in the form of percentages was used to analyze the age, education, residence, and exposure to reproductive health information. Meanwhile, bivariate analysis was used to analyze the relationship between the teenagers most often dating behavior (holding hands, hugging, kissing lips, stimulate/touch, having sexual intercourse).

Results

Respondents in the program performance and accountability survey data in this study were 429 teenagers with an age range of 15-18 years. There were 205 (47.8%) adolescents aged 15-16 years, and 224 (52.21%) aged 17-18 years.

Teenagers who most often engaged in dating behavior were in the age range of 17-18 years with details of holding hands at 37.8%, hugging 11.4%, kissing lips by 3.0%, stimulating/touching by 0.5%, and having sexual intercourse by 0.2%. Based on gender, there were 211 males (49.18%) and 218 females (50.81%). From the data, the number of female adolescents is more than male adolescents, but for dating behavior it is seen that male adolescents are more involved in dating with details of holding hands by 34.0%, hugging by 9.3%, kissing lips by 2.8 %, touching/stimulating by 2.2%, and having sexual intercourse by 0.2%. Based on education level, there were 18 teenagers (4.2%) who had not received any formal education, 402 (93.7%) were in elementary school, and nine (2.1%) were in junior high school. There were no adolescents aged 15-18 years in this study who were already in high school or who had graduated from high school. Teenage dating behavior was also mostly carried out by teenagers who only received elementary school education, with details of holding

Table 3. The Pearson Chi-Square Analysis of Independent Variable and the Dependent Variable

Dating Behavior			Holding hands		Hugging		Kissing lips		Stimulate / touch		Having sexual intercourse		
			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Don't know
Variable	Age	15–16 y.o	129	76	22	183	4	201	2	203	1	201	3
		17–18 y.o	162	62	49	175	13	211	2	222	1	219	4
	Total		291	138	71	358	17	412	4	425	2	420	7
	Pearson Chi-Square		0.037		0.002		0.041		0.929			0.964	
	Gender	Male	146	65	40	171	12	199	3	208	1	205	5
		Female	145	73	31	187	5	213	1	217	1	215	2
	Total		291	138	71	358	17	412	4	425	2	420	7
	Pearson Chi-Square		0.552		0.187		0.072		0.299			0.494	
	Education	No formal school	12	6	6	12	3	15	0	18	0	18	0
		Elementary school	274	128	64	338	13	389	4	398	2	393	7
		Junior high school	5	4	1	8	1	8	0	9	0	9	0
	Total		291	138	71	358	17	412	4	425	2	420	7
	Pearson Chi-Square		0.722		0.137		0.009		0.873			0.961	
	Residence	Urban	209	94	53	250	11	292	4	299	2	295	6
		Rural	82	44	18	108	6	120	0	126	0	125	1
	Total		261	138	71	358	17	412	4	425	2	420	7
	Pearson Chi-Square		0.722		0.137		0.009		0.873			0.961	
	Exposure to reproductive health information	Once	281	130	70	341	16	395	4	407	2	402	7
		Never	10	8	1	17	1	17	0	18	0	18	0
	Total		291	138	71	358	17	412	4	425	2	420	7
	Pearson Chi-Square		0.255		0.2		0.723		0.674			0.818	

hands by 63.9%, hugging by 15%, kissing lips by 3.0%, touching and stimulating by 0.9% and having sexual intercourse by 0.2%. According to the area of residence, adolescents who live in urban areas were 303 (70.6%), and those who live in rural areas were 126 (29.3%), with the number of dating characteristics mostly carried out by adolescents who lived in urban areas. Adolescents who lived in urban areas had performed dating behaviors such as holding hands by 48%, hugging 12.4%, kissing lips by 2.6%, touching or stimulating 0.5% and having sexual intercourse by 0.5%. According to the exposure to information related to reproductive health, as many as 411 (95.8%) adolescents had been exposed to information, and 18 (4.2%) had never been exposed to information related to reproductive health. Adolescents who were exposed to information engaged in more dating behavior with details of holding hands by 65.5%, hugging by 16.3%, kissing lips by 3.7%, touching and stimulating by 0.9% and having sexual intercourse by 0.5%.

There were 429 teenagers with an age range of 15-18 years who were studied using this program performance and accountability survey data. Most of the respondents were male (49.18%), and the average formal education was at elementary school with 402 people (93.7%). All of these adolescent respondents had been in a relationship, with as many as 291 (67.8%) teenagers holding hands, 71 (16.6%) teenagers hugging, 17 (4.0%) kissing lips, four (9%) teenagers touching or stimulating, while as many as two (0.5%) adolescents had sexual intercourse during dating. Five teenagers in this study also admitted that they had been in a relationship, some had only been in one relationship and some had four. They said that, during dating,

they were holding hands, hugging, kissing cheeks, forehead and lips. Some said they had also touched, but these five teenagers did not have sexual relations like husband and wife when dating. Dating behavior carried out by teenagers is very risky because it can lead to more serious things, and, if no special intervention is carried out, it will be possible for more teenagers to have sexual relations like husband and wife with their partners and cause many health problems in adolescents. The significance value found in the relationship between age and dating behavior is that the higher the age, the more types of sexual activity are carried out.

The explanation of the independent variable and the dependent variable in this study can be seen in Table 3.

Discussion

In this study, age is a variable that affects sexual behavior in adolescents during dating or before marriage. This research is in line with research studies by Ahmadian et al. (2014) and Akibu et al. (2017) which state that age is a factor that influences adolescents to engage in sexual behavior, and the average age of adolescents who engage in sexual behavior is 18.7 years, and half do it because they want to fulfill sexual desires. However, this is not in line with research by Haruna and Ibrahim (2014) which found that the age variable had no effect on sexual behavior during dating, or before marriage. Two sources in this study also revealed that age is a factor associated with dating behavior in adolescents. Sources argue that, by analogy, human babies are not able to do anything, let alone date or do more activities. Behaviors such as searching for identity, physical and mental psychological changes are literally only carried out by humans in the age range of 12-24, which is known as adolescence.

One of the factors that cause dating behavior and premarital sexual behavior in adolescents is the age factor. As is known, adolescence is a period of transition to adulthood, with an age range of 12-24 years. At this age, adolescents must face physical and psychological changes. Their sexual drive is high at this time, they are also unstable in decision-making and have a high curiosity that encourages them to try something, for example approaching the opposite sex and dating.

When two people start dating, they often start sexual behavior, which includes things like kissing, necking, petting, and having sex. Dating as a teen is an important part of socialization because it helps with learning how to be close to someone and gives you chances to build meaningful relationships with people of the opposite sex. It can also be a place to try new things sexually and learn more about yourself (Ohee, 2018). Because of this, dating is no longer a taboo subject. However, people who are dating should take precautions to avoid risky sexual behavior before marriage, which can damage sexual organs and make them more likely to get STDs like HIV/AIDS, gonorrhea, genital herpes, and syphilis. It can also have negative psychological effects, like guilt, regret, low self-esteem, and the bad feelings that come with an unwanted pregnancy (Ulum, 2015). The adolescents need to care about religious beliefs, learning enough about sexual health, getting enough training from their parents, taking care of the environment, and many other things in order to live a good life.

The study also found that gender factors, education, residence, and exposure to information related to adolescent reproductive health had nothing to do with sexual behavior during dating or before marriage. This was inconsistent with a study conducted Lou et al. (2012) that found media exposure, family, peers, and school were associated with adolescent sexual behavior and health. Today's adolescents find it difficult to avoid dating behaviors as mentioned in the data because they are used to living with gadgets and smartphones so that they can get information from anywhere easily. This information is sometimes taken as it is without being filtered, and this information affects their sexual behavior more than it affects their academic performance (Kumar et al., 2013).

In this study, it is also found that gender factors have no relationship to sexual behavior during dating or before marriage. Teen respondents in this study were 543 people with a total of 273 males (50.3%) and 270 females (49.7%). The results show that, on average, all adolescents, both male and female, have had sexual behavior during dating or before marriage. This happens because, on average, both males and females have the same sex drive and have the same desire to date. Other research that is in line with this research was conducted by Haruna and Ibrahim (2014) and states that gender does not affect sexual behavior during dating or before marriage, for both adolescents and young adults. Seven sources in this study also did not mention and argued that gender factors were associated with behavior during dating. This study is not in line with research conducted by Zuo et al. (2012) which found that gender is an important factor that influences sexual behavior in adolescents.

Another study conducted by Lopez et al. (2015) also said that male adolescents are more likely to use pornography and engage in sexual practices during dating and even engage in risky behavior, and this is in line with research from several Asian countries (Belay et al., 2020; Hong & Kang, 2017). On the other hand, Fibrila et al. (2021) found that there was a strong link (r = 0.276) between high school students in a Metro City who saw pornography on social media and their sexual behavior. Most teens think that watching pornography with friends on social media who also watch sexual material changes their views on early sexual activities (Tesfahun, 2021).

Another factor in this study is the education factor, and the result is that there is no influence of the education level factor with sexual behavior during dating or before marriage in adolescents

p =0,568 (α= > 0,05). A total of 486 (89.5%) adolescents in this study only received elementary school education and of 329 (60.1%) of them had sexual behavior during dating or before marriage. In theory, it can be said that by having education only in elementary and junior high schools, even not getting formal education, it means that their knowledge is low and can have bad consequences for their behavior.

Adolescents are a demographic that requires particular attention in the realm of sexual and reproductive health. This is due to their frequent engagement in risky sexual behavior and their limited access to information and reproductive health services. Consequently, these adolescents are not adequately informed about the information they should receive. Adolescents with limited understanding of sex and sexuality are more likely to engage in risky and unmonitored sexual behavior, which can have detrimental effects on their well-being (Rashid & Mwale, 2016).

But in fact, in this study there was no relationship between education level and sexual behavior during dating or before marriage in adolescents. Another study by Rosdarni et al. (2015) in the city of Kendari found adolescents who have low knowledge about sexual health are 4.28 times at risk of engaging in sexual behavior during dating and before marriage. This is in line with the research conducted by Hariningsih et al. (2022) which said that there was relationship between the level of knowledge with reproductive health and sexual behavior in adolescents. Neither of the two sources said that the education factor was an important factor related to dating behavior in adolescents.

The factor of residence is also one of the behavioral factors studied, but it was found that there was no relationship between the factor of the area of residence and sexual behavior during dating or before marriage in adolescents. This means that adolescents who live in rural or urban areas have the same risk of being exposed to sexual behavior during dating or before marriage. This is not in line with a study conducted by Ray et al. (2012) for 220 adolescents in India, which said that rural and urban men differed significantly in their sexual attitudes and practices. Place of residence and media were found to be significant predictors of sexual activity among adolescents. Urban male adolescents are significantly less likely to engage in penetrative sexual activity than rural male adolescents. This is also in line with research conducted by Salih et al. (2015) which found that there was a relationship between the area of residence and sexual behavior during dating or before marriage by adolescents. According to the findings, young people in rural areas are sexually active at an early age with insufficient protection.

In this study, it was found that there was no relationship between exposure to information related to adolescent reproductive health and sexual behavior during dating or before marriage in adolescents p =0.134 (α= <0.05). This study is not in line with research conducted by Okigbo and Speizer (2015) which states that there is a significant relationship or influence between knowledge related to reproductive health and sexual behavior during dating or before marriage. Quantitatively, there is no relationship between exposure to information related to reproductive health and it has nothing to do with dating behavior in adolescents.

The research concluded that there were no significant differences in the sexual behavior of adolescents who had completed their education, those who had not, or those with differing levels of educational attainment. Even adolescents who have not concluded formal instruction experience a shared sense of transformation within themselves, regardless of their educational heritage.

Conclusions

Based on the results of the research and responding to the objectives of the study, the authors can conclude that the factors associated with dating behavior in adolescents are age factors. Adolescent respondents at all ages from 15-18 years have had sexual behavior during dating or before marriage. And the higher the age of the teenager, the more likely the teenager can perform sexual behavior during dating or before marriage.

The factors that are not related to sexual behavior in adolescents, according to both quantitative and qualitative research, are gender, educational level, and the region where they live. This means that adolescents with educational levels of elementary, junior, and senior high school, even those who are not in school, have the same risk of having sex during dating and before marriage.

In this study, one of the strategies for developing adolescent health programs is designed with the aim of improving the quality of adolescent health, as well as increasing adolescent awareness of preventing sexual behavior before marriage which often begins with dating behaviors in adolescents in Indonesia, especially West Java.

Declaration of Interest

All authors declare that they have no conflicts of interest.

Acknowledgment

We would like to thank our respondents for their participation in this study and for their time.

Funding

This research received no external funding.

Data Availability

The participants of this study did not give written consent for their data to be shared publicly, so due to the sensitive nature of the research supporting

data is not available.

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The development of the health promotion program on maternal anemia: Qualitative study

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Abstract

Background: Iron deficiency anemia in pregnant women is a crucial global health problem. Iron deficiency anemia is impacted on health during antenatal, labor and postpartum period. Although the national policy provides the preventive and solving the maternal anemia, the statistics of maternal anemia are still high.
Purpose: The aim of the study is to develop a health promotion program that is suitable for maternal anemia.
Methods: Qualitative research was used to develop the health promotion program on maternal anemia through in-depth interviews. Ten pregnant women who had hematocrit less than 33 volume percentages or hemoglobin less than 11 g/dl and five healthcare professionals were selected by purposive sampling. A total of fifteen participants were interviewed based on the semi-structured questionnaire for 30-45 minutes per case at the antenatal care clinic, Watbot hospital, Phitsanulok, Thailand. The period of the study was six months from the first of August 2022 until the end of January 2023.
Results: Thematic analysis was used to analyze the data and identified three main themes: 1) encouragement the attitude of self-care during pregnancy; 2) accessibility of the program ; and 3) practical use of the program and integrating the program based on the context of pregnant women and healthcare professionals.
Conclusion: The health promotion program was developed suitable for maternal anemia. The tailored program should be tested in terms of feasibility, accessibility, and practical use. It will support pregnant women with anemia, develop a key performance index of maternal and child health, decrease risks and complications, and promote maternal and child health based on the various contexts

Keywords: anemia; health promotion program; iron deficiency anemia; pregnant women

Introduction

Maternal anemia in pregnant women is a crucial global health problem (World Health Organization) (WHO, 2012; 2022). Anemia in pregnant women is defined as hemoglobin (Hb) level lower than 11 g/dL or hematocrit (Hct) level lower than 33% and is divided into three classifications of severity as follows: mild (Hb10-10.9 g/dL), moderate (Hb 7-9.9 g/dL) and severe (Hb <7 g/dL) (WHO, 2011). The Center of Disease Control (CDC) defined in detail that Hb level lower than 11 g/dL or Hct level lower than 33% in the first and third trimester of pregnancy and Hb level lower than 10.5 g/dL or Hct level lower than 32% in the second trimester of pregnancy us due to the physiological changes during pregnancy (CDC, 1989; Zofkie et al., 2022).

The Global Health Observatory (GHO) reports indicated that the prevalence of anemia worldwide increased to around 40% of pregnant women in 2016 (Vardell, 2020; WHO, 2016). In Thailand, the prevalence of anemia in pregnant women was 32.2% in 2019 Department of Health

OPEN ACCESS

Jurnal Keperawatan Padjadjaran (JKP)

Volume 11(3), 192-202

http://dx.doi.org/10.24198/jkp.v11i3.2360

Article Info

Received : August 24, 2023
Revised : September 22, 2023
Accepted : October 17, 2023
Published : December 01, 2023

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Citation

Klankhajhon, S., Pansuwan, K., Rithpho, P., & Arifin, H. (2023). The development of the health promotion program on maternal anemia: Qualitative study. *Jurnal Keperawatan Padjadjaran, 11*(3), 192-202. http://dx.doi.org/10.24198/jkp.v11i3.2360

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

(DoH2022) . One of five cases of anemia in pregnant women is caused by iron deficiency anemia (IDA) (WHO, 2011; 2016). The evidence strongly supports that maternal physiological changes during pregnancy with inadequate iron intake are indicated as common causes of IDA in pregnancy (Tana, 2012; Braymann, 2015; Camaschella, 2015; Pinchaleaw, 2017). Maternal anemia has impacts on maternal health that is related with increasing rate of preterm labor, fetal growth restriction, low birth weight, perinatal mortality and morbidity, postpartum hemorrhage and infection, and postpartum depression (American College of Obstetricians and Gynecologists (ACOG), 2021; Maha, Tondare, & Tondare, 2017; Tandon, Jain, & Malhorta, 2018).

The Thailand national policy aims to decrease the rate of maternal anemia through the DoH and MoPH (DoH, 2023). They provide iron supplement for all pregnant women based on the recommendation from WHO (CDC, 1998; WHO, 2016). Healthcare professionals use the healthcare processes as a health promotion program with groups and individual health education for pregnant women with anemia (Bureau of Nutrition, 2011; DoH, 2011). Health education consists of maternal anemia such as severity, consequences, prevention, treatment, dietary and iron supplement, and self-care during pregnancy (Achebe & Gafter-Gvili, 2017; Food and Drug Administration, 2016). Most of the health promotion programs as health education focused on the knowledge, self-care, and health behavior for taking iron supplements, having food supporting iron intake, and avoiding food with prevention of iron absorption. These studies developed a program based on nursing theory such as: health belief model, self-care theory, health education theory and goal attainment theory (Pipat kul, Sinsuksai, & Phahuwatanakorn, 2015; Senanayake et al., 2010; Sirisopa & Pongchaidecha, 2015; Techakampholsarakit, Kantaruksa, & Sansiriphun, 2018). The prevalence of anemia in Thai pregnant women is still higher than the key performance indicator (KPI). This might indicate that the current healthcare process and health promotion program might not fit with maternal anemia. The systematic review of interventions to promote anemia prevention for pregnant women suggested that ab education program should be provided with social support, motivation, and mutual goal setting through the appropriate media. In addition, these health education program or interventions were evidence-based developed only on healthcare professionals' views (Techakampholsarakit et al, 2018). The KPI must be less than 14% for anemia in pregnancy (DoH, 2023) whereas the national statistics report that percentages of anemia in Thai pregnant women are ranged between 10.78-17.33 from 2013 to 2022 (DoH, 2023; WHO, 2022). Therefore, the objective of this study was to develop a health promotion program for maternal anemia based on the Thai context. The insights of pregnant women with anemia and healthcare professionals point of views was explored to tailor a health promotion program that fit with maternal anemia.

Materials and Methods

Design

Phenomenological qualitative research can be integrated to explain and describe the ontological meaning and the experience of a particular group of people. This study explores the knowledge and experiences of pregnant women with anemia and healthcare professionals through in-depth interviews. Their knowledge and experiences provided insights to develop a health promotion program for maternal anemia based on the Thai context. The data were collected between the first of August 2022 to the end of January 2023.

Sample and setting

A total of fifteen participants, consisted of ten women and five healthcare professionals, were selected by purposive sampling for in-depth interviews at the antenatal care clinic, Watbot hospital, Phitsanulok, Thailand. The women sampling grid is shown in Table 1. Women were initially invited by the nurse at ANC. A target sample size was ten to fifteen pregnant women for in-depth interviews (Creswell, 2014; Holloway, Wheeler, & Holloway, 2010). When a pregnant woman expressed willingness to participate in the interviews, they contacted the researcher by telephone (free call) or in person at the ANC during office hours. Then, women interested in participation were given full information by the researcher. The researcher took written consent. The participants were screened through inclusion and exclusion criteria. The inclusion criteria were woman who able to read, speak and understand the Thai language. Pregnant women who diagnosed with maternal anemia, which had Hct level less than 33 volume percentages or hemoglobin less than 11 g/dl, and no complications were eligible for recruitment. Women with any complications and extremely high stress scores (ST-5 score > 8 points) during pregnancy were excluded. Healthcare professionals were initially invited by the assistant researcher at the hospital. When a healthcare professional expressed willingness to participate in the interviews, they contacted the researcher by telephone (free call) or in person at the hospital during office hours. Then, those interested in participation were given full information by the researcher. The researcher took written consent. The participants were screened through inclusion and exclusion criteria. The inclusion criteria were healthcare professionals able to read, speak and understand the Thai language. Healthcare professionals who worked related to maternal and newborn during pregnancy, delivery, and postpartum period for at least two years were eligible for recruitment. Participants were offered a gift voucher of 300 baht to take part in the interviews.

Table 1. Purposive sampling frame for pregnant women in the interviews

Variable	Details of variable	
Number of pregnancy	Primigravida (first time)	Multigravida (second or more)
History of anemia during pregnancy	Yes	No
Gestational age (GA) at the first visit	> 12 weeks	< 12 weeks
Antenatal care visit at clinic following the recommendation	Yes	No

Table 2. Demographic characteristics of pregnant women and HCPs for a in-depth interviews (n=15)

Demographic characteristics	n	%
Age		
20-34 years	11	73.33
> 35 years	4	26.67
Occupation		
Employee	2	13.33
Self-employed	3	20
Agricultural	2	13.33
Housewife	3	20
	5	33.33
Education		
Secondary school or equal	3	20
High school or college degree	5	33.33
Bachelor degree or equal	4	26.67
	3	20
Income		
< 5,000 Baht	3	20
5,000-10,000 Baht	3	20
10,000-20,000 Baht	4	26.67
>20,000 Baht	5	33.33

Table 3. Demographic characteristics of pregnant women for a in-depth interviews (n=10)

Demographic characteristics	n	%
Gestational age at the first ANC		
<12 weeks	8	80
>12 weeks	2	20
Pre-pregnancy Body Mass Index (BMI)		
Underweight (BMI < 18.5 kg/m2)	2	20
Healthy (BMI 18.5-22.9 kg/m2)	4	40
Overweight (BMI 23-29.9 kg/m2)	4	40
Hb Level		
7- 9.9 g/dL	1	10
10-10.9 g/dL	9	90

Data collection

The data were collected through in-depth interviews. The semi-structured questions were developed by the researcher based on the concepts of anemia in pregnancy, research objective, and context. The items of questions were verified by the three experts in maternal and newborn nursing in terms of content, construct, and language based on the scale level content validity index (s-CVI) at 0.85. It calculated the average proportion from all items level content validity index (i-CVI) (Polit & Beck, 2006). The question guide consisted of the designing or tailoring of the health promotion program as a healthcare service for pregnant women with anemia in terms of the main concepts of the program, duration, and feasible to use in real life. Steps in conducting the interviews were as follows: (1) the name, position and contact details of the researcher were introduced to the participants; (2) study information was briefed to the participants on the purposes, benefits and processes of the study, and ethical issues; (3) any questions from the participants were answered by the researcher before starting the interviews; and (4) the main findings from the interviews were summarized for checking accuracy and correction with the participants (Creswell, 2014; Holloway et al., 2010). The interviews ended with eliciting the participants' demographic characteristics. All interviews took about 30 to 45 minutes per participant and were recorded with a digital voice recorder and field notes.

Data analysis

Thematic analysis was used to analyze data. The data were managed by the researcher as well as manually. The process in conducting a thematic analysis was as follows (Braun & Clarke, 2006; Holloway et al., 2010). Firstly, the data were fully transcribed. The full transcripts were checked and cross-checked for accuracy. Next, all transcripts were read and reread several times to understand each interview in depth. The data were compared for similarities and differences among participants based on a list of all topics from interviews. Verbatim quotes and manifest data were underlined and highlighted as key words. The data contents were coded. The codes were checked back with the transcripts for accuracy. The codes were grouped according to initial categories and progressed to sub-themes and themes. The themes were examined in terms of relationships in two dimensions between data set and codes; and codes and themes. The themes were defined and named for presenting the overall data in each theme. Lastly, the coding and the themes were examined for accuracy by the researcher, co-researcher and consultant. The process of thematic analysis was reported in relation to the research questions and literature.

Ethical consideration

Ethical approval for this study was obtained from the Naresuan University Institution Review Board, Naresuan University, Thailand (IRB No. IRB P3-0201-2564), which approves dates between 14 March, 2022 and 14 March, 2023. The decision to participate was made by individual samples independently and without pressure. Participants could withdraw at any time without giving any reason

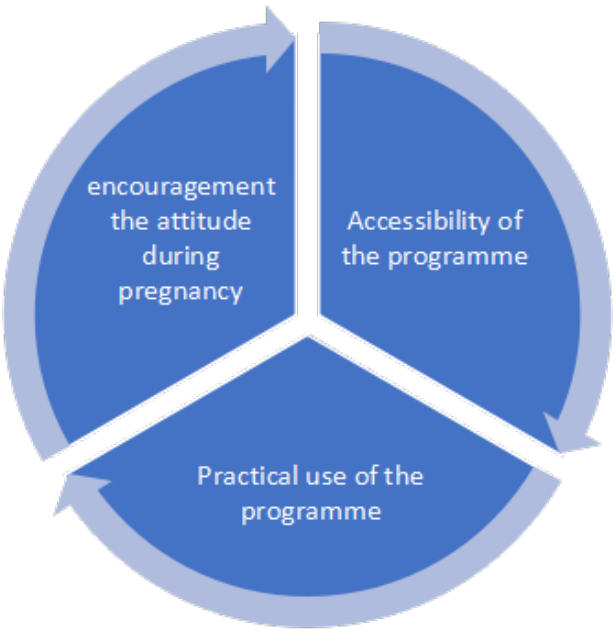

Figure 1. Themes and sub-themes of health promotion programme for maternal anemia

and their withdrawal from the research did not affect the standard of care or their careers. All data in this study were identified by individual codes, except for copies of the consent form which contained the names and contact details of all participants. No data could be accessed by anyone other than the researcher, co-researcher, assistant researcher, and consultant. The data were presented and reported without personal identification. During data collection and analysis, the researcher used a personal notebook with strong password protection. All files and documents were kept securely in the locked storage at Naresuan University, Thailand. Personal information will be kept for one year after the end of the study; all other anonymized data will be kept for a period of ten years after completion of the study in locked storage at Faculty of Nursing, Naresuan University, Thailand.

Trustworthiness

The rigors of this study was obtained in terms of trustworthiness through credibility, confirmability, objectivity and transferability (Anney, 2014; Holloway et al., 2010). The methods of data collection and data analysis process were reported in rich description of characteristics with the details of research setting, characteristics of participants, and the Thai context. The decision-making of the researcher in each stage was demonstrated so that the research processes and context of the study can be applicable for justification in transferability to other contexts or situations in future research (Anney, 2014; Baillie, 2015; Holloway et al., 2010). The protocols of data collection and data analysis were checked with the researcher, co-researcher and consultant to ensure that they were described well enough in terms of data collection process, raw data, process of data analysis and interpretation of the findings as an audit trial for dependability.

The process of qualitative interviews was checked by consolidated criteria for reporting qualitative studies (COREQ) in three domains: research team and reflexivity; study design; and analysis and findings. The researcher summarized the findings from the interviews, which were re-examined by the researcher, co-researcher, and consultant in each phase of the data analysis, including codes and themes as a peer-debriefing for credibility (Anney, 2014; Baillie, 2015; Holloway et al., 2010). The research process was recorded with a diary by the researcher including the feelings and contexts behind the decision-making for confirmability. The effect of the researcher on the research process was acknowledged because the researcher as an instrument might influence the process of the data collection and data analysis. The data analysis process was demonstrated in rich description to ensure that the findings were interpreted from the interviews (Anney, 2014; Baillie, 2015; Holloway et al., 2010; Shenton, 2004).

Results

A total of fifteen participants, consisted of eleven pregnant women and five healthcare professionals, participated in the in-depth interviews. One woman withdrew from the study due to their duties and transportation. The demographic characteristics of participants are summarized in Table 2. Five healthcare professionals included three instructors and two Registered Nurses (RN). The age of healthcare professionals ranged from 34 to 52 years. The average income of participants was 30,000 baht a month. They had experience of maternal and newborn care during antenatal, labor, and postpartum period, which ranged from three to fifteen years. Two of them graduated with a bachelor's degree in health sciences such as nursing and public health. Two of them graduated with a master's degree and one of them graduated with a philosophy of nursing. Pregnant women were residents of the Lower Northern region Thailand such as Sukhothai, Pichit, Phitsanulok, and Tak in both the rural (village or countryside) and urban (town) areas. The age of participants ranged from 22 to 45 years. The average income of participants was 12,000 baht a month.

Most of the pregnant women visited as the first antenatal care visit before 12 weeks of gestational age (8, 80%). Nearly half of participants had a healthy pre-pregnancy BMI (4, 40%), four women had an overweight (40%) and two women had an underweight (20%). Most of them also had a mild severity of IDA (Hb 10-10.9 g/dL) (9, 90%). They did not have signs and symptoms of anemia and complications during pregnancy such as sexual transmitted infection (STI) and gestational diabetes mellitus. The demographic characteristics of pregnant women are summarized in Table 3.

Topics of in-depth interviews covered a range of designing or tailoring of the health promotion program for pregnant women with anemia in terms of main concepts of the program , duration, and feasible to use in real life. The themes and sub-themes are shown in Figure 1. Three main themes emerged from the interviews: 1) Encouragement the attitude of self-care during pregnancy; 2) Accessibility of the health promotion program; and 3) Practical use of the program and integrated program based on the context of pregnant women and healthcare professionals.

Theme 1: Encouragement of self-care during pregnancy

This theme indicated the expression of pregnant women and healthcare professionals that focused on an attitude of pregnant women with anemia. The significant strategy was how to increase their attitude about appropriate self-care during anemia in pregnancy. Attitudes of pregnant women will encourage them to enhance sustainable self-care knowledge and skills during pregnancy such as

nutrition during pregnancy, iron supplement, drug use, and antenatal care visit attendance frequency. Participants, especially healthcare professionals, illustrate that maternal anemia has been an important health issue in Thailand for a long time. Many health promotion program, were run by Thai national and international policies such as the World Health Organization (WHO), were applied to improve maternal and fetal health in an antenatal care clinic and communities. Unfortunately, it appears to not have worked as the rate of anemia in pregnancy is still high. They expressed that the program should focus on changing and gaining their attitude or mindset of self-care during pregnancy in terms of health awareness. The step of health education should be in enhancing their attitude before anemia knowledge. The content should be adequate and meet needs of pregnant women with anemia. This will support them to get a higher level of attitude.

"Anemia in pregnant women is a significant issue in Thailand for long time. We have a lot of program and strategies to help pregnant women with anemia such as health education, advice, reminder via phone, and teaching, but it's not work. I worked with pregnant women more than ten years; this issue is still high. …. Some years are slightly decreased but it's not sustainability. …… In my opinion, if we gain or change their attitude, it might be better than enhance their knowledge. They will have self-awareness to change their health behavior during pregnancy." (Healthcare professional (HCP 1, 43 years old)

"It's been a problem for a long time. …I worked as a nurse more than 20 years. …. We find ways to educate and support them such as milk, eggs, and vitamin supplements. ….It's noting, if they didn't see. It might not be significant for their life because it's normal. …We should find how to change their views to see the importance of the problem: anemia during pregnancy. …It helps to solve this problem." (HCP 3, 52 years old)

"I have had this problem since my first-time pregnancy around three years ago. I got health education about the consequences of anemia during pregnancy, how to take iron supplements, and prevention complications. …I think, noting. …..I believe the another things are more importance than anemia. I have not seen an importance. ….For my current pregnancy, I learn from the previous that anemia during pregnancy is importance. If I didn't have good behavior, it might affect my womb and my baby after birth. …..So, I think, the mindset or attitude is a significant for pregnant women to increase their good health behavior." (Pregnant woman 4, 30 years old)

"For me, I need to get how is important for my life and my baby before getting the content about food intake, vitamin or iron supplements. …..Sometimes, I think the content should be focus on our need rather than your need as a pattern of health education. … It annoy me and impact on my attitude as a boring. (Pregnant woman 3, 24 years old)

Theme 2: Accessibility of the health promotion program

Participants illustrated that the health promotion program for pregnant women with anemia should be easy and accessible. They expressed their experiences of another health program for clients and that some programs have many conditions for engagement . This might affect their emotions and attitude to join the program. The health promotion program should be accessed anytime, anywhere, any gestational age and should be participated as a simple process based on their decision.

"The health promotion program should be design for all pregnant women with anemia. All of them can be engaged if they want. …It should be designed to register as an easy step." (HCP 4, 36 years old)

"…in my second time of pregnancy, I have an anemia due to iron deficiency. I want to join the program for pregnant women who had Hct less than normal, but I cannot join because I have already visited around 32 weeks of gestational age. Nurse told me that I cannot join because your pregnancy closed to the end. …..I think, it might good for all pregnant women to participate in the program. It should be reduced conditions for joining." (Pregnant woman 10, 45 years old).

"The program should be easy to access such as we can use or join it anytime, anywhere based on my context. I used to join the program for teenage pregnancy, it annoyed me, …. Complicated process and difficulty to access. I did it every week and not easy to do it." (Pregnant woman 3, 24 years old)

Theme 3: Practical use of the program and integrated program based on context of pregnant women and healthcare professionals.

Pregnant women expressed their ideas and their experiences to tailor the health promotion program for maternal anemia that the program should be easy to be applied in the real life in terms of the contents, period of time, and our lifestyles both urban and rural area. They also indicated that the program should be adapted to use in the daily life and flexible for all pregnant women.

"I want the health promotion program that will be used in my daily life. In my point of view, I feel the health promotion program, that I got from nurse, is an ideal program. It cannot be used in my life. …For example, they teach me as a student, I learned a lot around 2-3 hours. OMG, I don't have enough time to learn for more than an hour. I know, it's good for me, but I must do my work. It should be applied to my life." (Pregnant woman 8, 38 years old)

"Some contents of health education, I don't know how to use it. I have a lot of questions as what I should to do? …. For example, I learn about what kind of meat I should eat when I have anemia during pregnancy. They told me I should eat offal, but I don't like it. In addition, during pregnancy, I cannot eat due to my morning sickness. ….They

also said, 'you should eat it', it help me to improve health status. I don't know how to do it. I try to eat a lot of iron supplements to replace food with offal. Unfortunately, my Hct is still low." (Pregnant woman 1, 22 years old)

Healthcare professionals strongly indicated that the program should be applied with their duties and responsibilities. It should be integrated with their regular work and office hours. They also expressed that they know the ideal program might support pregnant women to gain their Hct and health behaviors, but it takes time and increases our work, including working overtime. It is the cause of burnout from work. The health promotion program should be practically used for sustainability based on the context of the healthcare system.

"It might better to integrate the health promotion program to their routine work. I feel tired doing the extra program that might not fit with my work. I cannot do the program after office hours. …not good for me. After office hours, it's my time to feel free and enjoy my life. It's not time to work." (HCP 5, 34 years old)

"I am concerned about this problem, anemia in pregnancy. …However, it good to be concerned my duties. Please, do not increase our workload. I provide nursing care for pregnant women and then do the documents. I run the antenatal care in the early morning every day, I have not enough time to work overtime. I feel burned out." (HCP 4, 47 years old)

Discussion

The findings of this study illustrate the point of views of pregnant women and healthcare professionals to tailor the health promotion program for pregnant women with anemia. Their views indicated that the program should focus on attitudes of pregnant women, accessibility to the program, practical use and integrated with their real-life for both pregnant women and healthcare professionals. A total of fifteen participants consisted of ten pregnant women and five healthcare professionals participated in the in-depth interviews. One woman withdrew from the study due to their duties and transportation.

From the findings it indicted that women may have had moderate to high level of self-care during pregnancy. This is similar to findings of a study conducted in China with 1,088 pregnant women. The first time visit at antenatal care before 13 weeks of gestation is associated with higher level of self-care than pregnant women who had visit fort the first time after gestational age 13 weeks. Women with early visit received health education from healthcare professionals that helped them in decreasing risk of complications, getting information about nutrition during pregnancy, and avoiding alcohol intake and smoking (Ma et al,, 2020). Surprisingly, most samples had a mild severity of anemia and they didn't have any signs and symptoms of anemia. They still had a normal life during pregnancy as a routine. This is similar to findings of pregnant women's experiences who had mild to moderate severity of anemia that they perceived nothing as not normal (Chatterjee & Fernandes, 2014; Klankhajhon et al., 2021). The characteristics of participants will reflect their ideas for designing the program.

Three main themes emerged from the interviews: 1) Encouragement the attitude of self-care during pregnancy; 2) Accessibility of the health promotion program; and 3) Practical use of the program and integrating the program based on the context of pregnant women and healthcare professionals.

This first theme indicated the expression of pregnant women and healthcare professionals that focused on an attitude of pregnant women with anemia. The significant strategy was how to increase their attitude about appropriate self-care during anemia in pregnancy. Attitudes of pregnant women will encourage them to enhance sustainable self-care knowledge and skills during pregnancy such as nutrition during pregnancy, iron supplement, drug use, and antenatal care visit attendance frequency. The findings are similar to a study about the effectiveness of changing health behavior. The key strategy is enhancing their positive attitude. Many studies found that high level of attitude positively related with self-care during pregnancy (Bayisa et al., 2022; Moshi, Kibusi, & Fabian, 2020). In addition, the studies illustrated the experiences of pregnant women with low level severity of anemia associated with negative attitude. It impacts their competency of self-care (Chatterjee & Fernandes, 2014; Klankhajhon et al., 2021).

Participants, especially healthcare professionals, illustrated that maternal anemia has been an important health issue in Thailand for a long time. The issue of anemia with pregnant women is one of the KPI of antenatal care. Healthcare professionals provided many anemia prevention programs and health education programs based on national and international policies. From the statistics, the rate of maternal anemia except pregnant women with thalassemia is continuing at a higher rate than the standards. It shows these programs might not be suited for pregnant women with anemia. It also indicated that these programs might not solve maternal anemia sustainability. In addition, some women in this study had experience of maternal anemia in the previous pregnancy.

Therefore, the findings indicated that attitude of health behavior is the main point in the health promotion program for pregnant women with anemia. The program should be designed with questions and answers, and a knowledge sharing section. It will helps to improve their attitude, knowledge, and skills. This is also similar to a literature review of health behavior modification in pregnancy which gained their attitude, knowledge, and empowerment (Boguszewski et al., 2018; Grant, Morgan, & Mannay, 2019). However, the empowerment in pregnancy wasn't mentioned in this study. This may be because most of the pregnant women had an early

antenatal care visit before 12 weeks of gestation. They got support and prenatal education from nurses, healthcare professionals, and their family members as social support. Furthermore, most of them had low level severity of anemia without any signs and symptoms. So, it is strongly expressed to focus on attitude that should be included as a key point to improve health behavior and Hct level in pregnant women with anemia and that the program should focus on changing and gaining their attitude or mindset of self-care during pregnancy in terms of health awareness.

The step of health education should be in enhancing their attitude before anemia knowledge. The content should be adequate and meet the needs of pregnant women with anemia. It will support them to get a higher level of attitude. The study illustrated that the first fifteen minutes are good to provide health education because this is the best time as being alert in terms of attention and perception. Normally, a lecture including health education will take around 50–60 minutes (Bradbury, 2016). Participants revealed that the health promotion program for pregnant women with anemia should be easy and accessible. The health promotion program should be accessed anytime, anywhere, any gestational age and should be participated as a simple process based on their decision. The findings are similar to a study about the health promotion program that it should be accessible and result in increasing facilities and reducing barriers (WHO, 2022). All pregnant women with anemia should have a chance to participate in the program without limitation of gestational age, maternal age, and others except the limitation due to their health status and complications during pregnancy. The program should be easy to participate in without complicated process based on their context. These factors will affect participation adherence and attitude of pregnant women in the program.

Pregnant women expressed that the program should be easy to be applied in their real life in terms of the contents, period of time, and lifestyles, both urban and rural area. They also indicated that the program should be adapted to use in daily life and flexible for all pregnant women. The study of the effects of health promotion program on health behavior found that the context of family, community and healthcare system should be considered (Smith, Portela, & Marston, 2017; Zinsser et al., 2020). The real-life context should be concerned for both clients and healthcare providers when designing the health promotion program for pregnant women with anemia in terms of time, cost, duties, and implication for both rural and urban areas.

Healthcare professionals also illustrated that the program e should be applied with their duties and responsibilities as a regular work during office hours. In addition, the health promotion program should be practically used for sustainability based on the context of workload and healthcare system. The program e should be designed to apply to prenatal education and integrated with daily duties both online and onsite. The statement “Do not increase their workloads at antenatal care clinic” is the key point that should be concerned about nurses and healthcare professionals’ responsibilities. A cross-sectional study by Diehl et al. (2021) revealed that 497 registered nurses had a lot of work and this was positively associated with high level of fatigue and burn out. During the COVID-19 pandemic, the workload of registered nurses who work at an intensive care unit was positively related with occupational exhaustion (OE). It led to burn out and quitting the job as a nurse (Aljanfawi, 2022; Cho et al., 2022).

The setting for collecting the data was a secondary care at a community hospital. The service covers the treatment of uncomplicated diseases, health promotion, health prevention, and rehabilitation for all age groups. The environment of this setting might influence the findings in term of healthcare professionals as a nurse or midwife. They take on a multifunction role in the antenatal care clinic as nursing care, basic treatment, healthcare educator, and documentation.

Conclusion

The findings from pregnant women and healthcare professionals are both necessary and timely for informing the health promotion program tailored specifically for pregnant women with anemia. It was useful for healthcare professionals to better understand their expressions and ideas to solve the maternal anemia issue. This study will be applied in clinical practice of health education in antenatal care clinics for designing and developing a lesson plan and learning outcomes of pregnant women. For the nursing administration, the health promotion program on maternal anemia will be established based on pregnant women-centered and concerned on enhancing attitude of pregnant women, accessibility for all of them, and practical use and integrated with the context of both women and healthcare professionals. The limitation of this study should be considered. The small size of the pregnant women and healthcare professionals might affect the generalizability of the findings. Most of the pregnant women represented a low to medium level of education and family income including living in rural area. These factors may have limitations to represent the entire population. In future study, the program will be tested in terms of feasibility, accessibility, practical use, and outcomes. The tailored program will support developing a key performance index of maternal and child health, decrease risks and complications, and promote maternal and child health based on the context.

Declaration of Interest

This research was fund from Faculty of Nursing, Naresuan University, Thailand. The funder has no role in the study design, collection, management,

analysis or interpretation of data or writing of this report.

Acknowledgment

The authors would like to thank Dean of faculty of Nursing, Naresuan University, Thailand for her kind support. I also would like to acknowledge my deepest thanks and gratitude to Professor Dr.Kenda Crozier as a consultant for her kind support and useful advice and guidance. We also thank our colleges for their kind supports and helpful suggestions.

Funding

The research was funded by faculty of Nursing, Naresuan University, Thailand: R2565N002/2565 for supporting financially.

Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Personal factors related to self-care management among people with hypertension at primary health care: A cross-sectional study

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OPEN ACCESS

Jurnal Keperawatan Padjadjaran (JKP)

Volume 11(3), 203-213

http://dx.doi.org/10.24198/jkp.v11i3.2340

Article Info

Received : August 01, 2023
Revised : October 05, 2023
Accepted : October 17, 2023
Published : December 01, 2023

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Citation

Kurnia, A.D., Hariyati, S., Melizza, N., Al-Husna, C.H., Amatayakul, A., & Handoko, A. (2023). Personal factors related to self-care management among people with hypertension at primary health care: A cross-sectional study. *Jurnal Keperawatan Padjadjaran, 11*(3), 203-213. http://dx.doi.org/10.24198/jkp.v11i3.2340

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

Abstract

Background: Hypertension requires long-term treatment and can last a lifetime. Recommendations for hypertensive patients, where it is necessary to change behavior related to self-care, consist of increasing a healthy diet, limiting sodium intake, increasing physical activity, reducing smoking, and reducing alcohol consumption.
Purpose: The purpose of this study was to identify the self-care model of patients with hypertension in primary healthcare in Kota Malang.
Methods: This study's design was descriptive analytic with a cross-sectional methodology. Using G Power, 321 hypertension patients were used as samples. Purposive sampling was used in this study. The instruments used H-SCALE, also known as the Hypertension Self-Care Activity Level Effects. Pearson Chi-squared test was used to examine correlations among variables.
Results: Factors of gender (p=0.001) and education (p=0.020) are related to self-care in hypertensive patients. Majority of respondents were women, 223 people (69.5%), Most of the respondents had elementary school education, 136 people (41.4%), the majority of the 321 respondents (216, 67.3%) have moderate self-care category. Gender and age were significant factors associated with self-care among hypertensive patients (p<0.05).
Conclusion: Gender and education level have significant correlation with self-care management of hypertension. Providing self-management intervention by considering gender and education level needs improvement. Other factors need to be explored in further research.

Keywords: blood pressure, primary healthcare, self-care

Introduction

Hypertension is a degenerative disease that can become a problem and significantly make medical conditions serious, which can increase the risks of rupture of a blood vessel in the brain, heart disease, kidney disease and other diseases (Wahyuni et al., 2021). Hypertension is included in the silent killer disease group or silent disease because patients are not aware of the symptoms of high blood pressure and have not had their blood pressure checked (Uchmanowicz et al., 2018). Hypertension is divided into two types, namely essential or primary, whose origin is unknown, and secondary caused by endocrine diseases and heart disease (Tarigan et al., 2018).

Hypertension requires long-term treatment and can last a lifetime (Xiang et al., 2020). The success of treatment lies not only in the persistence of control, but also in the persistence of taking antihypertensive drugs to avoid

complications (Jung & Lee, 2017). Hypertensive patients must adhere to their medication because hypertension is a chronic disease that cannot be cured, control of blood pressure is key (Wulandari & Puspita, 2019). Angioedema, coronary artery disease, acute and chronic renal failure, arterial disorders, cerebrovascular accident, congestive heart failure, myocardial infarction, and cardiovascular disease are complications that will occur if hypertension pressure treatment is not applied systematically (Zhang et al., 2020).

The incidence of hypertension has an impact on increasing morbidity and mortality in the community. Hypertension needs special attention considering the impact it has both in the short and long term (Haldi et al., 2020). Anti-hypertensive drugs require high adherence to support the process of treating anti-hypertensive disease. Inappropriate use of anti-hypertensive drugs can cause a spectrum of toxicity, failure of medical therapy, high medical costs, complications up to patient death, and hinder the quality of the health service itself (Mila et al., 2021).

The World Health Organization (WHO, 2023) estimates that the global prevalence of hypertension currently accounts for 1.28 billion adults aged 30–79 years. It is estimated that 46% of adult patients with hypertension are not aware they have the illness. The prevalence of hypertension in Indonesia based on Health Research and Development of RI, 2018 reached 34.1%. This percentage shows an increase from the Ministry of Health RI, 2013 figures where the prevalence of blood pressure/hypertension was 25.8%. As for cases of hypertension in Indonesia, it is estimated that only a third of cases are diagnosed, the rest are undiagnosed (Ministry of Health RI, 2021).

East Java has a population of 935,736 residents, the percentage affected by hypertension being 13.47% with men at 13.78% and women 13.25%, within an age range of 25-44 years (29%), 45- 64 years (51%), and over 65 years (65%) (Attygalle et al., 2020). Meanwhile, the results of a survey by the Department of Communication and Information (2020) in Malang City showed hypertension is the second highest disease with a total of 32,109. However, 2021 data from the Ciptomulyo Health Center show the highest number of patients with hypertension is in the Bakalan Krajan sub-district, Malang City, being around 400 people.

From these results, it is stated that the level of success in managing hypertension patients in Indonesia still requires attention and requires serious efforts from all parties. One effort to reduce hypertension complications is self-care or self-management (Salami, 2021). Self-care is defined an activity to reduce anxiety levels to stress, increase and control the level of mental well-being that starts with self-awareness about what is happening to the patient, which will make a person able to prevent and control and overcome various problems that can affect physical, mental, and spiritual health conditions. In self-care, hypertensive patients have a domain consisting of a low-sodium diet, a healthy and nutritious food diet, physically involved in active activities, smoking management, and reducing alcohol consumption, reducing stress levels, weight management, and reducing exposure to pollution and cold air (Unger et al., 2020). Meanwhile, Warren-Findlow et al. (2013) reported that self-care consists of medication adherence, weight management, physical activity, exposure to smoking, alcohol care, low salt, and low fat.

According to Peltzer and Pengpid (2018), in Indonesia the prevalence of hypertension based on the Indonesian Family Life Survey (IFLS 5) is still high (33.4%) and the level of awareness of the disease is low (42.9%). Whereas in hypertensive patients, according to Niriayo et al. (2019), the prevalence of adherence to self-care behavior revealed that the majority of research respondents were non-smokers (89.9%) and abstinent from alcohol (68.8%). Less than half of participants adhered to prescribed antihypertensive medications (48.2%) and recommended levels of physical activity (44.9%).

In the context of self-care, the American Heart Association has recommendations for hypertensive patients, where it is necessary to change behavior related to self-care and which consists of increasing a healthy diet, limiting sodium intake, increasing physical activity, reducing smoking and alcohol consumption, lowering blood sugar levels, anxiety and stress, reducing exposure to pollution, and exposure to cold air. Self-care is an individual's ability to take the initiative to shape behavior in maintaining health and well-being in life. If self-care can be formed properly, it will help shape the character of integrity, structure and function as well as human development toward a better life (Muhlisin & Irdawati, 2010). This study aimed to examine self-care management among people with hypertension at primary healthcare in Malang, Indonesia.

Materials and Methods

Design and participants

This study used a cross-sectional study approach. The population in this study were hypertensive patients in primary healthcare in Malang, Indonesia including Ciptomulyo Health Center, Dinoyo Health Center, and Pandanwangi Health Center. Respondents are members of the Prolanis group (Chronic Disease Management Program).

Samples

The sampling technique used was purposive sampling, with inclusion criteria: a. Patients diagnosed with hypertension aged ≥ 18 years old; b. Patients who are able to communicate well. Exclusion criterion was patient is not in a state of complications. After calculating using G Power with an effect size of 0.2, a power of 0.8, a probability of 0.5, a sample size of 321 respondents was obtained.

Table 1. Respondent Demographic Data (n= 321)

Variable	Frequency	Percentage
Gender		
Male	98	30.5
Female	223	69.5
Age (y.o)		
Early adulthood (26 – 35)	53	16.5
Adulthood (36 – 44)	110	34.3
Middle age (45-59)	142	44.2
Older people (> 60)	16	5.0
Education level		
No education	53	16.5
Elementary school	136	41.4
Junior high school	61	19.0
Senior high school	57	17.8
Diploma	3	0.9
University	11	3.4
Occupation		
Occupation	113	35.2
No Occupation	208	64.8
Routine control		
No	48	15.0
Yes	273	85.0
Long diagnosed		
<1 years	28	8.7
1 years or more	293	91.3
Medication		
No	196	61.1
Yes	125	38.9

Instruments

The Hypertension Self-Care Activity Level Effects, or H-SCALE, was used in this study. The goal of the questionnaire was to gauge how well hypertension patients were following the suggested self-care regimen. The H-SCALE has six domains and 29 components (Warren-Findlow et al., 2013). The Cronbach's alpha coefficient of 0.73 was used in the pilot study to examine the reliability of each item on the questionnaire (Warren-Findlow et al., 2013). The overall results were between 10 and 183. This questionnaire used Indonesian language adapted from Huda et al. (2015). The Cronbach's alpha coefficient of H-SCALE questionnaire was 0.73 (Huda et al., 2015).

There were six domains of hypertension self-care activity level effect (H-SCALE), as follows: (a) Medicine adherence: three items measure the number of days in the previous week (0–7) on which a person took their blood pressure medication, did so at the indicated dosage, and did so at the same time each day.; (b) The DASH diet is compared to employing 11 items that relate to eating a healthy, low-fat, and low-salt diet. Items ask about consuming the appropriate amount of fruits and vegetables and avoiding foods with high salt content. They also ask about avoiding fatty or fried foods. The questionnaire featured both good and negative items (4, 5, 6, 7, 8, 9, and 10). (11, 12, 13, and 14). Negative items received scores of 7 to 0, while positive items received scores of 0 to 7; (c) Two questions were used to assess physical activity; (d) Two questions were used to measure smoking exposure. The responses were tallied (range 0–14); (e) Practice of weight management activities is assessed with 10 items related to dietary practices such as cutting portion size and making food substitutions as well as exercising specifically to lose weight; (f) Alcohol intake is assessed using the 1-item, National Institute on Alcohol Abuse and Alcoholism (NIAAA) Quantity and Frequency Questionnaire.

Data Analysis

The demographics data were reported using

Table 2. Variable in Self-care in hypertensive patients (n=321)

Variable	Category	Frequency	%
Self-care among Hypertension patient	Poor	55	15.6
	Moderate	216	67.3
	Good	50	15.6
Medication	Poor	0	0
	Moderate	254	79.1
	Good	67	20.9
Diet	Poor	56	17.4
	Moderate	224	69.8
	Good	41	12.8
Physical activity	Poor	64	19.9
	Moderate	198	61.7
	Good	59	18.4
Smoking	Yes	119	37.1
	No	202	62.9
Weight management	Poor	61	15.0
	Moderate	212	66.0
	Good	48	15.0
Alcohol consumption	Yes	0	0.0
	No	321	100

descriptive statistics. This study used Pearson chi square in analyzing the relationship of factors that influence hypertension self-care. Ethical approval was obtained from the Ethical Review Board (ERB) Committee of Faculty of medicine, University of Muhammadiyah Malang (No.E.5.a/155/KEPK-UMM/X/2022).

Results

Demographic Data

Out of the 321 participants, 223 (69.5%), were women; 44.2% were of age in the late adult category. Most of the respondents (41.4%) had elementary school education. The majority (64.8%) were not employed. Most (85%) of them did go for their routine checks (Table 1).

Self-Care in Hypertension Patients

Based on Table 2, it can be explained that the majority of the 321 respondents (216 people, 67.3%) have moderate self-care category with. The majority of the 321 respondents (254 people, 79.1%) were in the category of moderate drug use,. The majority of the 321 respondents (224 people, 69.8%) had a moderate diet category of. The majority of the 321 respondents (198 people, 61.7%) had moderate physical activity category of. The majority of the 321 respondents (202 people, 62.9%) were in the non-smoking category,. The majority of the 321 respondents (212, 66%) had sufficient weight management category . All respondents did not consume alcohol.

Self-Care among Hypertension Patients

Table 3 shows that the average respondent does not take medication. Respondents have a week to eat more than one portion of vegetables 4 times and 48% do not eat fatty foods. 48.6% of respondents did not engage in any sports activities. Nearly half of the respondents are unsure about weight management. All respondents did not drink alcohol.

Relationship between demographic variables and self-care among hypertensive patients

Table 4 shows the factors of gender (p=0.001) and education (p=0.020) which are related to self-care in hypertensive patients.

Discussion

The aim of the study was to identify the self-care model of patients with hypertension in primary healthcare in Kota Malang. This study showed that most respondents were in sufficient total self-care. This is supported by the motivation of the sample to carry out routine blood checks once a month at the posyandu or puskesmas. In addition, it is supported by the gender that most women's motivation is better than men in the process of self-care. The results of this study are reinforced by literature (Setyorini, 2018) that the motivation and beliefs possessed by individuals indicate readiness to change behavior in a direction that can be better in the process of self-care. Meanwhile, in terms of gender, it is consistent with literature (Djamaluddin et al., 2022) that women are more responsible for maintaining their own

Table 3. Self-Care among Hypertension Patients

Item	Measurement								Mean	SD
Medication Usage	**Number of Days**									
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**		
Take your blood pressure pills?	205 (63.9)	20 (6.2)	9 (2.8)	8 (2.5)	3 (0.9)	3 (0.9)	4 (1.2)	69 (21.5)	1.85	2.88
Take your blood pressure pills at the same time every day?	205 (63.9)	40 (12.5)	14 (4.4)	5 (1.6)	0	0	2 (0.6)	55 (17.1)	1.49	2.61
Take the recommended number of blood pressure pills?	203 (63.2)	34 (10.6)	14 (4.4)	4 (1.2)	2 (0.6)	1 (0.3)	2 (0.6)	61 (19)	1.63	2.72
Diet	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**		
Eat nuts or peanut butter?	146 (45.5)	90 (28)	31 (9.7)	25 (7.8)	9 (2.8)	5 (1.6)	7 (2.2)	8 (2.5)	1.2	1.66
Eat beans, peas, or lentils?	175 (54.4)	68 (21.2)	31 (9.7)	19 (5.9)	11 (3.4)	6 (1.9)	6 (1.9)	5 (1.6)	1.03	1.58
Eat eggs?	33 (10.3)	55 (17.1)	65 (20.2)	74 (23.1)	56 (17.4)	20 (6.2)	7 (2.2)	11 (3.4)	2.64	1.69
Eat more than one serving of fruit such as apples, bananas, oranges, melon, watermelon, papaya, or raisins?	21 (6.5)	49 (15.3)	46 (14.3)	63 (19.6)	29 (9.0)	32 (10.0)	22 (6.9)	59 (18.4)	3.58	2.24
Eat more than one serving of vegetables such as broccoli, collard greens, spinach, potatoes, squash or sweet potatoes?	15 (4.7)	37 (11.5)	34 (10.6)	40 (12.5)	29 (9.0)	40 (12.5)	32 (10.0)	94 (29.3)	4.33	2.32
Drink milk (in a glass, with cereal, or in coffee, tea or cocoa)?	110 (34.3)	74 (23.1)	54 (16.8)	38 (11.8)	14 (4.4)	4 (1.2)	4 (1.2)	23 (7.2)	1.73	1.98
Eat whole grain breads, cereals, grits, oatmeal or brown rice?	163 (50.8)	70 (21.8)	39 (12.1)	35 (10.9)	8 (2.5)	1 (0.3)	2 (0.6)	3 (0.9)	1.00	1.35
Eating salt more than 6 gram (one teaspoon) per day?	127 (39.6)	115 (35.8)	32 (10.0)	22 (6.9)	11 (3.4)	8 (2.5)	2 (0.6)	4 (1.2)	1.14	1.43
Eating fried food such as chicken, or fish?	18 (5.6)	41 (12.8)	45 (14)	82 (25.5)	55 (17.1)	39 (12.1)	16 (5.0)	25 (7.8)	3.31	1.89
Eating fatty foods?	156 (48.6)	116 (36.1)	34 (10.6)	10 (3.1)	3 (0.9)	1 (0.3)	1 (0.3)	0	0.73	0.93
Eat pickles, olives, or other vegetables in brine?	210 (65.4)	62 (19.3)	18 (5.6)	19 (5.9)	4 (1.2)	2 (0.6)	4 (1.2)	2 (0.6)	0.68	1.26

Cont. Table 3. Self-Care among Hypertension Patients

Item	Measurement								Mean	SD
Medication Usage	**Number of Days**									
Physical Activity	0	1	2	3	4	5	6	7		
Do at least 30 minutes total of physical activity?	75 (23.4)	50 (15.6)	23 (7.2)	21 (6.5)	13 (4.0)	10 (3.1)	6 (1.9)	123 (38.3)	3.60	2.98
Do a specific exercise activity (such as swimming, walking, or biking) other than what you do around the house or as part of your work?	156 (48.6)	48 (15.0)	28 (8.7)	21 (6.5)	13 (4.0)	7 (2.2)	8 (2.5)	40 (12.5)	1.81	2.45
Smoking	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**		
Smoke a cigarette or cigar, even just one puff?	261 (81.3)	9 (2.8)	3 (0.9)	5 (1.6)	3 (0.9)	2 (0.6)	0	38 (11.8)	0.99	2.31
Stay in a room or ride in an enclosed vehicle while someone was smoking?	223 (69.5)	23 (7.2)	17 (5.3)	20 (6.2)	11 (3.4)	6 (1.9)	0	21 (6.5)	1.05	1.99
Weight management	**Strongly disagree**		**Disagree**		**Not sure**	**Agree**	**Strongly agree**			
I am careful about what I eat	6 (1.8)		18 (5.6)		83 (25.9)	180 (56.1)	34 (10.6)		3.67	0.83
I read food labels when I grocery shop	24 (7.5)		23 (7.2)		145 (45.2)	118 (36.8)	11 (3.4)		3.21	0.91
I exercise in order to lose or maintain weight	2 (0.6)		8 (2.5)		153 (47.7)	132 (41.1)	26 (8.1)		3.53	0.70
I have cut out drinking sugary sodas and sweet tea	4 (1.2)		24 (7.5)		168 (52.3)	109 (34.0)	16 (5.0)		3.33	0.74
I eat smaller portions or eat fewer portions	3 (0.9)		13 (4.0)		140 (43.6)	150 (46.7)	15 (4.7)		3.50	0.69
I have stopped buying or bringing unhealthy foods into my home	1 (0.3)		13 (4.0)		161 (50.2)	132 (41.1)	14 (4.4)		3.45	0.66
I have cut out or limit some foods that I like but that are not good for me	3 (0.9)		18 (5.6)		132 (41.1)	156 (48.6)	12 (3.7)		3.48	0.70
I eat at restaurants or fast-food places less often	6 (1.9)		11 (3.4)		67 (20.9)	202 (62.9)	35 (10.9)		3.77	0.75
I substitute healthier foods for things that I used to eat	6 (1.9)		17 (5.3)		120 (37.4)	153 (47.7)	25 (7.8)		3.54	0.78

Cont. Table 3. Self-Care among Hypertension Patients

Weight management	**Strongly disagree**	**Disagree**	**Not sure**	**Agree**	**Strongly agree**								
I have modified my recipes when I cook	5 (1.6)	18 (5.6)	161 (50.2)	119 (37.1)	18 (5.6)	3.39	0.74						
Alcohol consumption	**Number of Days**												
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**					
On average, how many days per week do you drink alcohol?	321 (100)	0	0	0	0	0	0	0	0.00	0.00			

health.

Self-care is an activity created and carried out by individuals to maintain a prosperous life whether in health or illness (Fernalia et al., 2021). Self-care in hypertensive patients is a positive form of client effort to optimize the client's health, control and manage signs and symptoms that appear, prevent complications and minimize disturbances that arise in bodily functions (Winata et al., 2018). Patient involvement is in the process of care and self-monitoring of their disease in controlling blood pressure such as lifestyle modification, monitoring blood pressure at home or in health services, strengthening healthy behavior; if total self-care is good and there are healthy lifestyle behaviors, it can more easily reduce problems in hypertension (Suprayitno & Damayanti, 2020).

From the results of the research conducted, it was found that the majority of respondents were not taking hypertension drugs. This is due to sufficient use of hypertension drugs due to low education factors, as the majority of the sample in this study were elementary school graduates. The results of this study are supported by Puspita et al. (2017) that having higher education can change positive behavior. Education is also able to provide information to someone, which will lead to an increase in their knowledge. In addition, social support factors also affect the level of adherence of hypertensive patients (Kartikasari et al., 2022). In the research results, it was found that the majority of respondents lived with extended families. Good support from family members has an important role in adherence to treatment for patients with hypertension. The results in this study are in line with literature (Nuratiqa et al., 2020) which reported that the greater the support obtained from family members with hypertension, the higher the adherence to treatment. Support from family members will provide a sense of comfort, attention and a sense of being cared for in carrying out hypertension treatment, so that patients with hypertension are compliant to treatment (Apsari et al., 2021).

The majority of respondents in this study had a moderate level of hypertension diet. It was concluded that there is still neglect regarding the process of maintaining dietary patterns in people with hypertension; this is what makes patients non-adherent to medication therapy (Khusuma et al., 2020). Low-income levels, low education levels, and lack of family support are important indicators that can lead to neglect of dietary adherence. A person's income level is closely related to their eating preferences (Ainiyah & Wijayanti, 2019). The majority of patients who do not work have a relationship where they have limited skills so it is difficult to fulfill their life needs (Pratiwi et al., 2021). Furthermore, the level of education will be related to how a person makes decisions in maintaining his health (Nurman, 2021), as well as low family support causing a person to experience a decrease in motivation in promoting a healthy lifestyle (Amelia & Kurniawati, 2020). Many respondents in this study had to eat more than one portion of vegetables four times in a week and 48% do not eat fatty foods. It was concluded that there is still neglect regarding the process of maintaining dietary patterns in people with hypertension; this is what makes patients non-adherent to medication therapy (Khusuma et al., 2020).

The results in this study are in line with literature (Sapwal et al., 2021) that the low rate of adherence to a hypertensive diet is due to lack of family support, which plays an important role in supporting adherence to a hypertensive diet. Likewise, in terms of low education, it also results in low dietary adherence in hypertensive patients, which is supported by research (Devi & Putri, 2021). Income and work will also make it harder for a person's compliance process, which is reinforced from the results of research conducted by Pratiwi et al. (2021) because there will be a connection related to fulfilling daily needs compared to checking and improving health.

Many of respondents did not engage in certain sports activities. Lack of physical activity increases the risk of hypertension. People who are inactive tend to have a higher cholesterol so that the heart muscle has

Table 4. Correlation of factors to self-care in hypertensive patients

Variables	Pearson Chi-square	P-value
Gender	14.100	0.001*
Age	10.866	0.093
Education Level	21.088	0.020*
Occupation	1.479	0.477
Routine control	0.355	0.837
Long diagnosed	0.256	0.880
Medication	0.615	0.735

*Significancy at $p < 0.05$

to work harder with each contraction; the bigger and more often the heart muscle pumps, the greater the pressure that is imposed on the arteries so that blood pressure increases (Karim et al., 2018). Tamamilang et al. (2018) confirmed that lack of physical activity can lead to cerebrovascular accident further leading to disability and even death. Low physical activity and already in a chronic stage, contributes to a low level of cardiorespiratory fitness, which is a factor for worsening cardio metabolism compared to other risk factors (Benjamin et al., 2018). The importance of physical activity is related to the increased secretion of vasodilator substances such as nitric oxide. In addition, physical activity will also reduce catecholamine levels and increase insulin sensitivity, both of which are associated with a decrease in sodium and water retention, which causes a decrease in blood pressure (Karatzi et al., 2018).

The results of this study showed that none of the respondents consumed alcohol. However, this does not rule out the possibility that alcohol consumption in sufferers needs to be avoided, It is emphasized in research (Ramadhani, 2021) that alcohol has a long-term effect that will increase cortisol levels in the blood so that the activity of the renin-angiotensin-aldosterone system (RAAS), which functions to regulate blood pressure and body fluids increases; alcohol consumption increases the volume of red blood cells so that blood viscosity increases and causes hypertension. The ethanol compound in alcohol can physiologically increase cortisol levels when consumed, thereby increasing blood pressure in the arteries as a result of which the heart pumps blood more forcefully to flow throughout the body, then the blood vessels become stiff and narrow so they cannot expand or vasoconstriction occurs (Dewi et al., 2021).

More than half of the total respondents on the weight management item are unsure about weight management. This relates to patient demographic data including gender and age. Gender influences weight management behavior in people with hypertension. Asih (2021) states that women have better behavior habits than men. As for age related to the process of weight management in research, it was reported that increasing age will affect a person's independence, especially in meeting the needs of daily life and self-management such as weight (Sakinah et al., 2020).

There is relationship between gender and self-care among hypertensive patients. Due to the majority of the sample being women, smoking is not a problem in self-management processes related to health due to hypertension. Smoking behavior also has a relationship with the incidence of hypertension; in smoking, the nicotine contained in cigarettes is absorbed into the bloodstream, causing damage to the arteries, triggering the process of atherosclerosis and increasing blood pressure.

There is relationship between educational level and self-care among hypertensive patients. Education can be a factor that can affect a person's adherence to treatment (Kartikasari et al., 2022) Okatiranti et al.'s (2017) findings on knowing the level of knowledge of hypertensive patients also corroborates the results of this study, that respondents who have a good level of knowledge are those with a high level of education. The higher a person's education level, the better his knowledge, so that this results in an increase in one's potential to maintain and improve health. In addition, previous study reported that there were also a significant association between education (p=0.005) with diet adherence among adult hypertensive patients in Padang (Gusty & Merdawati, 2020).

Conclusion

This study sought to determine the factors having significant differences in self-care management among patients with hypertension in a primary healthcare setting. This study highlights self-care management among patients with hypertension has a significant difference in gender, age and education level.

Declaration of Interest

There is no conflict of interest.

Acknowledgment

The authors would like to thanks to University of Muhammadiyah Malang to support this study.

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Factors related to sleep in family caregivers of people with dementia: A systematic review

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Abstract

Background: Family caregivers (FCGs) face many problems when taking care of people with dementia.
Purpose: This study wanted to explore the factors related to FCGs' sleep in people with dementia.
Methods: The study used a systematic review approach based on PRISMA. The study focused on FCGs for people with dementia in the home setting. A narrative synthesis was employed.
Results: The result showed that the sleep problem and severity of a patient with dementia have an essential role in their state. Those indirectly impact the FCGs' condition. The majority of the study's sleep problems were related to physical fatigue that influenced the FCGs' distress. Coping mechanisms have an essential role in the caregiver situation. A maladaptive coping mechanism would increase the stress of the caregiver and lead to a sleep problem.
Conclusion: The consequences of those are burden and depression. Therefore, FCGs should be supported by families, friends, and healthcare workers. Community online groups of the FCGs might be helpful to support each other.

Keywords: caregivers, dementia, depression, quality of life, sleep

Jurnal Keperawatan Padjadjaran (JKP)

Volume 11(3), 214-222

http://dx.doi.org/10.24198/jkp.v11i3.2356

Article Info

Received : August 14, 2023
Revised : October 16, 2023
Accepted : October 23, 2023
Published : December 01, 2023

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Citation

Kabaya, S., Greiner, C., Juanamasta, I.G., & Aungsuroch, Y. (2023). Factors related to sleep in family caregivers of people with dementia: A systematic review. *Jurnal Keperawatan Padjadjaran, 11*(3), 214-222. http://dx.doi.org/10.24198/jkp.v11i3.2356

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

Introduction

Japan is faced with an extraordinary situation centered on its rapidly increasing elderly population. In Japan, the aging trend hit 28.1% in 2018 and created a super-aged population (Japan Ministry of Health Labour and Welfare, 2015). This is a rather strange case, with no parallels found in the other countries of Asia. Besides, the number of older people with dementia has grown. It is estimated that this figure will exceed some 7,000,000 (20% of the elderly population) in 2025. Moreover, with the introduction of a community-based holistic care scheme, the percentage of elderly with dementia living at home is projected to rise. Moreover, an estimated 50 million older people worldwide suffer from dementia (Alzheimer's Association, 2017) with 10 million new cases per year. People with dementia (PWD) suffer a severe lack of control, mental conditions, and behavioral difficulties. Wandering behavior is a condition frequently displayed by PWDs that entails regular, repeated, time-disordered, and/or spatially-disordered lapping activities, random and/or pacing habits, absconding, as well as losing themselves, unless accompanied (Algase et al., 2007). Prior report showed that 6 out of 10 of community-dwelling PWDs have wandering activity (Alzheimer's Association, 2017) with incidence rates ranging from 17.4% for community-dwelling seniors, 50% for individuals with severe dementia, and 63% for community-dwellers (Cipriani et al., 2014). Dangerous wandering activities, such as absconding and missing outside (Algase et al., 2004), frequently lead to injuries (Pai & Lee, 2016; Rowe & Bennett, 2003). FCGs have the

most challenging situation to control behavior due to wandering.

Caring for people with dementia puts a tremendous strain on family careers and is limited by the economic outlook, such as productivity loss, which impacts life quality (Shikimoto et al., 2018). It is also said that dementia is one of the disorders of burdening patients and one of the population of geriatric diseases (Matsushita et al., 2016). In comparison, the mental health status of elderly dementia FCGs is poor relative to that of elderly dementia-free caregivers. It is also believed that the stress caused by caring for them could be a factor in the collapse of home care and the neglect of the elderly. For the elderly with dementia, the value of informal human capital such as neighbors, colleagues, district groups and volunteers that will support the families in their neighborhood while strengthening public access is emphasized.

Although the demand for caregivers is growing, there is a reality that only family members typically assume their responsibility for caring for the elderly living in their families. However, the strain of caring for the elderly can have a significant effect on FCGs' quality of life, contributing to social alienation, financial challenges, and psychological and physical fatigue (Knodel & Nguyen, 2015). FCGs face multiple challenges to maintaining their other responsibilities, including child-rearing, employment, and marriages. The impact on FCGs is very nuanced (Chaobankrang et al., 2019). Many FCGs are unpaid and have no bargaining power (Tamdee et al., 2019). According to the study, most over-stressed FCGs did not undergo any instruction before taking care of the elderly (including those with dementia), mostly learning from practice, relationship, and appreciation. It is also stated that the factors associated with stress as FCGs were the health status of FCGs, faith in treatment, the partnership between FCGs and the elderly individual, and the economic burden of care, except for the condition of elderly with dementia (Tamdee et al., 2019).

All of those problems were found to impact directly and indirectly to FCGs' sleep. The previous study found that several aspects of carers' sleep were significantly predicted by factors such as depression, sleep hygiene, burden, and the sleep of care-receivers (Peng et al., 2019). Additionally, stress, depression, and anxiety were found to be major contributors to poor sleep (Almutairi, 2022). Therefore, the goal of this research was to find sleep-related factors in FCGs of elderly with dementia. Specifically, this study explored the factors that impact community FCGs, especially unpaid caregivers.

Methods

Search strategy

A literature search for relevant articles published between 1st January 2010 and 14th February 2020 was performed using several databases including Ovid, MEDLINE, and Web of Science with limitations of publication based on PICO (Table 1). The search terms were "family caregiver," "dementia," and "sleep." After searching for the articles by using each term independently, all of the search words were added together, "family caregiver" AND "dementia" AND "sleep."

Inclusion and exclusion criteria

The search was limited to human studies in English and Japanese with peer reviewing. The references from retrieved articles were reviewed for further relevant studies.

To be included, studies had to meet the following criteria (1) published from 1st January 2010 to 14th February 2020; (2) written in English; (3) with peer reviewing; (4) including at least one word related to caregiver and dementia in the title. Exclusion criteria were as follows: (1) paid caregiver; (2) intervention research / qualitative research / case reports / review or systematic review articles; (3) without full-text; (4) with no information on the factors related to sleep.

Screening

All of the authors did the screening. First, the researcher screened by checking for the same article and out of the topic. Then, the title was screened by using a minimum of one term of "family caregiver," "dementia," and "sleep." The final screening was done using the exclusion criteria. Those articles which were not full-text articles and no information on the factors related to sleep were excluded. Finally, there were 13 articles out of 30 articles obtained which matched with the inclusion criteria and which are shown in Figure 1. Critical appraisal tools from the Joanna Briggs Institute were used to check each relevant article's quality. The answers included yes, no, or not applicable. Critical appraisal was done by each author and discussed to decide

Table 1. PICO Settings

Study Design	publication data
Population	family caregivers caring for people with dementia in the home setting
Interest/Exposure	factors related to sleep in family caregivers of people with dementia
Comparison	-
Outcome	sleep in caregivers of people with dementia

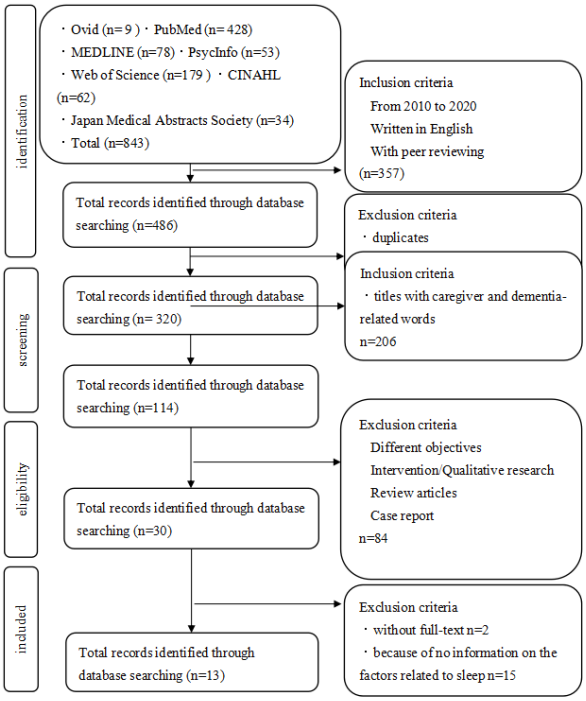


Figure 1. Study Selection Flowchart

low quality, medium, or high.

Results

A total of 843 articles were found from searching, although 357 of them were initially disqualified based on their titles. Of the remainder, 366 were rejected because they lacked full-texts, were off-topic, or duplicated. After applying the exclusion criteria, 101 studies were removed, leaving a total of 13 articles that met the inclusion criteria and which were included in this systematic review. The majority of studies (11) used the cross-sectional method and two studies used cohort.

The total number of FCGs who joined the studies was 2,762 caregivers, of which 273 were spousal, and 2, 257 family care recipients were identified in those studies. One study that involved non-FCGs had a total of 48 non-FCGs. Eight of 14 studies were conducted in the United States, three studies in Taiwan, and two studies in Japan. According to the relationship between patients with dementia and caregiver, mostly family members, most studies were as the primary caregiver and five studies were conducted on secondary caregivers. Three studies showed the family as the primary caregiver and did not use secondary caregiver, and four studies were conducted using a spousal caregiver. The details of the results are presented in Table 2.

Based on Table 3, the study from Japan and Taiwan explained the relationship of FCGs was dominated as child and parent relationship. The study from the United States (US) found the result that the relationship was dominated as spousal, except for one study dominated by child and parent relationship (Leggett et al., 2018). Besides, FCGs in Asia were younger than in the US. The youngest FCGs came from Japan (Mean ± sd = 50.4 ± 12.4) (Okuda et al., 2019) and the oldest came from the US (Mean ± sd = 78.8 ± 7.60) (von Kanel et al., 2014). In contrast, based on the results of the seven studies, the oldest care recipients were from Japan (Mean±sd=83.7±7.63) (Montgomery et al., 2018), and the youngest care recipients were from the US (Mean±sd=77.4±9.02) (Peng et al., 2019) and Taiwan (Mean±sd=77.6±8.62) (Chiu et al., 2014).

FCGs in Japan were quite equal between female and male (Okuda et al., 2019). However, the FCGs were dominated by the females in the Taiwan and US. The seven studies showed that most of the studies were dominated by females for care recipients. One study from Taiwan showed a slightly equal balance between male and female recipients (Chiu et al., 2014), and one study each from Japan and the US was dominated by male care recipients (Montgomery et al., 2018; Peng et al., 2019).

Sleep problems of FCGs

Wang et al. (2016) and Okuda et al. (2019) found FCGs' sleep problems were poor sleep quality by the mean of PSQI score was 8.1. Another study from Japan showed insomnia was one of the most common comorbidities that FCGs experience since becoming caregivers (Montgomery et al., 2018). The study by Chiu et al. (2014) explained the majority of sleep problems in their study were sleep quality problems (99.4%), dozing in the daytime (97.8%), and waking up before the sleep cycle ends (67.8%). Peng et al. (2018) reported that all of the FCGs reported at least one symptom of sleep

Table 2. Overview of the studies.

Author	Country	Primary or secondary	Sleep problems	Factors related to sleep
Okuda et al. (2019)	Japan	Family and secondary caregivers	AD patients diagnosed insomnia. Getting up during the night, sleeping excessively during the day, difficulty falling asleep, awakening too early in the morning, and awakening during the night.	Sleep disturbance in Alzheimer's patients
Chiu et al. (2014)	Taiwan	Family and secondary caregivers (22.2%)	The majority of sleep problems of FCGs were sleep quality problems, dozing in the daytime, and waking up before the sleep cycle ends.	FCGs' depression, fatigue, and the synergistic effects of physical fatigue and depressive symptoms
Polenick et al. (2018)	US	Family/spousal	FCGs had sleep disturbances	The higher number of medical/nursing tasks (especially wound care), and trouble falling back asleep after waking in the night
Wilson et al. (2019)	Ohio/US	Family and secondary caregivers (42.3%)	The mean of PSQI showed poor sleep quality	Short-allele carriers for 5-HTTLPR
Peng et al. (2019)	New York/US	Family and secondary caregivers (22.2%)	FCGs sleep was poor with short sleep duration and low sleep efficiency.	Presence of chronic-conditions, depression, burden, sleep hygiene behaviors, and care recipients' sleep.
Montgomery et al. (2018)	Japan	Family and secondary caregivers (39.7%)	The most common comorbidities that FCGs experienced since becoming caregivers were insomnia	Alzheimer dementia severity
Taylor et al. (2015)	US	Family/spousal	FCGs demonstrated moderate sleep apnea, lower than average sleep efficiencies, and significant sleep complaints.	Avoidant coping
Simpson and Carter (2013)	Texas/US	Family	FCGs had poor sleep efficiency and shorter sleep latency	The frequency of behaviors, and specifically of agitation and apathy,
Peng et al. (2018)	Taiwan	Family	FCGs felt at least one symptom of sleep disturbance with the mean score on the GSDS was poor	Younger FCGs, and eloping behavior
Wang et al. (2016)	Taiwan	Family and secondary caregivers (74.3%)	The average GPSQI was poor	Perceived stress from the frequency of the patient's behavioral and memory problems, and the reactions of caregivers to the patient's behavioral and memory problems
Leggett et al. (2018)	US	Family and secondary caregivers	FCGs sleep interrupted and nighttime awakenings.	Care of recipients with higher fall risk, FCGs with chronic medical conditions, the emotional difficulty of the caring role, and care provision interrupted sleep
von Kanel et al. (2012)	UCSD/US	Family/spousal		Spousal death
von Kanel et al. (2014)	UCSD/US	Family/spousal		Yearly increases in Positive Affect

*AD = Alzheimer's Dementia, PSQI = Pittsburgh Sleep Quality Index, HTTLPR = serotonin transporter-linked polymorphic region, GSDS = General Sleep Disturbance Scale, GPSQI = Global Pittsburgh Sleep Quality Index
*UCDS = University of California, San Diego; US = United States of America

Table 3. The study characteristics of FCGs and care recipients

Authors	Mean age of FCGs (sd)	Mean age of PWD (sd)	FCGs female (%)	Care recipient female (%)	Relationship status (%)		
					Spouse	Child	Other
Okuda et al. (2019)	50.4 (12.4)	82.8 (9.6)	50.2	72.2	4.8	84.5	10.7
Chiu et al. (2014)	56.0 (13.8)	77.61 (8.2)	50.6	65	40.6	55.6	3.3
Polenick et al. (2018)	75.57 (1.15)		59				
Wilson et al. (2019)	65 (12.5)		75		55.4	44.6	
Peng et al. (2019)	65.40 (9.84)	77.40 (9.02)	93	30.2	69.8	27.9	2.3
Montgomery et al. (2018)	53.89 (11.02)	83.70 (7.63)	45	78.7			
Taylor et al. (2015)	73.31 (7.05)		81.7				
Simpson and Carter (2013)	63.3 (12.8)	79.3 (9.1)	88.8	58.8	50.1	41.3	8.8
Peng et al. (2018)	56.0 (13.8)	77.6 (8.2)	65	50.5	40.6	55.6	3.4
Wang et al. (2016)	58.25 (12.88)		78		20.8	79.1	
Leggett et al. (2018)	59.1 (1.5)	80.7 (0.4)	61.1	55.6	35.1	40.6	24.3
von Kanel et al. (2012)	74.1 (8.1)		69.7				
von Kanel et al. (2014)	78.80 (7.60)		69.4				

Note: child includes son, daughter, son in law, and daughter in law; others, include siblings, relatives, and grandchild

disturbance, and the mean score on the General Sleep Disturbance Scale was 55.4 (sd = 36.2).

A study from the US showed 27.8% of FCGs had sleep disturbances on some nights, most nights, or every night in the last month (Polenick et al., 2018). Peng et al. (2019) measured subjective and objective sleep and found they were in agreement which indicated that FCGs sleep was poor with short sleep duration (Mean±sd =5.93±1.2 hours) and low sleep efficiency (79%). Furthermore, Taylor et al. (2015) reported that FCGs have moderate sleep apnea (AHI=10.10±8.39), lower than average sleep efficiencies, and clinically-significant sleep complaints by PSQI scores ≥5 (Mean±sd=6.25±3.2). Simpson and Carter (2015) reported that poor sleepers' sleep efficiency averaged 77%, and sleep latency was shorter (Mean±sd = 27±26.9 minutes). Leggett et al. (2018) found that approximately 20% of FCGs said they were "exhausted" when they went to bed at night as a result of their care duties, and 10% said caregiving caused their sleep to be interrupted most days or every day. FCGs commonly experienced nighttime awakenings as primary outcome: 7% said this happened every night, 10% reporting it happened most nights, and 31% reported it at least some nights.

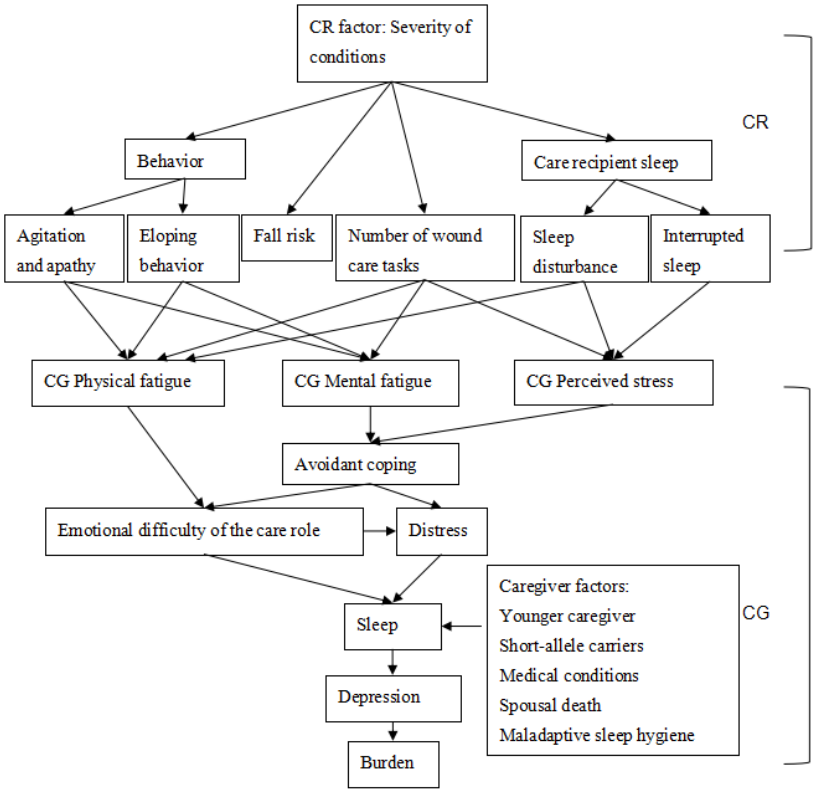
Sleep problems of care recipients

Okuda et al. (2019) found care recipients with sleep problems, with the number of AD patients diagnosed with insomnia by physicians was 50%. The most frequently reported sleep symptoms in the SDI were getting up during the night (84.3%), sleeping excessively during the day (76.8%), difficulty falling asleep (69.0%), awakening too early in the morning (67.5%), and awakening during the night (50.8%). Another study by Peng et al. (2019) explained that care recipients had been diagnosed with dementia for 6.79 years (SD = 3.35 years) with varying levels of sleep disturbances based on an average SDI score of 2.37 (SD = 2.13; range 0–6.98).

Factors related to sleep of FCGs

Factors related to FCGs sleep were divided into two groups. One included factors resulting from care recipients included sleep disturbance in Alzheimer's patients (Okuda et al., 2019), a higher number of medical/nursing tasks, in particular, wound care task (Polenick et al., 2018), care recipients' sleep (Peng et al., 2019), AD dementia severity (Montgomery et al., 2018), the frequency of behaviors that were specifically of agitation and apathy (Simpson & Carter, 2013), absconding behavior (Peng et al., 2018), the frequency of the patient's behavioral and memory problems (Wang et al., 2016), caring for care recipients with higher fall risk, care provision that interrupted sleep (Leggett et al., 2018) and spousal death (von Kanel et al., 2012).

The others were caused by FCGs or themselves. Those were FCGs' depression, fatigue, the



*CR = care recipient or elderly with dementia, CG = family caregiver, caregiver factor = the individual factor,] = scope of the factor, arrow = flow state between factors

Figure 2. The pathway of factors related to sleep in the FCGs

synergistic effects of physical fatigue and depressive symptoms (Chiu et al., 2014), short-allele carriers for 5-HTTLPR (Wilson et al., 2019), depression and sleep hygiene burden (Peng et al., 2019), avoidant coping (Taylor et al., 2015), younger caregivers (Peng et al., 2018), perceived stress (Wang et al., 2016), the reactions of caregivers to the patient's behavioral and memory problems, caregiver characteristics of more chronic medical conditions, the emotional difficulty of the caring role (Leggett et al., 2018) and yearly increases in positive affect (von Kanel et al., 2014).

Discussion

Care recipients' factors

Most of the studies showed sleep problems of care recipients and dementia severity as a significant factor that impacts the FCGs' sleep (Chiu et al., 2014; Leggett et al., 2018; Montgomery et al., 2018; Okuda et al., 2019; Peng et al., 2019; Simpson & Carter, 2013). The condition or severity of dementia increased the FCGs' task, which indirectly reduced the caregiver's time of sleep. Sleep disturbance and severity of dementia impacted the sleep of the FCGs and health, including depression, physical and mental fatigue, and burden. This was in line with the Alzheimer's Association (2018) which reported the impact of Alzheimer's caregiving emotion and well-being, health-related to sleep and finances. The previous studies showed having medical records in which a partner had dementia was associated with an increased risk of death in the following year after accounting for variations in FCGs' age (Alzheimer's Association, 2018; Christakis & Allison, 2006). Another study found that FCGs under pressure are at a greater risk for death than those who are not (Alzheimer's Association, 2018; Perkins et al., 2013), which was in line with the findings of the study that more caregiving-related distress and burden had more sleep problems and higher depression (Chiu et al., 2014; Montgomery et al., 2018; Peng et al., 2019; Wilson et al., 2019). Thus, the sleep and health problems of FCGs' impacted their lifespan as well in the long time.

FCGs' characteristics factors

The characteristics of FCGs have potential factors which influence sleep. One study showed younger caregivers and employed tend to have higher chance of getting sleep problems because the problem might source from the elderly and their

children (Montgomery et al., 2018; Peng et al., 2018). Also, that study showed that most FCGs were male, in line with the previous study in the United States that showed older male spouse FCGs was the factor related to sleep efficiency (Mills et al., 2009; von Kanel et al., 2012). Moreover, another study from Japan showed that sleep disturbances negatively affected the burden and health of younger caregivers such as sons and daughters of their care recipients than other classes of aged people such as spouses of care recipients. In contrast, Chiu et al. (2014) showed age and gender did not correlate with sleep disturbance. It might be the potential sleep problem was related to employed young male as the son relationship and older male as a spouse of care recipients. Further study needs to explore FCGs' age, gender, relationship status, employment status, and the interaction to explore the relationship with sleep problems.

Despite the fact that FCGs used secondary caregivers, the stress and burden related to sleep problems could not be permanently reduced. One study showed the presence of a foreign helper would help to reduce mental and physical fatigue. FCGs tried many efforts to help their sleep, which included pharmacology, paying secondary caregivers, asking for help from relatives, and nursing homes. For problems of FCGs which were hard to solve, they might use cultural support such as social support from the relatives, change primary FCGs with siblings periodically, and financial support to help the FCGs' stress. Further studies need to explore factors related to cultural support.

As shown in Figure 2, coping has a significant role in decreased or increased stress. There are two mechanisms of coping, avoidant and approach. Avoidant coping is described as ineffective efforts to suppress excessive or distracting thinking, and approach coping is vice versa (Taylor et al., 2015). Avoidant coping, considered as maladaptive coping, would lead to being distressed and emotional role problems. The accumulation of those problems over a long period would become a sleep problem for the FCGs. Subsequently, FCGs would begin to feel symptoms of depression, which would affect the burden from the caregiver. FCGs with depression would take more time and have difficulty to fall asleep due to physiological processes of depression or worry at bedtime or rumination. That could increase depression and prevent the FCGs from falling asleep (Peng et al., 2019). Otherwise, an adaptive coping mechanism would reduce the stress of the FCGs. Positive affection, such as happiness, cheerfulness, and enjoyment, is the essential part of a good psychological condition, which will make them get healthy sleep.

Limitations

This study's limitations are that the study could not use articles other than English, and Japanese, and so could not explore potential articles which were published in their local language. Another limitation was related to the culture of the country. The primary FCGs might influence the culture, which showed the studies in the US and Taiwan were dominated by females, otherwise in Japan the majority was by males or equal with females. In addition, the US's studies were dominated by spousal caregivers, and in Japan and Taiwan dominated by their child. The culture-related to FCGs' role and health might explain the differences across the countries and continents. Furthermore, a comparison study related to sleep of FCGs and care recipients would give better conditions whether the care recipient stays in the house with the family, adult day care center, community-dwelling, or nursing homes.

Implications for nursing practice

This study has a massive implication for the FCGs and care recipients. Sleep problems are just one of the severe problems that have consequences of depression, burden, and chronic disease leading to death. Prevention action is critical. All countries all over the world face this problem. Preparing policy-related to Alzheimer's dementia is needed, precisely policy related to the adult daycare center, community-dwelling, and nursing homes, which depends on the culture of the country. Technically, preparing primary healthcare to screen the elderly as early as possible, because early detection can help the FCGs to take care of the care recipients. FCGs can prepare their family conditions and finances as well. Nursing care delivery or nursing counseling for nurses in primary healthcare could be developed for FCGs and care recipients. The care delivery model focuses on helping the FCGs to take care of their care recipients and nurses help in maintaining them for the long term. Moreover, technology development could help by big data observation for screening and predicting population growth, which could significantly help prevent FCGs sleep problems in order to prepare them in taking care of the care recipients.

Conclusions

These findings indicate that most of the problems of care recipients affected FCGs physical fatigue, which would lead to emotional problems of the FCGs' role related to stress and distress. Caregiver individual factors such as genetics, poor medical history, and maladaptive sleep hygiene (drinking coffee, napping habits, smoking) have a vital correlation with distress, which might directly affect FCGs' sleep. Furthermore, health problems will also increase. Intervention coping mechanisms and caregiver role might have a significant impact on the FCGs. Any innovation for the FCGs to solve the sleep problem is needed. Besides, caregivers should be supported by families, friends, and healthcare workers. An FCG community online group is beneficial to support each other. Sharing and talking with people in a similar condition will give many benefits to the FCGs. Not only with psychological and sleep problems, but also other problems can be solved.

Declaration of conflict of interest
We declare that there are no conflicts of interest.

Acknowledgment
None

Funding
There was no funding used for this study.

Data Availability
The datasets generated during and analyzed during the current study are available from the corresponding author upon reasonable request.

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Scoping review of grief studies in Indonesia

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Abstract

Background: One death can cause nine bereavements. Considering the impact of human loss, studies on grief are crucial for better bereavement care services.
Purpose: This study examined studies on grief conducted in Indonesia. Indonesian grief research mapping will identify study gaps and suggest further research.
Methods: The reporting for a scoping review adhered to the PRISMA (preferred reporting elements for systematic review and meta-analysis) statement for a scoping review. A systematic screening was performed in MedLine, Embase, CINAHL, Web of Science, Scopus, and PubMed, as well as manual searches via Google Scholar, Portal Garuda, and relevant studies without language and date restrictions. The data retrieved in the literature were analyzed descriptively, and the themes were developed using NVivo software.
Results: Based on the 18 included studies, the types of grief studies in Indonesia can be divided into pre- and after-loss grief areas. Regarding the themes of the studies that have been conducted in Indonesia, five themes can be derived, related to (1) study purposes, (2) cause of grief, (3) population, (4) concept being studied, and (5) outcomes being studied.
Conclusion: There is significant room for growth in the grief research field in Indonesia. It will be vital for researchers in Indonesia to perform additional studies on pre-loss grief, other studies connected to interventional trials, and further studies examining variation in the outcomes.

Keywords: bereavement; grief; Indonesia; scoping review; studies

OPEN ACCESS

Jurnal Keperawatan Padjadjaran (JKP)

Volume 11(3), 223-235

http://dx.doi.org/10.24198/jkp.v11i3.2318

Article Info

Received : June 24, 2023
Revised : October 15, 2023
Accepted : October 20, 2023
Published : December 01, 2023

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Citation

Kustanti, C.Y., Ikaningtyas, N., Yunitri, N., Arifin, H., Sinaga, M.R.E., Asi, E.K., Melati, N., & Susanti, H.D. (2023). Scoping review of grief studies In Indonesia. *Jurnal Keperawatan Padjadjaran, 11*(3), 223-235. http://dx.doi.org/10.24198/jkp.v11i3.2318

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

Introduction

Grief is the response to various losses; individuals grieve the loss of loved ones, vitality, opportunities, properties, and functional abilities (Zisook & Shear, 2009). Although stated as a normal response, grief is unique to each individual and each type of loss (Zisook & Shear, 2009). The loss of a relative is a major loss and can be the most challenging and distressing experience. Each death can affect nine significant others (Verdery et al., 2020). In the case of non-communicable diseases (NCDs), for instance, these account for 74% of all fatalities worldwide, or 41 million deaths annually (WHO, 2020), which causes 360 million people to grieve. Aside from non-communicable diseases, the number of bereaved individuals significantly increased during the COVID-19 pandemic with around 1.5 million Indonesians estimated to be in bereavement due to more than 160,000 deaths during the pandemic (WHO, 2021).

Grief can diminish over time and reach the acceptance stage for many

people, although this does not imply that the deceased is forgotten (Zisook & Shear, 2009). It has been widely recognized that a significant number of individuals are able to navigate the experience of loss without any external intervention. People can embrace the loss of the person and move on with their lives. However, many other individuals experience a rollercoaster after the loss, where grief becomes intense and ultimately pathological (Zisook et al., 2010). After six and twelve months, the ICD-11 and DSM-5 diagnose pathological grief as prolonged grief disorder and persistent complex bereavement disorder, respectively (Eisma et al., 2020). Grief can also occur before the death of a person, in addition to pathological grief after a loss. Family members or caregivers of those with a life-threatening illness may experience anticipatory or pre-loss grief (Kustanti et al., 2022). The prevalence of grief disorder in the general population was 9.8% (Lundorff et al., 2017), unexpected death bereavement was 49% (Djelantik et al., 2020), cancer-bereaved families were 14.2% (Kustanti, Chu et al., 2021), and COVID-19 related bereavement was 46.4% (Kustanti et al., 2023) compared to the prevalence of anticipatory grief symptoms which was 24.8% (Kustanti et al., 2022).

Pathological grief increases the risk of more advanced psychological issues, such as post-traumatic stress disorder and depression (Shear et al., 2013). Elevated mean cortisol levels, flattened diurnal cortisol slopes, and higher morning cortisol were identified in bereaved subjects (Hopf et al., 2020). As a direct consequence of this, psychological issues can also affect physical problems. Additionally, grief can lead to an increase in the consumption of tobacco and alcohol, in addition to playing a role in the development of new physical morbidities and even suicide (Pitman et al., 2020). In light of the health burden that grief disorder may cause, it is crucial to identify and treat bereaved individuals using a variety of methods. In order to provide appropriate care for bereaved individuals, it will be vital to collect evidence on bereavement care.

Numerous palliative care studies have been conducted worldwide, including in Indonesia (Rochmawati et al., 2016). However, there is a shortage of research on bereavement care and a lack of information on the breadth of the grief follow-up provided by specialized services (Guldin, 2014). In fact, it is crucial to conduct grief research in Indonesia due to its citizens' diverse cultural and resource backgrounds. Bereaved persons in Indonesia should have access to optional bereavement care that considers their individual needs. Therefore, this research aimed to investigate grief studies in Indonesia. The research mapping of grief in Indonesia will provide the opportunity to evaluate the study gaps and provide recommendations for future research.

Methods

Design

This study is a scoping review, and the processes are (a) formulating the research topic, (b) locating relevant studies, (c) selecting the study, (d) charting data, and (e) compiling, summarizing, and disclosing the findings (Arksey & O'Malley, 2005). The reporting for a scoping review adhered to the PRISMA (preferred reporting elements for systematic review and meta-analysis) statement for a scoping review (Tricco et al., 2018).

Search strategy

A literature search was performed in MedLine, Embase, CINAHL, Web of Science, Scopus, Google Scholar, Portal Garuda and PubMed, along with any restrictions, on April 25, 2023, including searches for relevant articles and reference lists to ensure that all the studies could be located. Keywords, subject headings, and Boolean operators were utilized for "grief" and "Indonesia." The full-detailed search strategies for each database are presented in Table 1.

The inclusion criteria of an article to be included in this review were (1) an empirical study design in any form of designs, either qualitative, quantitative, or mixed methods, (2) related to grief and bereavement, and (3) conducted in Indonesia or associated with Indonesians. Articles were excluded according to the criteria: (1) unrelated topic, (2) insufficient data, (3) studies in the form of reviews, abstracts, presentation in a conference, or protocol, and (4) duplicate publication from the same dataset.

Two researchers screened all papers using Rayyan.ai. After removing duplicates, one of the authors reviewed the titles and abstracts of the articles. The first author then evaluated the applicability of the full-text papers based on the inclusion and exclusion criteria. Manual searches of previously published meta-analyses followed this, using review articles, bibliographies, Portal Garuda, and Google Scholar to identify additional eligible studies. We consulted the article containing the most detailed information for investigations derived from the same data set. Another author participated in the screening process to ensure accuracy, and team discussions resolved disagreements. After the evaluation process, the characteristics of the included studies were retrieved and displayed in a table.

Data synthesis

The data retrieved in the literature were presented descriptively in a table, consistent with the scope and objectives of the scoping review. This process was conducted independently by each of the reviewers who participated in the preceding stage, and a third reviewer was enlisted to reach a consensus on the differences discovered. The answers to the study

questions in the selected articles were summarized, and numerical and thematic results were provided in a narrative, theme format, as indicated in the results. QSR NVivo software was used to organize and analyze the data.

Results

Search strategy

The six databases yielded a total of 155 articles, with 61 duplicates. After removing duplicate citations, 94 papers were reviewed by one of the authors based on the title and abstract. Following this process, 86 articles were excluded, and 16 papers were reviewed for their eligibility. Meanwhile, manual searches from Google Scholar, Portal Garuda, relevant articles, and reference lists were conducted to identify more potential papers. Three studies were related to grief in Indonesia; unfortunately, the full text could not be located and they were excluded for further synthesis. However, the topics of the three studies could be identified as associated with the development of grief instruments for nurses and the coping style of AIDS-bereaved women. Finally, 18 articles were included in this scoping review. The screening process is presented in Figure 1.

Descriptions of the included studies

The first study on grief in Indonesia was published in 2008; the latest publication was in 2023. Of 18 studies, 55% were conducted with quantitative designs using observational methods, including cross-sectional and psychometric properties. The rest of the studies were performed with qualitative approaches. Most studies were located in Java and were mainly conducted in Jakarta. The total

Table 1. Search strategy

Databases	Syntax	Articles
MedLine	Ovid MEDLINE(R) ALL <1946 to April 25, 2023> 1 Grief/ or Prolonged Grief Disorder/ or Disenfranchised Grief/ 10113 2 duka.mp. 15 3 Indonesia.mp. or Indonesia/22273 4. 1 or 2 10128 5. 3 and 4 16	16
Embase	('grief'/exp OR grief) AND indonesia:ti,ab,kw	10
CINAHL	(AB grief OR TX mourn OR TX mourning OR TX mourn OR TX mourning OR TX bereaved OR TX bereavement OR) AND AB Indonesia	6
Web of Science	Results for Grief OR Prolonged Grief Disorder OR Disenfranchised Grief OR sorrow OR sorrowed OR bereaved OR bereavement (All Fields) AND Indonesia (All Fields)	28
Scopus	(TITLE-ABS-KEY (indonesia)) AND ((TITLE-ABS-KEY (grief)) OR (TITLE-ABS-KEY (sorrow)) OR (TITLE-ABS-KEY (mourn OR mourning)) OR (TITLE-ABS-KEY (bereaved OR bereavement)))	75
PubMed	(grief[MeSH Terms]) AND (Indonesia)	20
Google Scholar	grief OR bereavement OR sorrow OR mourn OR duka OR berduka OR kabung OR berkabung AND Indonesia	

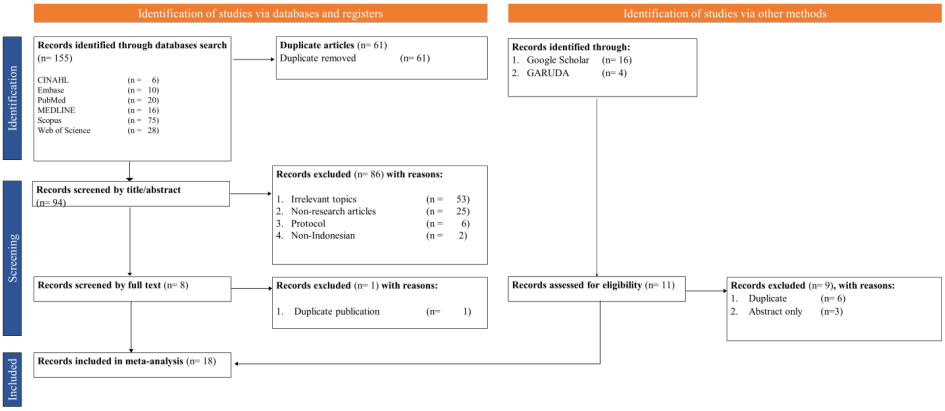

Figure 1. PRISMA flow chart diagram

Table 2. Characteristics of the included studies

Study	Journal name	Study purposes	Study setting & design	Participants	Outcomes & tools	Results
Betriana and Kongsuwan (2020)	Nursing in Critical Care	To describe the grief reactions and coping strategies of Muslim nurses in dealing with the death of patients.	Indonesia Qualitative phenomenology	Muslim ICU nurse (n=14)	Grief reactions and coping strategies	Four reactions to grief, four factors influencing reactions to grief, and three coping strategies used in dealing with death in ICU.
Betriana and Kongsuwan (2019)	Intensive and Critical Care Nursing	To explain the significance of the grieving processes that Muslim nurses who cared for patients in intensive care units went through.	West Sumatra Province, Indonesia Qualitative phenomenology	Muslim ICU nurse (n=14)		Four reactions to grief, four factors influencing reactions to grief, and three coping strategies used in dealing with death in ICU.
Damar (2008)	Dissertation	To determine the need for a specific bereavement counseling program for HIV/AIDS-afflicted women who lost their husbands to AIDS and what services are needed.	Jakarta Qualitative	Indonesian women who lost their male partners to AIDS within 12 months of the research (n=6).	Interview about bereavement counseling.	Four primary themes: limited awareness of HIV/AIDS; coming to terms with being a widow and living with HIV; the "new" role as a single parent, i.e., mothering, for the widow of an AIDS-related spouse, and the necessity for counseling addressing seropositivity.
Djelantik et al. (2021)	Journal of Affective Disorders	To determine the prevalence, latent classes, and cultural correlates of extended grief disorder, PTSD, and depression after traffic accidents in Balinese family members.	Bali Cross-sectional	Bereaved individuals after traffic deaths (n=301).	The expression of caring for the deceased.	Balinese culture may protect widowed people from mental illness and inform other nations' grief rites.
Fauziah and Kahija (2017)	Jurnal Empati	To comprehend the mental state of children who lost their mothers to suicide.	Semarang Qualitative phenomenology	Child who lost mother to suicide (n=1).	The grieving process	Themes developed: (1) address the mother-child bond. (2) Four superordinate themes: emotional shock, self-closing conduct, psychological conditions, and social relationships. (3) Covers three superordinate themes: supporting reasons for recovery, positive changes following recovery, and personal significance of suicide experiences.

Cont. Table 2. Characteristics of the included studies

Study	Journal name	Study purposes	Study setting & design	Participants	Outcomes & tools	Results
Indah (2021)	International Journal of Disaster Risk Reduction	To investigate how doctors and mourning patients interact in Indonesia's post-disaster Aceh.	Aceh, Indonesia Qualitative phenomenology	Disaster-affected patients (n=11)	Bereaved and disaster-affected	There were asymmetrical power relations that negatively affected their physical and emotional well-being.
Mariyana and Betriana (2021)	Journal of Pediatric Nursing	To describe the experiences of parents and caregivers who cared for children with chronic diseases.	West Sumatra Qualitative phenomenology	Parents and caregivers of children with chronic disease (n=11)	Anticipatory grief	Findings revealed three categories, namely expressions of care, efforts of care, and ways of accepting the situations.
Mas'amah et al. (2023)	Pastoral Psychology	To improve funeral services for indigenous people in emergencies or crises and provide social support for bereaved family members and mortuary workers who performed funerals during the COVID-19 pandemic.	Kupang Qualitative	Bereaved family members and mortuary workers (n=22).	Semi-structured interview approach about the experiences of the bereaved family.	Thematic analysis revealed three themes: COVID-19 and funeral protocol, difficulty in executing cultural and religious burial rituals, and shame toward bereaved families.
Mujahidah et al. (2015)	Jurnal keperawatan jiwa	To study loss and grief among mothers who lost infants.	Depok Qualitative phenomenology	Bereaved mothers by infant deaths (n=10).	The experience of loss and grief	The themes are infant death causes, grief stages, Response After Loss, social support networks, post-loss hope, wisdom of loss, and coping mechanisms.
Mujahidah and Suwarningsih (2021)	Jurnal Ilmiah Kesehatan	To explore how social support affects loss and grieving in flood and landslide victims.	Bogor Cross-sectional	Flood and landslide victims (n=150).	Social support for loss and grief	Social assistance affects flood and landslide victims' grief and loss.
Nugraha et al. (2023)	Medical Science Monitor	To evaluate health-related quality of life (HRQoL) and mental health in 729 Indonesian medical students during the COVID-19 pandemic	Indonesia Cross-sectional	Indonesian medical students (n=729)	The 12-item HRQoL, the 21-item Depression, Anxiety, and Stress Scale (DASS-21)	37.3% had impaired physical components, and 66.9% had impaired mental components of HRQoL.

Cont. Table 2. Characteristics of the included studies

Study	Journal name	Study purposes	Study setting & design	Participants	Outcomes & tools	Results
Priastana et al. (2018)	Indonesian Journal of Health Research	To investigate family social support and resilience of older adults who suffer from chronic grief due to partner loss in Pakurenan culture and the relationship between them.	Bali Cross-sectional	Men or women 60 years of age or older lost a partner less than 48 months (n=255).	The resilience of the older adults.	Family social support and resilience are positively correlated.
Geni and Rahmania (2013)	Indonesian Journal of Cancer	To determine whether coping mechanisms and anticipatory grief were related among parents of children with cancer.	Jakarta Quantitative correlational	Parents with children who had been diagnosed with cancer (n=55)	Anticipatory grief	The findings showed that anticipatory grief and emotion-focused coping both correlated positively, while religious-focused coping did not significantly correlate with each other.
Rahmawati et al. (2021)	Nurse and Health: Jurnal Keperawatan	To identify society's dimension variables related to grief and loss during the COVID-19 pandemic.	Indonesia Quantitative correlational	Indonesian people aged 15 years and over (278)		The societal dimensions of education, age, type, gender, and work do not exhibit any relationships with loss and grief. However, age and education are moderately related to loss and grief.
Ristriyani et al. (2018)	Enfermeria Clinica	To identify the acceptance of women living with HIV in relation to status disclosure.	Jakarta gCross-sectional	Women with HIV positive (n=235)	Acceptance of Disease and Impairments Questionnaire (ADIQ)	Women are getting closer to being fully accepting of their HIV status.
Samutri et al. (2022)	Macedonian Journal of Medical Sciences	To investigate how persistent grief affects Indonesian women who have experienced prenatal loss.	Yogyakarta Qualitative phenomenology	Women who experienced chronic sorrow due to perinatal loss within the past 7 weeks–3 years. (n=9)	Chronic sorrow screening tool and the Burke/Eakes Chronic Sorrow Assessment Tool	Three main themes: (1) Grief recurrence is common, especially when exposed to certain triggers (pregnancy memories and mementos); (2) suitable coping mechanisms and emotional assistance are required to treat grief; (3) Particular aspects of chronic grief, such as reduced sadness and the presence of another child acting as both a solace and a source of grief, are linked to perinatal loss.

Cont. Table 2. Characteristics of the included studies

Study	Journal name	Study purposes	Study setting & design	Participants	Outcomes & tools	Results
Sinaga et al. (2020)	Nurse Media Journal of Nursing	To describe the experiences of mothers with intrauterine fetal death/demise (IUFD) in Indonesia	Lampung Qualitative phenomenology	Mothers who had experienced intrauterine fetal death/demise (IUFD) (n=7)	The traumatic experiences of mothers with IUFD	Four key themes, including the mothers' reactions to a loss, moral support received by the mother, unfavorable behavior on the part of others, and physical and psychological changes.
Tay et al. (2016)	Social psychiatry and psychiatric epidemiology	To determine if West Papuan refugees had a unitary construct of complicated grief and if so, whether the factorial structure was a six-factor structure or one of PCBD or PGD based on DSM-5 or ICD-11 formulations.	Indonesians in Papua New Guinea	(n=230)	Complicated grief	Conflict and loss associated with feelings of injustice may be especially pathogenic in generating the anger/negative appraisal component of complicated grief amongst refugees.

Abbreviations: ADIQ: Acceptance of Disease and Impairments Questionnaire, HIV: Human Immunodeficiency Virus, PMTC: Preventing Mother-to-Child Transmission of HIV, PTSD: Posttraumatic Stress Disorder, WLWH: Women Living with HIV, IUFD: Intra Uterine Fetal Death, HRQL: Health Related Quality of Life, PCBD: Persistent Complex Bereavement Disorder, PGD: Prolonged Grief Disorder, ICD-11: International Classification for Diseases.

number of participants was 2,814, ranging from one to 729 individuals for each study. Regarding the target population, people living with HIV AIDS, mothers who had lost their children, bereaved spouses, older adults, and caregivers of persons with a life-threatening illness were the most frequently investigated groups. Table 2 presents the characteristics of the studies included in the scoping review.

This scoping review shows that most studies (80%) focused on grief after a loss (Figure 2). This scoping review did not identify any interventional studies, but Damar (2010) investigated the feasibility of bereavement counseling using a qualitative approach. For grief instruments, the Inventory of Complicated Grief (ICG), Inventory of Complicated Grief – Revised (ICG-R), Prolonged Grief Disorder – 13 and the revised version (PG-13 and PG-13-R), and Brief Grief Questionnaire (BGQ) are the validated tools for grief diagnostic (Kustanti et al., 2021). However, none of these instruments were utilized by the researchers in Indonesia. They utilized grief screening instruments such as the Acceptance of Disease and Impairments Questionnaire to measure the grief symptom or scale. Caregivers of chronic diseases, such as cancer and HIV/AIDS, were the most examined group. Other populations included COVID-19 and unexpected deaths resulting from prenatal loss, accidents, suicide, and natural disasters. The Indonesian researchers were also interested in studying grief and bereavement among nurses, medical students, funeral employees, refugees, and the general population.

Based on the types of grief and bereavement, the related studies in Indonesia can be divided into studies on anticipatory grief and studies on post-loss grief.

Studies on grief in Indonesia

Among the included studies, three focused on the area of pre-loss, namely anticipatory grief. Two studies investigated the coping mechanism related to the acceptance stages due to a loss. Another study was about the experience of caring for people living with chronic illnesses and about the acceptance of the diagnosis of a life-threatening illness. The studies on anticipatory grief mostly centered on examining coping mechanisms, such as the caregivers' level of acceptance, in response to the decline in health and impending mortality.

Examining the experience of loss and grief was the most studied topic in grief after a loss. In terms of types of loss, chronic illness-related grief was of greater concern to researchers than sudden loss. For unexpected loss, the target population was accident, suicide, and disaster. Considering that the pandemic can also be considered a disaster, three investigations on COVID-19-associated bereavement have been conducted. Some studies could not be categorized as to whether they were in expected or unexpected deaths, such as the death of persons in the intensive care unit or the loss of a

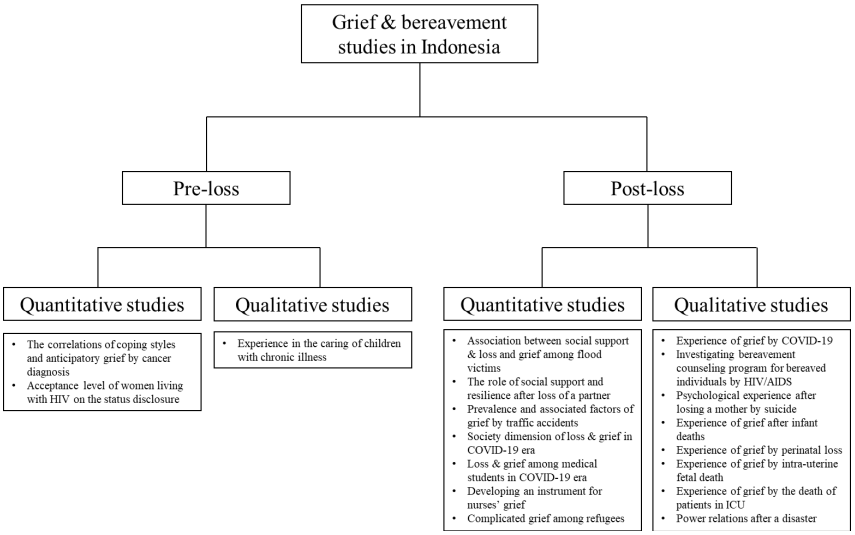

Figure 2. The pattern of grief and bereavement studies in Indonesia

Table 3. Themes of grief and bereavement studies in Indonesia

Themes	Codes
Study purposes	Prevalence of grief Association of factors toward grief Exploring the experience of grief Instrument development Improvement of bereavement care services Latent classes
Cause of bereavement	Bereaved by chronic illnesses Bereaved by unexpected deaths Bereaved by COVID-19 Bereaved by the loss of a relative
Target population	Spouse Women Parents Doctors Caregivers Family members Elderly Medical students Indigenous students Mortuary workers Nurses Mothers Women living with HIV AIDS
Concept being studied	Status disclosure of HIV AIDS Culture Bereavement counselling Social support Society dimension
Outcomes being studied	Grief Health-related Quality of Life Posttraumatic Stress Disorder Resilience Depression Coping Acceptance stage

partner.

Regarding the themes of the studies that have been conducted in Indonesia, five themes can be derived as follows (Table 3):

Study purposes (1): The focus of grief studies in Indonesia was about the prevalence of grief, factors related to grief, the experience of loss, the development of instruments to measure grief, bereavement care services, and latent classes. The field of grief studies encompasses a wide range of subjects, including the development of instruments to assess grief disorders, enabling Indonesian academics and practitioners to monitor the presence of pathological grief effectively. Additionally, there is a focus on the provision of bereavement care services. There is a wide availability of instruments designed to assess grief symptoms and disorders; nonetheless, it is worth noting that no translational studies pertaining to this topic have been conducted in Indonesia. Several grief care strategies are readily accessible, yet no research has been conducted to examine these therapies' efficacy in Indonesia.

Cause of bereavement (2): The primary emphasis of palliative care is to enhance the overall quality of life for individuals who are confronted with a life-threatening illness, as well as their respective families. The present study has identified chronic disease and unexpected events as the focal points of investigation in relation to the phenomenon of grief. Nevertheless, the primary emphasis of the disorders was predominantly on cancer and HIV/AIDS.

Target population (3): Studies on grief have been conducted with various populations as their subjects. The participants' backgrounds were healthcare workers and those outside the healthcare industry. The only topic lacking is an examination of grief experienced by children.

The concept being studied (4): The included research looked at three different aspects of the grieving process: the sociocultural context of loss, bereavement counseling, and coping following the diagnosis of a life-threatening illness. Therefore, many other bereavement care interventions have not yet been investigated.

Outcomes being studied (5): The investigation's primary focus was grief. The quality of life, PTSP, resilience, depression, and coping style are other secondary outcomes. The results on a physical level have not yet been investigated. In addition, other psychological outcomes like anxiety were not identified in any of the studies that were considered for this review.

Discussion

1992 marked the beginning of the palliative care movement in Indonesia (Putranto et al., 2017). This study determined that the first bereavement care study was published in 2008, approximately sixteen years after Indonesia's initial palliative care movement. It is necessary to conduct a scoping review to identify the status of grief and bereavement studies in Indonesia and to recommend additional evidence for the Indonesian bereavement care movement. This scoping review has identified the topics of studies conducted in Indonesia, including the study purposes, cause of bereavement, target population, concept, and outcomes.

Most of the research included in this scoping review was performed in the Java region, with a particular focus on Jakarta. Despite a policy on palliative care in Indonesia since 2007, its implementation is limited to five major cities: Jakarta, Yogyakarta, Surabaya, Denpasar, and Makassar. Due to the centralization of palliative care services in five major cities, particularly in Java, it is unsurprising that research on grief has also been predominantly focused in this region. Hence, there remains a significant opportunity to investigate grief and bereavement practices beyond the region of Java.

This scoping review has shown that the field of pre-loss grief contains a significant amount of uncharted ground, which is not surprising given the small number of studies conducted on the subject. The coping technique in response to the loss that will occur as a result of the diagnosis of a life-threatening illness is the primary focus of the field of anticipatory grief. In fact, pre-loss grief can influence an individual's coping mechanism, and, without appropriate treatment, complications may include and increase the risk for grief disorder (Kustanti et al., 2022). Frequently, dramatic cognitive, behavioral, and personality changes deprive caregivers of the significant relationship they shared with the patient prior to the onset of the illness or injury (Yehene et al., 2021). Anxiety, emotional numbness, and sleep difficulties are more common in people who have not prepared well for the death of a loved one (Shear, 2012). A large portion of the current academic literature on pre-loss grief focuses on HIV, AIDS, and cancer-related grief, aside from numerous chronic illnesses. While the focus of care remains on the treatment of patients, caregivers or family members of individuals with a chronic disease may, however, continue to experience the burden of care after the patient's death. Therefore, providing help for those dealing with grief is critical for this demographic to forestall the occurrence of more serious problems. Since the patient has been diagnosed with a life-threatening illness, healthcare workers, including nurses, may conduct assessments on the patient's family members or caregivers in order to determine the degree to which they are experiencing anticipatory grieving. Patients and their family members should participate in a bereavement risk assessment using a formal instrument (Aoun et al., 2017). Therefore, appropriate bereavement support can be prearranged in advance (Kustanti, Fang et al., 2021).

Although different individuals and types of losses will experience grief differently (Zisook & Shear, 2009). the causes of bereavement, such

as chronic disease and untimely dying, were given the same amount of consideration in terms of post-loss grief. In regard to the types of bereavement, the research is more concerned about the grief that is associated with chronic illness. Chronic illnesses can cause functional limitations, financial stress, social isolation, increasing dependence on others, lower self-esteem, and mental health issues that trouble caregivers even after the death of the patients (Richman, 2022). Even if deaths due to chronic illness are expected, caregivers might not have the time or energy to cope with the situation since they have so many responsibilities for the care of the patient. As a result, the relationship between healthcare providers and patients' families ought to be maintained to provide bereavement care and this should begin with the monitoring of the caregivers' state of grief following the death of the patient.

On the other hand, due to the nature of unanticipated losses or acute illness, including during the COVID-19 pandemic, a loss can be traumatic because the individual may not have time to adjust to the loss (Neria & Litz, 2004). Accident victims, suicide victims, and victims of natural disasters make up the target population for unexpected loss. There have been three investigations carried out on COVID-19-associated grief, given that the pandemic can also be considered as bringing about an unexpected death. Pandemic safety precautions may exacerbate losses by disrupting the grieving process leading to negative impacts on the emotional and physical health (Tao et al., 2022). In addition, after-loss grief was typically encountered outside medical offices and healthcare facilities, so it was not widely acknowledged until it became a health issue. This late recognition might be due to the fact that the circumstances surrounding the death were particularly traumatic, or it could be because those affected were already vulnerable (Parkes, 1998). Because of the large amount of research that has been conducted, we are now able to identify those people who are at an increased risk after a bereavement.

The target population and cause of bereavement varied based on the themes extracted from the available evidence. However, the study objectives were limited to prevalence, experience, instrument development, the exploration of service enhancement, and association investigation; the opportunity to conduct grief and bereavement studies in Indonesia is still quite open. Still lacking, however, are interventional studies, including randomized controlled trials. In fact, Indonesia requires more culturally sensitive bereavement care. The examined concepts were also limited to HIV/AIDS status disclosure, culture, bereavement counseling, social support, and social dimension. Other social and psychological outcomes, such as anxiety, will also be of concern in Indonesia. Studies on the explorations of grief among children are also crucial for better bereavement care services.

Strengths and limitations

This study is the first scoping assessment of Indonesian studies examining the state of grief and bereavement research in Indonesia. The scoping review results can guide Indonesian researchers in mapping their bereavement care research plan. In order to ensure that a comprehensive search of the articles was conducted, databases and manual searches were utilized.

Unfortunately, we were unable to assess the study quality because we did not restrict the included studies to a specific study design. There may be more studies on grief and bereavement than we had in this scoping review, as some full text could not be located. We continued to report these investigations even though only limited information could be retrieved. At least, the subjects or objectives of the inquiry were discernible.

Based on this current scoping review, several recommendations for future grief-related research can be listed. First, more research can be conducted in the area of anticipatory grief to strengthen the coping of caregivers or family members of individuals living with a life-threatening illness to prevent prolonged or complicated grief. Second, as this type of loss can be more traumatic, it is possible to undertake additional research on unexpected death-related grief. Third, no study has been conducted to determine the efficacy of bereavement interventions. Numerous treatments for bereaved individuals are currently available, but it is essential to investigate bereavement care suitable for Indonesians. Fourth, HIV, AIDS, and cancer-bereaved individuals were the most frequently researched population. This provides ample opportunity to explore other types of chronic illnesses, as each loss will result in atypical grief.

Fifth, limited study has been conducted on bereaved children and adolescents . Therefore, pediatric specialist colleagues can devote more attention to this topic. Sixth, more varied study designs can be performed to explore more investigations on grief and bereavement, including using a randomized controlled trial with more multidimensional variables as the outcomes. Seventh, in relation to the assessment of grief symptoms and disorders, a multitude of instruments demonstrate commendable efficacy. Nevertheless, researchers in Indonesia did not employ these instruments. One potential explanation could be the unavailability of instrument translations in Indonesia. Furthermore, the majority of the studies included in this scoping review employed qualitative methodologies. Additional research will be required to facilitate the translation and validation of tools pertaining to grief into Indonesian. The availability of instruments will enhance the accuracy and effectiveness of evaluating grief symptoms and disorders in studies and clinical practices.

Conclusions

This scoping evaluation revealed that studies on grief in Indonesia lack the variation of the concepts being studied; the focus should be placed on palliative care, end-of-life care, and bereavement care to support the advancement of palliative care in Indonesia. In addition to caring for terminally ill patients and their families, healthcare professionals should offer emotional support to those enduring other types of grief. For the provision of optional bereavement care, additional evidence will be required in the areas of anticipatory grief, grief related to unexpected deaths, the efficacy of bereavement interventions, other populations with chronic conditions, children, and adolescents.

Acknowledgement
The findings and conclusions in this document are those of the authors, who are responsible for its contents.

Funding Statement
The authors did not receive any specific grant or financial support from funding agencies in the public, commercial, or not-for-profit sectors for the research, authorship, and/or publication of this article.

Conflict of Interest Statement
The authors have declared no potential conflicts of interest.

Data Availability
As this study is a review of previous data, no new data were generated in support of this research.

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Application of telenursing as a nursing care delivery model in improving treatment adherence and glycemic control: A scoping review

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Abstract

Background: Diabetes mellitus is one of the chronic diseases that cause the highest mortality and high medical costs;, therefore medication adherence and glycemic control are important in disease management, one of which is through telenursing.
Purpose: To determine the telenursing model to improve medication adherence and glycemic control in patients with type 2 diabetes mellitus.
Methods: This study was designed a scoping review. The databases used are CINAHL, PubMed, ScienceDirect and Google Scholar. Articles published from 2016-2022 with appropriate inclusion and exclusion criteria. Thematic analysis was used based on study design, telenursing communication model, telenursing process, duration of telenursing and results.
Results: There were 12 relevant articles out of 2112 articles. We found a telephone call follow up is the most common method used for delivery of telenursing intervention. Telenursing intervention is implemented from at least 3 months until 12 months, and includes the assessment of current disease conditions, assessment of adherence to the prescribed treatment plan, treatment plan information, and solutions or follow-up to current issue.
Conclusion: Telenursing can be used as a nursing care delivery model in the diabetes mellitus type 2 patients because it is proven to reduce glycemic control, improve treatment adherence, reduce body mass index (BMI), glycosylated hemoglobin (HbA1c), and cholesterol, and improve diet adherence, physical exercise and self-management.

Keywords: diabetes mellitus; glycemic control; telenursing; treatment adherence

OPEN ACCESS

Jurnal Keperawatan Padjadjaran (JKP)

Volume 11(3), 236-244

http://dx.doi.org/10.24198/jkp.v11i3.2114

Article Info

Received : September 21, 2022
Revised : November 10, 2023
Accepted : November 15, 2023
Published : December 01, 2023

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Citation

Wahyuni, Y., Komariah, K., & Somantri, I. (2023). Application of telenursing as a nursing care delivery model in improving treatment adherence and glycemic control: A scoping review. *Jurnal Keperawatan Padjadjaran, 11*(3), 236-244. http://dx.doi.org/10.24198/jkp.v11i3.2114

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

Introduction

Chronic illness is defined as a condition that lasts a year or more and requires ongoing medical attention or requires restriction of activities of daily living or both. At the global level, chronic diseases are the cause of death as much as 63% with 36 million deaths every year (Anderson & Durstine, 2019). There is also an increase in chronic diseases in Indonesia, both in terms of morbidity and mortality. More than 80% of deaths are caused by cardiovascular disease and diabetes (Ministry of Health of the Republic of Indonesia, 2018). Basic Health Research shows that of the 10 highest causes of death, six of them are caused by chronic diseases, among which are hypertension and diabetes mellitus, which causes 44% (Ministry of Health of Republic Indonesia, 2017a). This description clearly shows that non-communicable diseases have become the main cause of death in Indonesia (Ministry of Health of Republic Indonesia, 2017a).

Treatment adherence of patients with chronic diseases is important because the disease cannot be cured and must always be controlled so that complications do not occur that cause death. According to the April 2015

World Economic Forum publication, potential losses due to non-communicable diseases in Indonesia in the 2012-2030 period are predicted to reach US$ 4.47 trillion, or 5.1 times GDP in 2012. The economic burden of non-communicable diseases can also be seen from Social Security Organizing Agency data which shows that INA-CBGs claims for the January-July 2014 period reached around Rp. 3.4 trillion for outpatient cases and around Rp. 12.6 trillion for inpatient cases (Ministry of Health of Republic Indonesia, 2017b).

Methods to improve compliance and nursing services in handling chronic diseases to achieve patient welfare can be done through telenursing. Telenursing in utilizing information and communication technology in providing nursing care to chronic patients can help patients control and manage their illness. The treatment model on telenursing through long-distance communication and information technology can minimize medical costs. The interventions provided in the implementation of telenursing are health education, health monitoring and health consultation (Ghoulami-Shilsari & Esmaeilpour Bandboni, 2019).

In recent years, research on the effectiveness of telenursing in providing care to chronic patients has been carried out with positive results. Telenursing has the potential to revolutionize healthcare delivery by increasing access for patients with chronic diseases, reducing healthcare costs, and increasing efficiency. Telenursing has advantages in providing interventions for patients with chronic diseases, such as making communication between patients and health workers more efficient, and telenursing more acceptable in intervening patients with chronic diseases at home on a regular basis (Ghoulami-Shilsari & Esmaeilpour Bandboni, 2019). Research by Shahsavari and Bavarsad (2020) about the effectiveness of telenursing in the control of BMI and HbA1c in type 2 diabetes patients in Iran showed that telenursing can improve adherence to treatment programs and have a beneficial effect on HbA1c and BMI in type 2 diabetes patients (Shahsavari & Bakhshandeh Bavarsad, 2020). Research by Yulianti and Rayasari (2016) in Indonesia shows that telenursing has an effect on reducing fasting blood sugar in type 2 DM patients. Another similar study showed that health education through telenursing for 12 weeks showed significant improvements in glycemic control, metabolic parameters and adherence to diabetes medication (Mohamed et al., 2016).

The various benefits of using telenursing have been explained above, but no one has explained what kind of telenursing model is right for improving medication adherence and blood sugar control. Therefore, the researchers feel it is important to identify a telenursing model that can be applied to healthcare settings to improve medication adherence and blood sugar control in patients with type 2 diabetes.

Methods

Research design

This study was designed using Arksey and O'Malley's scoping review framework. The framework consists of six stages: (a) defining the research question; (b) identifying relevant studies or search strategy; (c) selecting studies; (d) charting the data and assessing the quality of studies included; (e) collating, summarizing, and reporting the data; and (f) consultation (Arksey & O'Malley, 2005).

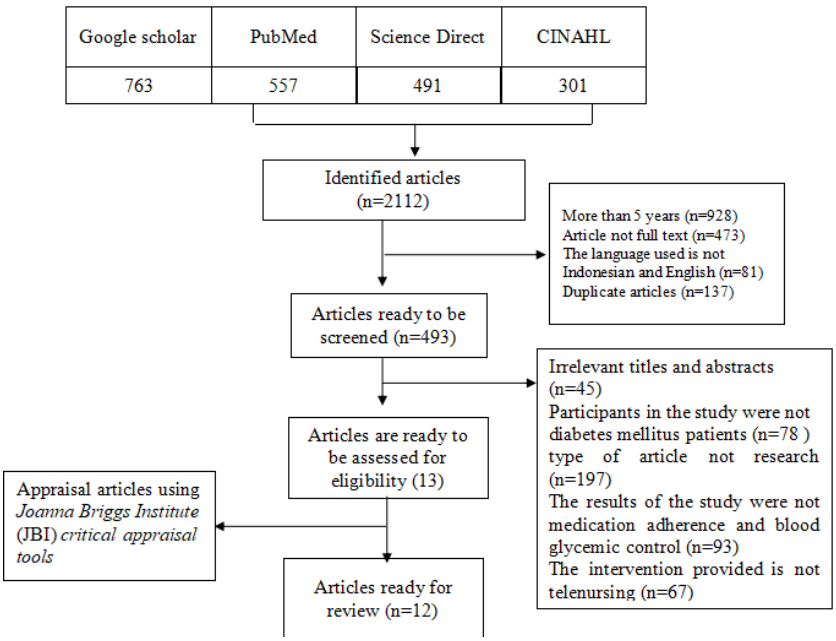

Table 1. Data Extraction of The Telenursing Communication Model to Improve Medication Adherence And Glycemic Control

Author/ Year	Sample	Location	Study design	Result
Shahsavari and Bavarsad (2020)	60 type 2 diabetes mellitus patients	lorestan, iran	Randomized controlled trial	The results showed that telenursing via telephone calls led by nurses could significantly reduce BMI and hba1c in the intervention group in type 2 diabetes mellitus patients who were illiterate and aged 50 years and over.
Mohamed et al., (2016)	60 type 2 diabetes mellitus patients	Egypt	Quasi experimental design	The results showed that the health education intervention given by telephone call for 12 weeks by nurses showed significant improvements in glycemic control, metabolic parameters and adherence to diabetes treatment regimens.
Yasmin et al. (2020)	320 type 2 diabetes mellitus patients	Bangladesh	A mixed-method, sequential explanatory design	Significant improvements in patient adherence to diet, physical exercise, tobacco cessation and blood glycemic control were found in the intervention group. Cost and other co-morbidities were found to be the main reasons for non-adherence.
Shahabi et al. (2022)	60 type 2 diabetes mellitus patients	Irans	A randomized clinical trial	After telenursing intervention and family empowerment, the adherence score increased significantly. The results showed a positive effect of a family-centered empowerment pattern used follow-up telephone calls on improving adherence to dietary regimens in patients.
Patimah et al. (2019)	32 diabetes mellitus patients pasien	Indonesia	Quasi eksperiment with control group pre and post test design	The results showed that there was a significant effect between telenursing (follow-up via telephone) and fasting blood sugar.The telenursing program also affects the dynamic behavior change process based on the awareness of type 2 diabetes mellitus patients to seek a healthy and quality life
Iljaz et al. (2017)	120 diabetes mellitus patients	Slovenia	Randomized controlled trial	The results showed that there was a significant decrease in Hba1c and blood pressure. The involvement of diabetic patients in web-based interventions has only a temporary impact on their functional health status.
Nelson et al. (2016)	80 diabetes mellitus patients		Quasi eksperimental	The results showed that adherence to treatment increased in the first and second months, but in the third month there was no difference in the control group and the intervention group. The results of the HbA1c measurement showed a stable value at three months and did not show any difference between the intervention group and the control group.
Li et al. (2021)	124 cchronic disease (included diabetes mellitus patient)	Australia	Randomised controlled trial	The results showed that the HbA1c value in the intervention group experienced a greater decrease when compared to the control group
Owolabi et al. (2019)	216 diabetes mellitus patients	South Africa	Randomised controlled trial design	The results showed that participants in the intervention group experienced an increase in adherence at the second, third and 12th months. The probability of HbA1c was 6.5% greater in the Perx group at months 9 and 12 and cholesterol (low density lipoprotein cholesterol and total) was lower in the Perx group at month 3. This intervention is very effective for those who are obese, taking medication for diabetes and taking 4 medications

Cont. Table 1. Data Extraction of The Telenursing Communication Model to Improve Medication Adherence And Glycemic Control

Author/ Year	Sample	Location	Study design	Result
Wild et al. (2016)	321 diabetes mellitus patizents	United Kingdom	Randomised controlled trial	The results of the study showed that both groups experienced an increase in blood glucose levels, but the intervention group had no significant effect, the adjusted mean change in blood glucose was 0.26 (-0.81 to 1.32), p = 0.634. The intervention group also had no significant effect on body weight, body mass index, systolic and diastolic blood pressure. Almost all participants (90.74%) were happy with the intervention and found it helpful.
Pichay-apinyo et al. (2019)	6 nurse dan 35 diabetes mellitus patients	Thailand	Randomized clinical trial	The results showed that the intervention group had significantly better control of diabetes and blood pressure than those on treatment as usual and that telemonitoring did not make a significant difference in the patients' body weight. Patients reported reduced carbohydrate intake, increased physical activity, increased medication adherence, improved sleep quality, and more frequent foot care. Patients and nurses both recommended the use of the intervention, although nurses reported an increase in workload.
Huo et al. (2019)	502 patients with both coronary heart disease and diabetes mellitus	China	Randomized clinical trial	The results showed that a text message intervention resulted in better glycemic control in patients with diabetes mellitus and coronary heart disease. While the mechanism of this benefit remains to be determined, the results suggest that a simple, culturally sensitive mobile text messaging program may provide an effective and feasible way to improve disease self-management.

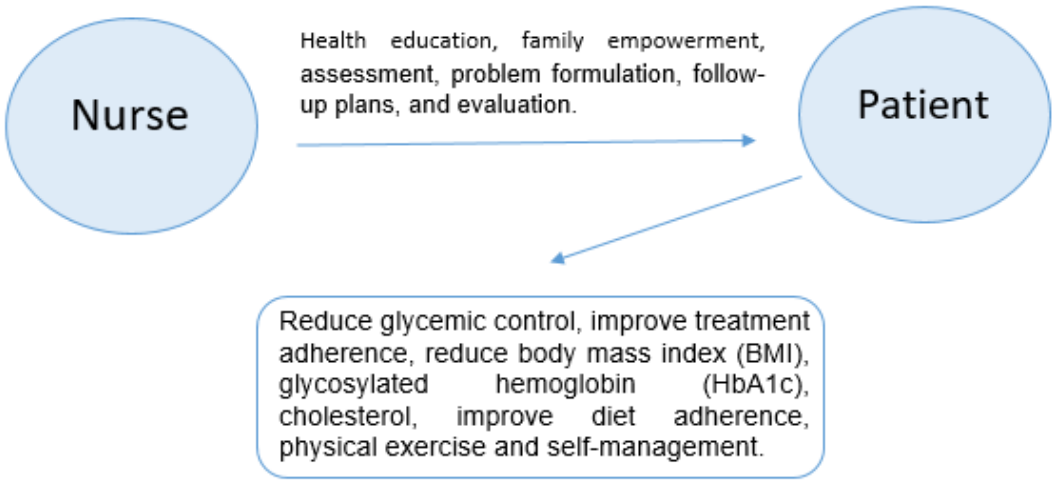

Figure 1. Telenursing as A Nursing Care Delivery Model

Search methods

The literature search method uses an electronic database, are as follows PubMed, ScienceDirect, Cinahl and Google Scholar. The author formulated the article search keywords using Boolean operators and phrase operators (OR and AND) to specify the search. Keywords adapted to Medical Subject Heading (MESH) are as follows: diabetes mellitus type 2 OR diabetes mellitus AND telenursing OR telemedicine OR telehealth AND treatment adherence OR therapeutic adherence and compliance OR adherence OR therapeutic AND glycemic control OR blood glucose control.

Inclusion and exclusion criteria

The inclusion and exclusion criteria in this study are based on the Participants/populations, Concept, and Context (PCC) framework. The inclusion criteria are the participants of type 2 DM patients, the concept used is telenursing, the contexts measured are medication adherence and glycemic control, articles sourced from the literature are clear and indexed, articles in English and Indonesian are full text and types of research articles. The exclusion criteria were the types of review articles, editorials, commentaries, letters to editors (LTE), and text-books.

Screening of articles

The first author (YW) filtered articles by title, abstract, publication years and language after removing duplicates. Full-text articles were then screened for their eligibility based on the inclusion and exclusion criteria. All studies were consulted with the second (MK) and third authors (IR).

Data charting

Data were charted into a table to summarize the finding for the narrative result of this scoping review (Table 1). The first author (YW) extracted data on inclusion and exclusion criteria and identified the association of telenursing with medication adherence and glycemic control. The second and third authors (MK and IR) provided input and suggestions for which articles to be included or excluded from the review.

Data analysis

We gathered and charted the following information: characteristics of the selected studies, telenursing communication model, telenursing process, the effectiveness of telenursing in improving medication adherence and glycemic control based on the selected article. Information about the factors that influence the successful implementation of telenursing was taken from the discussion and limitations sections of the manuscripts that were taken and underwent thematic analysis. After carrying out selection, analysis, and validation, we mapped and presented it in table format in Microsoft Excel 2016.

Results

Based on 12 relevant articles from the selection results, the following table includes data that have been categorized based on author, sample, research location, study design, and results.

Characteristics of the selected studies

There are 12 relevant articles from 2112 articles from 2016-2022, with the research design being five articles using randomized control trial (Iljaz et al., 2017; Li et al., 2021; Owolabi et al., 2019; Shahsavari & Bavarsad, 2020; Wild et al., 2016), three articles using quasi-experimental (Mohamed et al., 2016; Nelson et al., 2016; Patimah et al., 2019), three articles using randomized clinical trial (Huo et al., 2019; Pichayapinyo et al., 2019; Shahabi et al., 2022) and one article using the mixed method (Yasmin et al., 2020). The total number of participants was 1,930 patients with diabetes mellitus and the research sites were in Iran two articles, Egypt two articles, and on each from Indonesia, Thailand, Australia, China, United Kingdom, South Africa, Bangladesh and Slovenia.

Based on the analysis of the 12 articles, this scoping review describes the telenursing model used to improve medication adherence and blood sugar control in patients with diabetes mellitus. The telenursing models include: 1) telenursing communication model, 2) the process of providing telenursing-based nursing care, and 3) the role of telenursing in improving medication adherence and glycemic control.

Telenursing communication model

Based on the analysis of the articles, it shows that telephone calls are the most widely used communication model in telenursing. Of the 12 articles reviewed, five articles used telephone calls (Mohamed et al., 2016; Patimah et al., 2019; Shahabi et al., 2022; Shahsavari & Bavarsad, 2020; Yasmin et al., 2020), two articles used text messages (Huo et al., 2019; Vedanthan et al., 2017), one article used a mobile application (Li et al., 2021), one article used a website (Wild et al., 2016), one article used text messages and mobile applications (Iljaz et al., 2017), one article used text messages and phone calls (Yasmin et al., 2020), and one article used Automated Interactive Voice Response (Pichayapinyo et al., 2019).

The telenursing communication model can be grouped into three, namely telephone calls, text messages, and mobile applications and websites. The telephone call communication model is used by research nurses or research assistants to monitor and assess the health of research respondents through scheduled phone calls. Text messages as a model of telenursing communication are given in various ways such as sending automatic messages, one-way text messages and two-way text messages. The telenursing communication model for mobile applications and websites is carried out by means of

each respondent recording and entering data from the respondent's independent measurements into the application and the data that have been entered into the application will be assessed or followed up by the researcher.

Telenursing process

In several studies, the nursing care process through telenursing begins with health education and training about diabetes mellitus to all respondents (Mohamed et al., 2016; Patimah et al., 2019; Pichayapinyo et al., 2019; Shahsavari & Bakhshandeh Bavarsad, 2020). In addition, several articles conducted training to use the application and understand the program that would be followed by respondents (Li et al., 2021; Pichayapinyo et al., 2019). After the health education and training were completed, respondents received nursing care through telenursing communication models such as telephone calls, text messages and/or mobile applications and websites.

The telenursing process to improve medication adherence and glycemic control includes assessment, problem formulation, follow-up plans, health education and evaluation. In the assessment, the researcher assessed the respondent's medication adherence to the treatment plan, including exercise, diet and medication (Shahabi et al., 2022; Shahsavari & Bakhshandeh Bavarsad, 2020; Wild et al., 2016), dietary recommendations, walking habits, blood sugar monitoring (Huo et al., 2019; Mohamed et al., 2016; Nelson et al., 2016; Wild et al., 2016), and barriers in implementing treatment adherence (Nelson et al., 2016). Current health problems include symptoms of hypoglycemia and hyperglycemia, diabetes medication adherence, carbohydrate consumption, physical activity, sleep quality, and foot examination (Mohamed et al., 2016; Nelson et al., 2016; Pichayapinyo et al., 2019). Furthermore, after getting the results of the assessment, the researcher formulated the problem and determined a follow-up plan to provide a solution. Health education was also provided by researchers to respondents who participated in the research program. Evaluations for medication adherence and glycemic control were carried out at the end of the study (Huo et al., 2019; Iljaz et al., 2017; Nelson et al., 2016; Owolabi et al., 2019; Shahabi et al., 2022; Yasmin et al., 2020).

The telenursing intervention in this scoping review was carried out between 3–12 months. Telenursing communication model through telephone calls had a frequency of once to twice a week and a call duration of 10-30 minutes, depending on the patient's condition. Scheduled telephone calls were made at the time agreed upon by the respondent and the researcher. The telenursing communication model through text messages was carried out by sending text messages once every 1-2 days and consisted of one-way text messages and two-way text messages given alternately. The contents of the text messages included medication reminders, control schedule reminders, educative messages about diabetes, motivational messages, and text messages to assess the patient's current condition. Telenursing communication model through mobile media applications and websites involved inputting data from the results of independent measurements by respondents into the application. The input time was adapted to the measurements of each patient, such as reports of taking medication every day, for reporting blood sugar twice a week, for measuring blood pressure and weight once a week and other measurements according to research needs.

The effectiveness of telenursing in improving medication adherence and glycemic control

The use of telenursing in improving medication adherence and glycemic control in type 2 diabetes mellitus patients has good effectiveness as a model of nursing care. Telenursing is also considered effective for use in patients who have low education, the elderly and even in patients who live in rural areas. Patients and nurses recommend the use of telenursing, although nurses say its use increases the workload. In addition to improving medication adherence and glycemic control, telenursing can also reduce body mass index (Shahsavari & Bakhshandeh Bavarsad, 2020), increase glycemic control (Mohamed et al., 2016; Shahabi et al., 2022), reduce treatment costs and comorbidities (Yasmin et al., 2020), increase family empowerment (Shahabi et al., 2022), increase healthy and quality living behavior (Patimah et al., 2019), improve blood pressure control (Iljaz et al., 2017; Wild et al., 2016), lower cholesterol (Li et al., 2021), and decrease carbohydrate consumption, increase physical activity, and improve sleep quality, and foot care (Wild et al., 2016).

Telenursing communication models that are effective in improving medication adherence and glycemic control are telephone calls given once or twice a week with a duration of 10-30 minutes and text messages given once or twice a day. In this study, the effective duration of telenursing in increasing medication adherence and glycemic control was 3-12 months.

Discussion

In this scoping review, the authors examined the effectiveness of telenursing as a model of nursing care to improve medication adherence and glycemic control in type 2 diabetes mellitus patients. The results of the scoping review represented that telenursing can be provided through several communication models such as telephone calls, text messages, mobile applications and websites, and can combine the two communication models. Telephone calls are the most widely used telenursing communication model (Vijayalakshmi et al., 2020). The telephone communication model has several advantages such as convenient and fast, wide and unlimited coverage, suitable for urgent cases, no

separate infrastructure is needed, patient privacy is guaranteed and it is real-time interaction. In addition, the telephone communication model in telenursing can increase the involvement of more respondents and can be used easily by all groups, especially those with low levels of education (Schillinger et al., 2008).

Telenursing has been shown to improve medication adherence and glycemic control (Huo et al., 2019; Iljaz et al., 2017; Li et al., 2021; Mohamed et al., 2016; Nelson et al., 2016; Owolabi et al., 2019; Patimah et al., 2019; Pichayapinyo et al., 2019; Shahabi et al., 2022; Shahsavari & Bakhshandeh Bavarsad, 2020; Wild et al., 2016; Yasmin et al., 2020). This is related to the telenursing process as a whole. The telenursing process found in this scoping review is assessment, problem formulation, follow-up plans, health education and evaluation. The assessment phase includes an assessment of the respondent's compliance with the treatment plan, including exercise, medication, diet, physical activity, sugar monitoring, obstacles in implementing medication adherence, and current health problems including symptoms of hypoglycemia and hyperglycemia. Furthermore, in the formulation of the problem, the problem experienced by the respondent will be determined and then a follow-up plan will be designed to provide a solution. The follow-up plan includes self-monitoring of blood sugar, weight monitoring, blood pressure monitoring, insulin injection monitoring, and health education according to patient needs. In the final stage an evaluation for medication adherence and glycemic control will be carried out.

Although telenursing is changing the way in which professional nursing care is delivered over long distances, the fundamentals of nursing practice must still be applied. In delivering telenursing, nurses must continue to carry out the nursing process such as when delivering face-to-face nursing care, and assessment, planning, intervention implementation, evaluation and documentation must still be carried out. All nurses involved in telenursing are responsible for performing nursing care in accordance with applicable standards of practice, code of ethics, laws and policies as is done for face-to-face client care. This means that the quality of care provided through telenursing must be the same as the quality of care provided face-to-face (Nova Scotia College of Nursing, 2022).

The application of telenursing has great potential in increasing nursing access through technology so that it can reach patients more easily. Telenursing can help patients improve self-management through the nurse (Samimi et al., 2018). Patients with diabetes mellitus need more frequent contact with healthcare providers to manage their health problems. The application of telenursing can make it easier for diabetes mellitus patients to contact the health facilities they need. Barriers to complying with treatment programs such as transportation, long waiting times, overcrowded clinics and uncomfortable waiting areas can be overcome by telenursing.

In addition, the positive effect of telenursing was found to increase medication adherence and glycemic control. Telenursing can also reduce body mass index (Shahsavari & Bakhshandeh Bavarsad, 2020), improve glycemic control (Mohamed et al., 2016; Shahsavari & Bakhshandeh Bavarsad, 2020), reduce medical costs and co-morbidities (Yasmin et al., 2020), increase family empowerment (Shahabi et al., 2022), improve healthy and quality life behavior (Patimah et al., 2019), control blood pressure (Iljaz et al., 2017; Wild et al., 2016), lower cholesterol (Li et al., 2021), reduce carbohydrate consumption, increase physical activity, and improve sleep quality and foot care (Wild et al., 2016).

The use of telenursing technology has many benefits and advantages for various parties, including patients, health workers and the government. The aspect of convenience and increasing reach as well as reducing costs are advantages that can be seen directly (Sharma, 2014). Nurses' skills and knowledge about communication are an important factor in the success of telenursing, because in practice nurses will be faced with various types of patients through long-distance communication (Fadhila & Afriani, 2019).

The implementation of telenursing in developing countries has several challenges and obstacles, such as costs, human resources and policies. The main challenges faced in implementing telenursing are the occurrence of inadequate communication about the patient's clinical condition, causing clinical errors, limitations of computer support systems regarding communication, lack of visual references when communicating between nurses and patients, especially communication without video, difficulties in understanding nonverbal communication, especially when done by telephone. In interaction with video, the visual source is a distance compensation mechanism, providing a sense of closeness, integration, protection, and security to express needs, hopes and feelings (Sharma, 2014).

Conclusion

Telenursing can be used as a nursing care delivery model to patients with type 2 diabetes mellitus because it is proven to reduce glycemic control, improve medication adherence, reduce body mass index (BMI), glycosylated hemoglobin (HbA1c), cholesterol, and improve diet compliance, physical exercise and self-management.

Acknowledgement

The authors would like to express their gratitude to the Department of Fundamental Nursing, Faculty of Nursing, Universitas Padjadjaran for the support to this research.

Conflict Of Interest

The authors declare no conflicts of interest.

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Traumatic lumbar hematomyelia causing spinal shock: A case report

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Abstract

Background: Spinal cord hemorrhage or hematomyelia can arise from trauma or non-trauma causes, adverse effect of anticoagulation therapy and ruptured vascular malformation. Bleeding in epidural space is common and complications such as acute spinal cord syndrome can arise due to the compression and destruction of the spinal cord. Symptoms of hematomyelia might be varied depending on location of the lesion, often accompanied with acute radicular pain. In this case study, we reported a case of spinal shock after traumatic lumbar hematomyelia.
Case: A 13-year-old girl presented to Dr. Moewardi General Hospital with inferior paraparesis, bladder and bowel incontinence, a day after falling on her gluteus. Physical examination revealed reduced motoric and sensory function below 12th thoracal dermatome, with no patellar and reduced Achilles reflexes. Conventional X-ray was unremarkable and further investigation with MRI showed a hematoma on thoracal 10 to 12 vertebrae. Motor and sensory functions were improved after 12 days administration of corticosteroids and further improvement was seen almost immediately after decompression surgery.
Objective: To describe a case of spinal shock caused by traumatic lumbar hematomyelia
Method: This is a case report study describing spinal shock which improved after administration of corticosteroid and decompression surgery.
Conclusion: Spinal shock could be caused by traumatic lumbar hematomyelia, which is characterized by loss of motor, sensory, and bladder function, and decompression surgery improved the prognosis.

Keywords: case report; spinal shock; traumatic hematomyelia

OPEN ACCESS

Jurnal Keperawatan Padjadjaran (JKP)

Volume 11(3), 245-250

http://dx.doi.org/10.24198/jkp.v11i3.2352

Article Info

Received : August 07, 2023
Revised : October 13, 2023
Accepted : October 23, 2023
Published : December 01, 2023

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Citation

Tedjo, R. A.A., Gretalya, L.A.D., Tjung, V., Hafizhan, M., Putra, S.E., Suroto, S., Mirawati, D.K., Subandi, S., Danuaji, R., Budianto, P., Hambarsari, Y., Hamidi, B.L., Prabaningtyas, H.R., Hutabarat, E.A.J., Ristinawati, I., & Tejomukti, T. (2023). Traumatic lumbar hematomyelia causing spinal shock: A case report. *Jurnal Keperawatan Padjadjaran, 11*(3), 245-250. http://dx.doi.org/10.24198/jkp.v11i3.2352

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

Introduction

Spinal cord hemorrhage or hematomyelia can arise from trauma and/or non-trauma causes, adverse effect of anticoagulation therapy and ruptured vascular malformation (Akpınar et al., 2016; Berkowitz, 2022).

Symptoms of hematomyelia may be varied depending on location of the lesion, often presented with acute pain with radicular radiation (Claro et al., 2018). Clinical manifestations of hematomyelia are sensory problems, paralysis, and autonomic dysfunction (Sabouri et al., 2022). Spinal shock is a transient extinction of reflexes and muscle tone below the level of injury. Spinal shock was reported on 14-50 cases per million annually worldwide (Ziu & Mesfin, 2022) and can be caused by compression and destruction of the spinal cord following hematomyelia (Akpınar et al., 2016). Shaban et al. (2018) suggested that decompression through surgical procedure is considered as the definitive treatment for hematomyelia. Through this case report, we present a case of a 13-year-old girl with hematomyelia showing clinical improvement after surgery and oral medications.

Case Presentation

A 13-year-old girl presented to the Neurology Clinic, Dr. Moewardi General Hospital, Surakarta with inferior paraparesis after falling on her gluteus. Despite the pain, she was initially still able to walk. However, a tingling sensation was felt on both her legs right after the fall and, on the following day, she started to have inferior paraparesis, and she could not stand up, and was only able to move her legs. She also had bladder and bowel incontinence the day after the incident. She was brought to hospital, hospitalized for three days, and was referred to Dr. Moewardi General Hospital.

She had no previous history of malignancy, blood and coagulation disorder, infection, or prior blood-thinner medication.

Intervention or Clinical Examination

Ethical consideration

To obtain information regarding this case, written informed consent was obtained from the patient. The copies of the written consent were available.

Clinical Findings

On the physical examination, she was awake, alert, and oriented with Glasgow Coma Scale of E4V5M6 with normal vital signs. Meningeal signs and cranial nerve were unremarkable. She had inferior paraparesis with motor strength of 333 on the right leg and 111 on the left leg. We used Manual Muscle Test ranging from 0-5 with this patient, 3 being able to do active movements against gravity and a score of 1 for flicker or traces of contraction. Muscle tone in all extremities was normal. We also observed reduced pain and light touch sensation below the level of thoracal 12 (Th12) spinal cord. Proprioceptor sensation was reduced in her left leg, but preserved in her right leg. No patellar reflexes were found during examination and the Achilles reflexes were reduced on both lower extremities. No pathologic reflexes were found.

During neurological examinations, we revealed some degree of hypoesthesia on the Th12 level and below, which was secondary to hemorrhage on level Th 10-12. According to the Frankel and Asia Scale, her left leg was classified into class B or sensory only, where some sensory sensation was still present below the lesion. The right leg had more than 50% of muscle strength more than grade 3 which was classified into class D (Bennett et al., 2022; van Middendorp et al., 2011).

Laboratory and Imaging Findings

Hematology laboratory results were unremarkable with coagulation parameter and leukocyte parameter within normal range, excluding both coagulation and infection etiology. Conventional thoracolumbar X-ray was performed and showed no fractures or mass compressing the spinal cord (Figure 1).

Magnetic resonance imaging (MRI) was then performed (Figure 2) and showed irregular intramedullary lesion at thoracal 10 to 12 spinal cord which appeared hyperintense in T1W1, but hypointense in T2W1 and T2STIR, indicating intramedullary spinal cord hemorrhage.

Results

After admission to the hospital, she remained under observation for several days to see the progression of the disease and was scheduled for decompression surgery. She was observed to keep

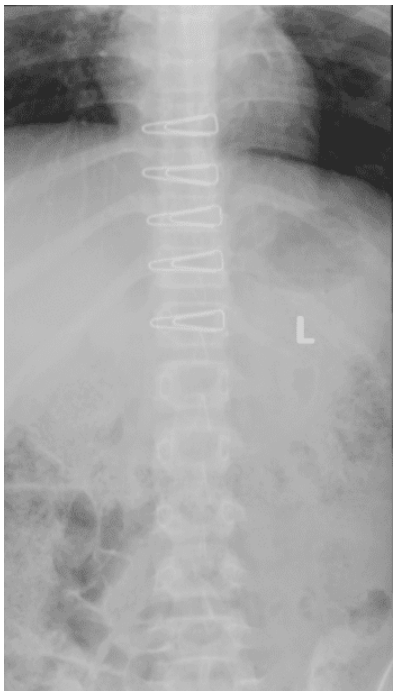

Figure 1. Thoracolumbar X-Ray; marker on VTh8-VL1

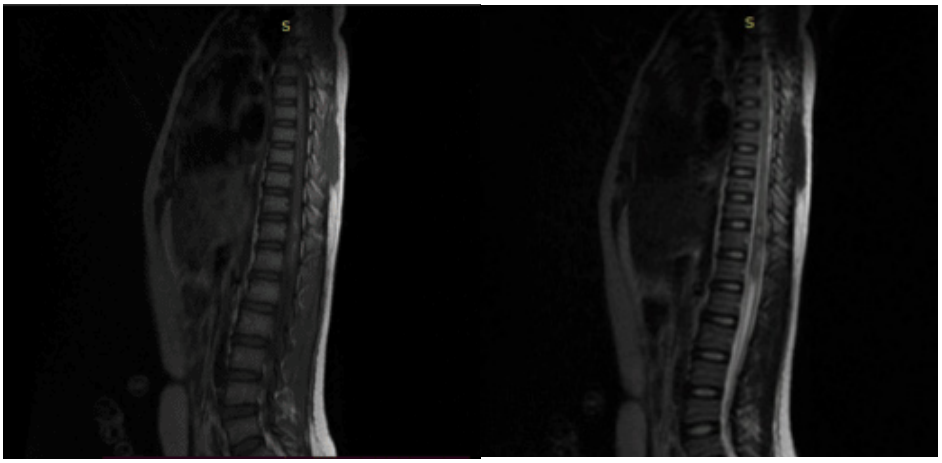

Figure 2. Sagittal T1FSE & T2frFSFfs with contrast Thoracolumbar MRI

thirty degrees head up position, stretch out every two hours to prevent decubitus ulcers and lower the risk of falling. Indwelling foley catheter was used due to bladder incontinence. During the observation, her ability to move her leg improved slightly which might be due to the reabsorption of the hematoma and passing of the acute spinal shock phase. Her right leg had a motoric function of 111 and improved up to 333 in 10 days. Dexamethasone 10 mg b.i.d. was administered for two days and later switched to methylprednisolone 125 mg q.i.d. for three days. Methylprednisolone was then tapered off every three days and switched to oral after a total administration for 12 days. She was then scheduled for decompression surgery. Explanation about the surgery was given before the surgery to the patient and her family. Following the surgery, she was given oxygen via nasal cannula, while her breathing pattern and saturation were monitored. Yellow hand band was also given to inform others of her risk in falling which was calculated from the Morse Fall Scale as 47 and she had a high risk of falling. Her motoric ability improved to 333 on her left leg. Patient was sent home after 15 days as inpatient.

Discussion

Hematomyelia or spinal cord hemorrhage is considered as a rare etiology for post-traumatic neurology deficit cases with limited literature (Gahlot & Elhence, 2020). The epidemiology of neurogenic shock is difficult to assess as it is still unknown how hemorrhagic shock and other injuries impact the hemodynamic effects of spinal cord injury. The global incidence of traumatic spinal injury is estimated around 768,473 annually worldwide, which is higher in low and middle income countries compared to high income (Kumar et al., 2018). Trauma Audit and Research Network identified that, from 490 isolated spinal cord injuries, 19.3% had spinal shock (Dave, 2023). For every one million people, t 30-40 had spinal shock, around 8000-10000 cases per year in Indonesia (Soertidewi et al., 2006).

Hematomyelia mostly occurs due to vascular malformations, vasculitis, hypo coagulation disorders, or trauma (Ramazanov et al., 2021). Intramedullary hemorrhage is rare in children compared to epidural hematomas (75%), subarachnoid hemorrhage (15%), and subdural spinal hematomas (4.1%) (Gahlot & Elhence, 2020; Nunes et al., 2016). Cervical spine is the typical location for traumatic hemorrhages in children, whereas it usually occurs in thoracic and lumbar spine for adult cases. Nonetheless, the locations may vary from patient to patient. In this case, the hemorrhage was in the lumbar area despite the patient being a 13-year -old girl. The hemorrhage occurred without compression or fracture from the trauma. Acute bleeding happened after trauma in the microcirculation of the spinal cord, since large vessels are usually spared due to their higher amount of collagen and elastin within its wall (Shaban et al., 2018).

Manifestation of hematomyelia depends on the level of spinal cord affected, which usually appears abruptly (Ramazanov et al., 2021). In this case, her chief complaint was loss of ability to move her lower extremities, primarily in the left leg, with some sensory sensation loss defined as incomplete paraplegia. The differences of neurological deficit in both legs might be caused by the hematoma which was more extensive in the left side of the leg. Another prior case of traumatic spinal cord injury with monoplegia of the right arm also reported an infarct on the right hemi cord on level cervical 4 (C4)-C5. The right arm showed no power in muscle testing and the left arm showed a mild weakness (Birua, 2019).

Our patient had spinal shock characteristics which were defined as loss of motor and sensory functions below the level of lesion secondary to complete or relatively complete spinal cord lesion (Salazar-Muñoz et al., 2019). Spinal cord pathway rearrangement causes loss of function that happens acutely post-injury. Accumulation of protein post trauma in the medulla also contributes to the

process of spinal shock. After the process abates, the function will return to normal. Since there was no hemodynamic instability (hypotension, bradycardia, and hypothermia) found, neurogenic shock could be excluded (Ko, 2018).

Disease progression of spinal shock is divided into four phases. The first phase (0-24 hours after injury),identified as areflexia/ hyporeflexia phase, shows none or decreased deep tendon reflex, delayed plantar reflex followed by cutaneous reflexes and sympathetic dysfunctions (Ditunno et al., 2004; Ko, 2018). These changes are due to motor neuron hyperpolarization. The second phase (1-3 days after injury) is characterized by prominent cutaneous reflexes without deep tendon reflexes. and is proposed due to denervation super sensitivity. Super sensitivity mechanisms include reduced excitatory neurotransmitter reuptake, increased synthesis, and insertion of receptors into postsynaptic membrane, decreased removal and degradation of receptor, and altered synthesis and composition of receptors (Ko, 2018). In the third phase (4 days-1 month after injury), deep tendon reflexes have returned and Babinski sign may appear, reflecting the growth of axon-supported synapse. Ankle jerk appears before Babinski sign and knee jerk. Cutaneous reflexes such as bulbocavernosus reflex, cremasteric reflex, and anal wink typically appear by the end of this period (Ditunno et al., 2004). Lastly, soma-supported synapse growth occurs in the fourth phase (1-12 months). Hyperactivity occurs in cutaneous and deep tendon reflexes in response to minimal stimuli. This mechanism is driven by synapse and short axon growth in empty synaptic endings in supraspinal neurons (Ko, 2018).

Three weeks after injury, patient was in the third phase of spinal shock. Loss of patellar reflex (Lumbar (L2)-L4 level) and returned Achilles reflex (L2-Sacral 2 (S2) level) aligned with loss of sensation in L2 level and below that level and represented recovery of reflexes in caudo-rostral pattern (Figliuzzi et al., 2022; Salazar-Muñoz et al., 2019). The recovery of superficial reflexes varies ranging from an hour up to months for deep tendon reflexes. Recent studies showed recovery pattern of reflexes with the following order: delayed plantar reflex, bulbocavernosus reflex, cremasteric reflex, ankle jerk, Babinski sign, and lastly knee jerk (Ziu & Mesfin, 2022).

Acute bladder and bowel incontinence were associated with the level of spinal cord hemorrhage. Lesion in Th10-L2 level will cause incontinence in bowel and bladder due to sympathetic loss which is in the thoracolumbar area (Francis, 2007). Spinal shock caused the suppression of autonomic and somatic activity of bladder, being a-contractile, and areflexic (Salazar-Muñoz et al., 2019).

Bladder dysfunction manifestation in post spinal cord injury might be varied depending on its location, supra-sacral, sacral, or infra-sacral, or mixed. Supra-sacral bladder dysfunction is an upper motor neuron (UMN) neurogenic dysfunction when there is blocked communication between sacral reflex arc and pontine micturition center (PMC). The lower motor neurons are damaged in sacral or infra-sacral spinal cord injury (SCI) which interrupts voiding reflex arc and leads to areflexic detrusor muscle and flaccid external urethral sphincter. Mixed type is classified to type A, which is more common than type B. Type A neurogenic bladder is caused by damaged detrusor nucleus causing detrusor areflexia and intact pudendal nucleus producing hypertonic external urinary sphincter. Contrarily, detrusor muscles are spared and pudendal nucleus are damaged in type B causing flaccid external urinary sphincter and spastic bladder (Dorsher & McIntosh, 2012).

In this case, incontinence happened due to supra-sacral lesion causing UMN symptoms called detrusor sphincter dyssynergia (DSD). Detrusor and urethral sphincter became hyperreflexia and increased the pressure within the detrusor (Perez et al., 2022). Complete spinal cord lesions at the T6-S2 level usually develop involuntary bladder contractions without sensation and DSD. Catheter was used to avoid large post-void residual volume which could lead to further complication such as urinary tract infection and autonomic dysreflexia (Chen et al., 2022). Head up position is needed to reduce intracranial pressure due to facilitation drainage of reverse blood flow from intracranial (Pertami et al., 2017). Yellow hand band is used to warn others of fall risk. This is given for someone ≥65 years old, hospitalized for fall-related injuries, and suffered from moderate to severe injuries that reduce mobility and independence (Wisconsin Hospital Association, 2007). Postoperative status and neurological diseases are one of the leading causes of falls. Process of assessment and risk detecting are effective in achieving reduction in falls (Montejano-Lozoya et al., 2020). There are three primary strategies to prevent falls: identify patient at risk, place bed or chair alarms on patients, and run to alarms. However these strategies are known to be ineffective and more studies are needed (King et al., 2018).

Spinal cord secondary injury entails inflammation, edema, ischemia, electrolyte imbalances, lipid peroxidation, and glutamate excitotoxicity leading to death of spinal cord tissue. It can be prevented by steroids or decompression surgery within 24 hours (Canseco et al., 2021). Decompression surgery is still encouraged if possible. However, in cases where surgery is less beneficial to perform, rehabilitation may improve patient's outcome and function. To prepare her for surgery, she needed to be explained about why she needs surgery, what the operating room looks like, and what she will feel and do after surgery. Visualization and using neutral words are recommended. Informing the patient's parent or guardian is also recommended for pediatric patients. Visualization using blocks, doll houses, and stuffed animals by telling the story of what will happen to the doll (as herself) can help the

explanation and indicate that the equipment is safe (Kaakinen et al., 2015).

Physiotherapy and strength training for three months, twice a day for 30 minutes each, may improve patient's ability to regain their strength (Oh et al., 2018).Three months are recommended according to the rehabilitation phases, acute subacute and long-term phase. In this case, patient' physiotherapy was not recorded; however, it was recommended upon discharge. When the vital signs are stable, physical rehabilitation is recommended to increase the patient's strength (Pegat et al., 2015). Concomitant with the strength training, there will be limitations of daily activities of the patient. Supportive care and surroundings are recommended. Dexamethasone and methylprednisolone are widely used to prevent neural secondary injury despite the controversies on their effect. Steroid are known to increase risk of pneumonia and hyperglycemia compared to the minimum benefit in spinal cord injury (Canseco et al., 2021). Methylprednisolone's neuroprotective effects are due to lipid peroxidase and inflammatory cytokines inhibition. This follow up after discharge of this patient was not recorded and observed, which limits this study.

Conclusions

Clinical symptoms of hematomyelia can affect sensoric, motoric, and autonomic systems, including bladder and bowel incontinence. Hematomyelia can cause spinal shock due to spinal cord pathway rearrangement and build-up of protein which leads to the shock. Decompression surgery is recommended to increase the prognosis of the patients. Minimizing the risk of falling and explanation of a procedure using visualization is recommended.

Declaration of Interest

All authors declare that they have no conflict of interests.

Acknowledgment

The authors would like to express gratitude to Universitas Sebelas Maret; Dr. Moewardi General Hospital, Surakarta, Central Java, Indonesia for facilitating this case report.

Funding

No financial support or grant were received.

Data Availability

Available on reasonable request from the corresponding author's email.

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p-ISSN : 2338-5324 e-ISSN: 2442-7276

Author Index

p-ISSN : 2338-5324 e-ISSN: 2442-7276

Subject Index

p-ISSN : 2338-5324 e-ISSN: 2442-7276

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Thanks to the excellent cooperation for supporting the Jurnal Keperawatan Padjadjaran

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