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Research article

Effectiveness of Using Simulation Method in Improving Post-Part Mothers' Knowledge About Newborn Care At Bandung City Hospital in 2025

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Abstract. One of the indicators of the Sustainable Development Goals (SDGs) is the reduction of the Neonatal Mortality Rate (NMR) by 2030. The highest mortality rate in newborns occurs within the first 24 hours after birth, which is often caused by inadequate newborn care. Health education is an important effort to address this problem. The selection of appropriate health education media plays a significant role in increasing maternal knowledge. One of the effective media is the simulation method, which presents real-life situations using props, enabling mothers to practice and understand newborn care in a more tangible way. This study aimed to determine the effectiveness of the simulation method in increasing maternal knowledge about newborn care at Bandung City Hospital. The research employed a pre-experimental design with a one-group pre-test–post-test approach. Data were collected using a newborn care knowledge questionnaire distributed via Google Forms. Univariate data analysis was conducted using percentages, while bivariate analysis was performed using the Wilcoxon Signed Rank Test. The findings showed that, in the pre-test stage, less than half of the respondents (46.7% or 14 mothers) had sufficient knowledge, while the rest had low knowledge levels. After the intervention, the post-test results indicated that the majority (90% or 27 mothers) had good knowledge. Bivariate analysis revealed a p-value of 0.001, indicating a statistically significant improvement in knowledge after the simulation-based health education. In conclusion, the simulation method proved to be effective in increasing postpartum mothers' knowledge of newborn care. The findings suggest that health facilities should consider integrating simulation-based education into maternal and neonatal health programs to support the achievement of SDG targets related to reducing neonatal mortality.

Keywords: Health Education, Maternal Knowledge, Neonatal Mortality, Newborn Care, Simulation Method

1. Introduction

Improving maternal and child health is one of the five priority indicators for health development in Indonesia for 2020-2024. One of the Sustainable Development Goals (SDGs) is to reduce the Neonatal Mortality Rate (NIR) to 12 per 1,000 live births by 2030, or 1.2% of total births (Ministry of Health, 2015). The 2024 World Health Statistics report states that the infant mortality rate in 2022 globally will be 17 per 1,000 live births, or 1.7% of live births. According to the United Nations Children's Fund (UNICEF), the neonatal mortality rate in Indonesia is recorded at around 56,000 babies, or 16.85% (WHO, 2023). The Central Statistics Agency (BPS) reported in 2023 that the Infant Mortality Rate (IMR) in Indonesia was 16.9% per 1,000 live births, while the IMR in West Java Province reached 13.56%. In 2022, Bandung City ranked fourth in West Java with an IMR of 13.60%.

According to the 2023 Indonesian Health Profile, the leading causes of infant mortality in Indonesia in 2022 included low birth weight (28.2%), asphyxia (25.3%), and congenital abnormalities (5.0%). The highest mortality rate occurred during the first 24 hours after birth, due to inadequate neonatal care and failure to care for newborns. According to the Ministry of Health (Kemenkes), in 2022, the number of deaths due to failure to care for newborns in

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Indonesia was 15.3% pneumonia, 6.6% diarrhea, 7% malaria, 5.7% neonatal infections, and 0.2% neonatal tetanus.

The newborn period is a crucial period in the early stages of life. Health problems often arise between birth and one month of age. Therefore, parents, especially postpartum mothers, need to recognize normal conditions and conditions that pose a risk to their baby's health by understanding how to care for their newborn. Research by Rintiani (2023) explains that one factor influencing postpartum mothers' understanding of newborn care is their knowledge. According to Notoatmojo (2010), efforts to introduce and improve postpartum mothers' knowledge about newborn care include health education activities. Bandung City Hospital (RSUD Kota Bandung) is a hospital with a relatively high birth rate. In 2024, 974 births were recorded, both spontaneous and cesarean sections. Given the increasing number of deliveries each month, Bandung City Hospital, specifically the Perinatology Unit, one of the infant care units, provides health education through lectures to postpartum mothers regarding newborn care. This health education aims to prevent failures in infant care and thus prevent an increase in infant hospitalizations at Bandung City Hospital.

According to medical records of infants hospitalized in the Perinatology Unit of Bandung City Hospital in 2024, 22.4%, or 218 infants, were readmitted from postpartum mothers who had previously received health education on newborn care. The percentage of admissions was 67% for neonatal jaundice (67%), pneumonia (5.9%), dehydration (15.1%), sepsis (5%), GERD (3.7%), and other (3.2%).

Based on the above incidents, health education using alternative methods such as simulations is necessary. Hasriyana (2021) also explains that health education using simulation methods tends to be considered more effective because it is non-monotonous and based on direct case analysis, and involves the subject comprehensively and actively.

The results of a preliminary study conducted through an interview method during an assessment of 10 postpartum mothers whose babies were re-hospitalized with cases of neonatal hyperbilirubinemia, umbilical cord infection, severe dehydration, diarrhea, and pneumonia in October 2024 revealed that 3 out of 10 mothers still did not understand what the nurses had conveyed regarding newborn care through the lecture method, 2 postpartum mothers said there was a lack of support from their families to care for their babies while 5 of the other postpartum mothers forgot what the nurses had said before going home.

2. Related Work

According to Kisman (2020), his research revealed that health education through simulations has better knowledge retention because there is a close relationship built between the facilitator and the mother, resulting in a more fluid atmosphere and optimal absorption of the material. Furthermore, according to Hasriyana (2021), the simulation method is more effective because it has the advantage of actively involving someone, providing opportunities for direct involvement, and developing someone's ability to assess situations. Hasriyana (2021) also explained that health education using the simulation method tends to be considered more effective because it is not monotonous and directly based on case analysis, and involves the object comprehensively and actively. Research conducted by Adam et al. (2014) revealed that mothers' knowledge of newborn health improved after being exposed to health education by health workers.

This connection and exchange of information can help mothers develop the ability to explore new knowledge at any time. However, research conducted by Nugraha (2023) concluded that the simulation method is not more effective than the demonstration method. However, based on several studies, the simulation method has been proven to be able to make significant improvements in a person's skills. For example, the results of research by Grafika et al. (2018) showed that simulations showed an increase in knowledge and awareness compared to PowerPoint or lecture methods. Similarly, research on simulation methods conducted by Cheng et al. (2014) found that simulations have a greater impact on problem-solving skills, resulting in more active and productive learning time. Therefore, simulation methods can be effectively used as a medium for health education.

3.Proposed Method

This research design uses an experimental research design with a pre-experimental research method and the research design used is a one-group pre-post test design. This research was conducted at Bandung City Hospital from January to February 2025. The population in this study were all postpartum mothers who gave birth spontaneously at Bandung City Hospital in 2024. Sampling used Purposive sampling using inclusion criteria,

namely (1) Postpartum mothers who gave birth spontaneously, (2) Postpartum mothers who had never received information about how to care for newborns, (3) postpartum mothers with live babies, normal birth weight, and healthy. The sample collected was 30 respondents. The bivariate analysis of this study used the Wilcoxon Signed Rank Test.

4. Results and Discussion

Result

Respondent Characteristics

Table 1 Frequency Distribution of Postpartum Mother Characteristics at Bandung City Hospital

Characteristics		Frequency	%
Age			
	Teenagers (12-20 years)	8	26.7%
	Young Adults (21-40 years)	20	66.7%
	Adults (41-65 years)	2	6.6%
	Total	**30**	**100%**
Education			
	Low (Elementary, Middle School)	4	13.3%
	High (High School, Diploma, Bachelor's)	26	86.7%
	Total	**30**	**100%**
Occupation			
	Working	6	20%
	Not Working	24	80%
	Total	**30**	**100%**
Income			
	≤ Minimum Wage (≤ Rp. 4.209.309)	24	80%
	≥ Minimum Wage (≥ Rp. 4.209.309)	6	20%
	Total	**30**	**100%**
Marriage			
	Married	30	100%
	Not Married	0	0%
	Total	**30**	**100%**
Parity			
	Primipara	10	33.3%
	Multipara and Grandmultipara	20	66.7%
	Total	**30**	**100%**
Characteristics		**Frekuensi**	**%**
Culture			
	No Trust	30	100%
	Have Trust	0	0%
	Total	**30**	**100%**

Source: Processed Data from SPSS Ver.29

The table above shows that the age group of respondents in this study were mostly young adults (21-40 years old). The education level of the respondents was mostly secondary education or high school graduates, namely 23 people (76.7%). A total of 24 people (80%) of the respondents in this study were mostly included in the group of unemployed or

housewives. And have an income of less than the minimum wage as many as 24 people (80%). Seen from the table above, all respondents or as many as 30 people (100%) were married. Respondents who received health education in this study were mostly or as many as 18 people (60%) were multiparous mothers and of the 30 respondents said that as many as 30 people (100%) did not have beliefs adhered to in their culture.

Univariate Analysis Results

Table 2 Distribution of Postpartum Women's Knowledge Before and After Health Education Using the Simulation Method

Knowledge Level	Before		After	
	F	%	F	%
Good	4	13,4%	27	90%
Fair	14	46,7%	3	10%
Poor	12	40%	0	0
Total	**30**	**100%**	**30**	**100%**

Source: Processed Data from SPSS Version 29

Table 2 above shows that postpartum women's knowledge increased after health education using the simulation method. Most respondents were in the good category after the intervention. Knowledge increased to a majority (90%) or 27 respondents with good knowledge, and a small minority (10%) or 3 respondents with sufficient knowledge.

Bivariate Analysis Results

Table 3 Analysis of the Effectiveness of Using Simulation Methods in Improving Postpartum Mothers' Knowledge of Newborn Care at Bandung City Hospital from January to February 2025.

	Good		Fair		Poor		Sig (2-tailed)
	F	%	F	%	F	%	
Pre Test (n=30)	4	13,34	14	46,7	12	40,0	**0.001**
Post Test (n=30)	27	90	3	10	0	0	

Based on table 3 above, from 30 respondents, the results of the analysis using the non-parametric statistical test Wilcoxon Signed Rank Test obtained p value = 0.001 <0.005, meaning H1 is accepted, which means the use of the simulation method is effective in increasing the knowledge of postpartum mothers about newborn care at Bandung City Hospital.

Discussion

Overview of the knowledge level of postpartum mothers before receiving health education using the simulation method

More than half, or 5 postpartum mothers aged 12-20 years, had insufficient knowledge regarding newborn care. This finding aligns with the theory of Ayu (2020) that the productive age for women to have children and care for them is 20-35 years old, as at this age, mothers are physically and psychologically ready and are more easily able to absorb and absorb information about newborn care.

In this study, more than half (43.3%) of postpartum mothers with higher education had insufficient knowledge. This finding contradicts the theory proposed by Miltia et al. (2020) that postpartum mothers with higher education will have good knowledge regarding newborn care.

In this study, less than half (33.3%) of unemployed mothers had insufficient knowledge regarding newborn care. According to research conducted by Rintiani (2022), other factors can influence this, including family support for successful newborn care. Unemployed mothers are more likely to require family support to obtain information related to newborn care based on experiences gained from their families.

The results of this study indicate that all (100%) postpartum mothers were married. According to Ekholuenetale, M., et al. (2020), babies of married mothers have a lower risk of death. This aligns with Susanto's (2019) finding that successful newborn care involves the attention of all family members, especially loved ones.

Of the 30 respondents, less than half (33.3%), or 10 respondents, were primiparous mothers, and all (100%) had insufficient knowledge regarding newborn care. According to Bobak (2015), primiparous mothers tend to experience minor or major problems adjusting to their new role of caring for a baby. The lack of knowledge among primiparous mothers in

this study aligns with the theory proposed by Friedman et al. (2013) that most newlyweds are not prepared for parenthood. Similarly, research by Leta (2020) in Eastern Ethiopia revealed that parity was a significant factor influencing postpartum mothers' knowledge.

Overview of postpartum mothers' knowledge after receiving health education using a simulation method.

Based on the results of the post-test analysis using SPSS, a very significant increase was found in postpartum mothers' knowledge after receiving health education using a simulation method. This was evaluated within 14-20 days after receiving health education via Google Forms.

This increase in post-test results occurred among respondents aged 12-20 years. After receiving health education using the simulation method, the majority, or 7 out of 8 respondents, had a good level of knowledge. According to Riyanti (2013), age influences a person's comprehension and thought patterns. At this age, they are usually more mature and intellectual in receiving information (Sarwono, 2011).

The majority (80%) of knowledge gains after health education also occurred among respondents with higher education. According to Ismara (2020), the higher a person's education, the easier it is for them to accept information, making it easier for them to change their mindset.

The majority (91.7%) of unemployed mothers had good knowledge after receiving health education. According to research by Aprianti (2022), this is because unemployed women automatically care for their babies full-time and prefer to rely on understanding rather than memorization. This aligns with Safitri's (2020) explanation that unemployed mothers spend more time with their babies. Consequently, housewives are more enthusiastic about newborn care.

Judging from the results before health education, of the 10 primiparous respondents with poor knowledge, all (100%) experienced an increase in their knowledge to good knowledge after receiving health education using the simulation method. According to Rintiani (2022), primiparous mothers are mothers experiencing childbirth for the first time and therefore require family support. The most frequently provided support concerns attention and assistance in caring for newborns. This statement is supported by the implementation of health education using simulation methods, which have involved families in participating in health education on newborn care.

The effectiveness of using simulation methods in improving postpartum mothers' knowledge of newborn care.

Based on the results of the research, more than half (27 of 30 respondents (90%) of this study) had a good level of knowledge in newborn care. The analysis showed that the use of simulation methods was effective in improving postpartum mothers' knowledge of newborn care, as indicated by a p-value of 0.001.

According to Notoatmodjo (2003), health education is essentially an activity or effort to convey health messages to communities, groups, or individuals. Furthermore, Notoatmodjo (2003) also explained that health education can transform knowledge through a process of growth and development toward improvement. Meanwhile, according to Makhfudzotin (2014), health education methods can be influential in improving mothers' knowledge. However, to achieve an effective learning process and create interest and emotional engagement between researchers and participants, it is necessary to select appropriate health education media so that learning tools/media are used appropriately and proportionally.

The simulation method is a learning model that attempts to create a realistic situation with maximum similarity (Johnston et al., 2017). This aligns with Nurmala's (2018) explanation that the simulation method is a learning activity that provides learners with the opportunity to imitate an activity related to newborn care. Research conducted by Fitri et al. (2022) found that the simulation method was considered more effective in increasing postpartum mothers' knowledge of newborn care because it fostered reciprocal communication between researchers and respondents regarding unclear issues.

The increase in knowledge observed in this study aligns with Putri's (2013) research, which states that knowledge improvement is influenced by several factors, including formal and non-formal education, information containing messages containing suggestions that contribute to knowledge formation, individual traditions and culture, environmental and social factors as venues for reciprocal individual interactions that influence the acquisition of knowledge, previous motherhood experience, and differences in age.

Another factor that can support changes in postpartum mothers' knowledge about newborn care in this study is family support. Family support is a key factor in improving maternal knowledge. Postpartum mothers play a role as providers of information, attention, and assistance when caring for newborns at home. In addition to family support, another important supporting factor is support from healthcare workers. Health education using simulation methods in this study is one form of support from healthcare workers in improving postpartum mothers' knowledge about newborn care. According to Putri (2013), knowledge through simulation methods stimulates mothers to further explore their knowledge, which is then processed through discussion and exchange of opinions so that the knowledge gained is long-lasting and will always be remembered.

5. Conclusions And Recommendation

The conclusion of this study is that the use of simulation methods is effective in improving postpartum mothers' knowledge about newborn care. Therefore, it is hoped that all related parties, especially colleagues, both nurses and midwives, especially those working in the maternal and infant care room, will begin to participate in health education using simulation methods regarding newborn care as a form of support for health workers in improving postpartum mothers' knowledge about proper newborn care so as to prevent failures in newborn care.

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