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The Effect of Health Education on Improving Pregnant Women's Knowledge: A Pre-Experimental Study

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Abstract

Pregnant women's knowledge of pregnancy danger signs is an important factor in preventing complications and reducing the risk of maternal morbidity and mortality. A lack of understanding of these danger signs often leads to delays in seeking medical care. This study aimed to determine the effect of health education on improving pregnant women's knowledge of pregnancy danger signs in the working area of Sekarjaya Public Health Center in 2025. This study employed a pre-experimental design using a one-group pretest–posttest approach and involved 30 respondents selected through purposive sampling. Data were collected using a structured questionnaire consisting of 15 multiple-choice questions that had been tested for validity and reliability. The intervention consisted of health education on pregnancy danger signs, delivered for approximately 45 minutes using lectures, interactive discussions, question-and-answer sessions, and leaflet media. Data analysis using the Paired t-Test showed a significant increase in knowledge scores, from a mean of 63.47 before the intervention to 82.20 after the intervention (p = 0.000). The results indicate that health education is effective in improving pregnant women's knowledge of pregnancy danger signs. It is recommended that health workers integrate health education as an essential component of antenatal care services to enhance maternal preparedness and safety during pregnancy.

Keywords: Health Education, Pregnant Women, Knowledge, Pregnancy Danger Signs

INTRODUCTION

Maternal health is an important indicator for assessing the success of a country's health care system because it is directly related to maternal morbidity and mortality rates (Souza et al., 2013). Governments and health professionals strive to provide evidence-based care to minimize the risk of complications during pregnancy and childbirth (Miller et al., 2016). Efforts to improve maternal health must address physical, psychological, and social aspects to achieve comprehensive maternal well-being (Bohren et al., 2017). Promotive and preventive interventions are essential components of antenatal care in reducing obstetric complications (Pazandeh et al., 2015). Pregnant women's knowledge of pregnancy and childbirth forms the foundation for making appropriate medical decisions (Kickbusch, 2013). Women with low health literacy are at greater risk of being unprepared for the childbirth process (Zibellini et al., 2021). Therefore, health education needs to be delivered systematically so that women are able to understand and manage their pregnancies effectively (Anggeriani et al., 2024).

Pregnant women's behavior in utilizing health services is influenced by their level of knowledge and understanding of the risks and benefits of medical interventions (Zahroh et al., 2023). Well-planned education can enhance women's ability to choose actions that are appropriate to their pregnancy conditions (Nguyen et al., 2024). In the global context, many pregnant women still make medical decisions based on perceptions or inaccurate information (Dumont et al., 2022). The World Health Organization emphasizes the importance of empowering women so that they can actively participate in clinical decision-making (Betran et al., 2016). Health education also helps reduce knowledge gaps between health professionals and patients in the decision-making process (Elwyn et al., 2012). Lack of knowledge is often a major reason for low maternal participation in choosing safe and indicated procedures (Jacques et al., 2024). Therefore, educational interventions are a strategic approach to building maternal independence and health literacy (Kennedy et al., 2020).

Health education plays a crucial role in supporting shared decision-making practices between health professionals and patients during pregnancy (Megregian et al., 2020). Shared decision-making increases women's confidence in facing childbirth and reduces anxiety (López-Toribio et al., 2021). The application of participatory-based educational models has been shown to improve knowledge and attitudes toward medical interventions (Hadizadeh-Talasaz et al., 2021). Therapeutic communication approaches in education foster trust and openness between pregnant women and health professionals (Shahveisi et al., 2023). Increased maternal knowledge influences adherence to medical recommendations during pregnancy (Sari et al., 2025). Structured education helps women recognize pregnancy danger signs and make timely decisions (Chen et al., 2018). Therefore, health care providers should integrate educational programs into every stage of antenatal visits (Raynes-Greenow et al., 2010).

Numerous studies indicate that educational interventions can reduce unnecessary medical procedures, such as elective cesarean sections without medical indications (Yu et al., 2024). Effective education can change women's perceptions of normal childbirth and increase their confidence in facing the process (Chen et al., 2021). Clear and evidence-based information interventions also reduce levels of conflict and postnatal regret (Eden et al., 2014). Comprehensive health education programs provide opportunities for women to understand the risks and benefits of each childbirth method option (Kuppermann et al., 2020). Systematic and evidence-based information delivery improves the quality of decision-making (Guillén et al., 2019). Education initiated early in pregnancy allows women sufficient time to consider their choices (Chaillet et al., 2024). Therefore, educational strategies should be an integral part of maternal services in primary health care facilities (Grobman et al., 2018).

Sociocultural context also influences the effectiveness of health education among pregnant women (Purwani et al., 2025). Environmental factors and family support can strengthen women's understanding of educational messages (Anggeriani et al., 2024). Studies show that education delivered through interpersonal communication is more effective than passive media such as brochures (Mushy et al., 2022). Women who are actively involved in educational sessions demonstrate higher knowledge retention (Stacey et al., 2020). Adapting educational content to local language and culture increases acceptance of the material (Peters et al., 2024). In many cases, collaboration among midwives, nurses, and nutritionists enriches educational approaches for pregnant women (Bohren et al., 2017). Thus, health education should be implemented through an interprofessional approach to achieve optimal outcomes (Miller et al., 2016).

Health education does not only focus on increasing knowledge but also on changing attitudes and healthy behaviors during pregnancy (Kickbusch, 2013). With adequate understanding, women can adopt preventive behaviors such as iron supplementation and regular antenatal check-ups (Sari et al., 2025). Health literacy plays a significant role in reducing anemia and pregnancy complications (Zibellini et al., 2021). Consistent health education helps women recognize danger signs and seek prompt medical assistance (Zahroh et al., 2023). Studies have shown that community-based educational interventions increase women's participation in health programs (Dumont et al., 2022). Empowering women through education has been proven to improve the quality of decision-making during pregnancy and childbirth (Nguyen et al., 2024). Therefore, health professionals have both moral and professional responsibilities to provide education tailored to women's needs (Elwyn et al., 2012).

Despite various efforts, many pregnant women still have low levels of knowledge regarding pregnancy and childbirth (Pazandeh et al., 2015). Limited consultation time and shortages of health personnel are often major barriers to effective education delivery (Jacques et al., 2024). The use of interactive media and experience-based approaches may serve as solutions to improve educational effectiveness (Mushy et al., 2022). Evaluations of educational programs highlight the need for innovation and regular monitoring to assess changes in maternal behavior (Stacey et al., 2020). Previous studies emphasize that education should be oriented toward women's specific needs based on gestational age and psychological condition (López-Toribio et al., 2021). Educational interventions

that emphasize active involvement have been shown to produce better maternal outcomes (Hadizadeh-Talasaz et al., 2021). Therefore, a pre-experimental approach is necessary to assess the direct impact of education on improving pregnant women's knowledge (Nguyen et al., 2024).

RESEARCH METHODS

This study employed a pre-experimental design using a one-group pretest–posttest approach. This design was selected to measure changes in pregnant women's knowledge levels before and after the implementation of a health education intervention. The pre-experimental design was considered appropriate because it allows the researcher to evaluate the direct effect of the intervention without a control group, while still providing empirical evidence regarding the effectiveness of the educational program in improving maternal knowledge. The study was conducted in August 2025 in the working area of Sekarjaya Public Health Center, which was selected due to its relatively high number of pregnant women and the availability of adequate health facilities to support educational activities.

The population of this study consisted of all pregnant women residing in the working area of Sekarjaya Public Health Center during the study period. The study sample included pregnant women who met the inclusion criteria: (1) willingness to participate and signing an informed consent form, (2) ability to read and write, (3) absence of cognitive impairment, and (4) gestational age in the first to third trimester. The exclusion criteria included pregnant women who did not attend the educational session in full or who experienced acute complications during the study period. Sampling was conducted using purposive sampling, in which respondents were selected based on specific considerations aligned with the study objectives. The minimum sample size was determined using the formula for comparing two means, with a 95% confidence level and 80% statistical power, resulting in a total of 30 respondents.

The research procedure was carried out in three main stages: preparation, implementation, and evaluation. During the preparation stage, the researcher coordinated with the Public Health Center, obtained ethical and administrative approvals, and prepared the research instruments. The implementation stage began with the collection of pretest data, which measured respondents' baseline knowledge of pregnancy danger signs using a structured questionnaire. This was followed by the delivery of the health education intervention conducted by the researcher, who is also a qualified health professional. The educational session was held in the counseling room of the Public Health Center and lasted approximately 45 minutes. After the intervention, a posttest was administered using the same questionnaire to assess changes in knowledge levels. The evaluation stage included data processing, statistical analysis, and interpretation of the findings in accordance with the study objectives.

The research instrument was a structured questionnaire developed by the researcher based on maternal education guidelines issued by the Ministry of Health of the Republic of Indonesia. The questionnaire consisted of 15 multiple-choice items designed to assess pregnant women's knowledge of pregnancy danger signs. The instrument underwent content validity testing by three experts in midwifery, who evaluated the relevance of each item to the study variables. A pilot test was subsequently conducted among 10 pregnant women outside the study sample to ensure clarity and comprehensibility of the language used. The validity test results showed that all items had calculated correlation coefficients greater than the critical value (r table = 0.361), indicating that all items were valid. Reliability testing using Cronbach's Alpha yielded a coefficient of $\alpha = 0.812$, demonstrating high internal consistency and confirming that the instrument was reliable for use in this study.

The intervention consisted of health education on pregnancy danger signs, delivered over approximately 45 minutes using a combination of lectures, question-and-answer sessions, interactive discussions, and leaflet media. The educational content covered the definition of pregnancy danger signs, types of danger signs in the first, second, and third trimesters, and appropriate actions to take when danger signs occur. The education was delivered using clear and easily understandable language,

employing a communicative, empathetic, and participant-centered approach. The intervention was conducted by the researcher, who has professional competence as a health worker and experience in maternal health education. The content and delivery methods were developed in accordance with national health education standards issued by the Ministry of Health to ensure that the information provided was scientific, practical, and relevant to the local context. Following the session, participants were given the opportunity to ask questions and reflect on their understanding to optimize knowledge transfer.

RESULTS AND DISCUSSION

This section presents the research findings on the effect of health education on improving pregnant women's knowledge in the working area of Sekarjaya Public Health Center. The results are organized based on data analysis obtained from 30 pregnant women who fully participated in the health education activities. The data are presented in tabular form and described descriptively to provide a comprehensive overview of the study findings.

Tabel 1 Characteristics of Pregnant Women Respondents in the Working Area of Sekarjaya Public Health Center (n = 30)

Characteristics	Category	Frequency (n)	Percentage (%)
Age (years)	< 20 years	4	13,3
	20–35 years	21	70,0
	> 35 years	5	16,7
Education	Primary/ Junior High School	8	26,7
	Senior High School	14	46,7
	Higher Education	8	26,6
Occupation	Housewife	17	56,7
	Private employee	7	23,3
	Self-employed	6	20,0
Gestational age (trimester)	Trimester I	6	20,0
	Trimester II	12	40,0
	Trimester III	12	40,0
Parity	Primigravida	10	33,3
	Multigravida	18	60,0
	Grande multipara	2	6,7

Based on Table 1, it can be seen that the majority of respondents were in the 20–35 year age group, totaling 21 women (70.0%), which physiologically represents a healthy reproductive age range. Respondents aged under 20 years accounted for 4 women (13.3%), while those aged over 35 years accounted for 5 women (16.7%). This distribution indicates that most study participants were within the ideal age range for pregnancy with minimal risk.

In terms of educational attainment, most respondents had completed senior high school (46.7%), followed by primary/junior high school education (26.7%) and higher education (26.6%). This distribution suggests that respondents' educational levels were relatively varied; however, the majority possessed sufficient literacy skills to read and understand the educational information provided. Secondary and higher education levels potentially enhance pregnant women's ability to receive and process health messages effectively.

Regarding employment status, more than half of the respondents were housewives (56.7%), followed by private employees (23.3%) and self-employed women (20.0%). This condition indicates

that most respondents had relatively flexible time to participate in educational activities and to apply the health behaviors learned. In addition, the inclusion of respondents from diverse occupational backgrounds enriched the dynamics of understanding during the educational discussion sessions.

From the perspective of gestational age, respondents were proportionally distributed, with the highest numbers in the second and third trimesters, each comprising 12 women (40.0%), while the first trimester included 6 women (20.0%). These data indicate that most pregnant women participating in the education had already experienced early physiological changes of pregnancy, making it easier for them to understand the context of pregnancy danger signs discussed.

Meanwhile, based on parity, the majority of respondents were multigravida (60.0%), meaning they had experienced previous pregnancies. Primigravida respondents (first pregnancy) numbered 10 women (33.3%), while grand multipara respondents (>3 pregnancies) accounted for 2 women (6.7%). These findings suggest that most respondents had prior pregnancy experience that could influence their baseline knowledge. However, previous experience does not necessarily guarantee accurate understanding of pregnancy danger signs, indicating that education remains relevant for all groups.
Overall, the characteristics of respondents in this study reflect a diverse profile of pregnant women in terms of age, education, occupation, and pregnancy experience. This variation highlights the need for health education to be tailored to individual backgrounds so that the messages delivered are more easily understood and applied in daily practice. These descriptive findings provide a foundation for further analysis of changes in pregnant women's knowledge following the health education intervention.

Table 2. Comparison of Pregnant Women's Knowledge Scores Before and After Health Education (n = 30)

Variable	Mean	SD	Min–Maks	t	p-value
Knowledge before education	63,47	8,52	45 – 80		
Knowledge after education	82,20	6,73	70 – 95	9,821	0,000*

Note: Paired t-Test; statistically significant at $p < 0.05$.

Based on the analysis presented in Table 2, there was a significant increase in the mean knowledge score of pregnant women after receiving health education on pregnancy danger signs. The mean knowledge score before education was 63.47 (SD = 8.52), with a score range of 45–80, while after the health education intervention it increased to 82.20 (SD = 6.73), with a score range of 70–95. The Paired t-Test results showed a t-value of 9.821 with a p-value of 0.000 ($p < 0.05$), indicating a statistically significant difference in knowledge levels before and after the health education intervention. These findings demonstrate that health education delivered through lectures, question-and-answer sessions, interactive discussions, and leaflet media was effective in significantly improving pregnant women's knowledge. The increase in the mean score of nearly 18.7 points indicates that most respondents were able to understand and retain the information delivered during the educational activities.

These results are consistent with health literacy theory, which states that knowledge can be enhanced through effective and communicative health education processes (Kickbusch, 2013). Education delivered using interactive methods strengthens understanding and improves women's ability to recognize pregnancy danger signs (Zibellini et al., 2021). Adequate knowledge enables pregnant women to make appropriate decisions in maintaining pregnancy health (Elwyn et al., 2012). The observed increase in knowledge scores reflects the success of education as an effective non-clinical intervention to raise maternal awareness (Chen et al., 2018). Thus, health education plays a vital role as a means of empowering pregnant women to achieve safe and healthy pregnancies (Souza et al., 2013).

The findings of this study further reinforce evidence that educational interventions contribute substantially to improving maternal health literacy. Health literacy serves as the foundation for pregnant women to understand medical information and make informed decisions regarding self-care

during pregnancy (Kickbusch, 2013). Previous studies have emphasized that structured, education-based interventions improve pregnant women's understanding of pregnancy risks and preventive measures (Zahroh et al., 2023). Accurate information helps women distinguish between normal physiological changes and danger signs during pregnancy (Nguyen et al., 2024). When women possess adequate knowledge, they are more prepared to take preventive actions and seek medical assistance promptly (Bohren et al., 2017). Health literacy also promotes positive health behaviors, such as iron supplementation and regular antenatal check-ups (Sari et al., 2025). Therefore, the results of this study confirm that improving knowledge is a critical initial step in fostering healthy and independent maternal behaviors (Miller et al., 2016).

These findings are also aligned with studies highlighting the effectiveness of participatory approaches in maternal health education. Interactive approaches allow pregnant women to actively ask questions, engage in discussions, and relate information to their personal experiences (Megregian et al., 2020). Women who actively participate in educational processes demonstrate higher levels of understanding compared to passive recipients of information (López-Toribio et al., 2021). Active participation also enhances confidence and reduces anxiety related to pregnancy and childbirth (Shahveisi et al., 2023). Two-way interaction in educational sessions creates a supportive and enjoyable learning environment that facilitates long-term information retention (Stacey et al., 2020). The results of this study indicate that educational methods combining lectures, discussions, and visual media such as leaflets can produce optimal outcomes (Raynes-Greenow et al., 2010). Consequently, health professionals should incorporate participatory elements into maternal education programs to ensure effective knowledge transfer (Kennedy et al., 2020).

In addition to improving knowledge, health education activities also support shared decision making between pregnant women and health professionals. Shared decision making helps women understand care options and their implications for maternal and fetal health (Elwyn et al., 2012). The application of this model has been shown to increase maternal satisfaction and trust in health services (Hadizadeh-Talasaz et al., 2021). Other studies indicate that the use of information-based decision aids enhances women's ability to choose appropriate obstetric interventions (Kuppermann et al., 2020). Effective education strengthens women's capacity to actively participate in clinical decision making during pregnancy (Nguyen et al., 2024). With adequate understanding, women may also decline unnecessary medical interventions, such as elective cesarean sections without clear indications (Betran et al., 2016). Thus, increased knowledge not only improves pregnancy preparedness but also enhances women's autonomy in determining safe and appropriate care (Yu et al., 2024).

Systematically delivered health education has also been shown to reduce the risk of complications by improving maternal preparedness. Information on pregnancy danger signs enables women to recognize symptoms that require immediate medical attention (Chen et al., 2018). This improvement in knowledge directly contributes to reductions in maternal morbidity (Souza et al., 2013). When women have a clear understanding of pregnancy-related risks, they are more likely to seek timely care at health facilities (Dumont et al., 2022). Comprehensive education promotes preventive behaviors such as maintaining balanced nutrition and monitoring blood pressure during pregnancy (Anggeriani et al., 2024). Previous studies have also shown that counseling delivered by experienced health professionals increases women's trust and adherence to medical recommendations (Bohren et al., 2017). Therefore, the findings of this study emphasize the importance of continuous educational activities at public health centers to strengthen promotive and preventive maternal health efforts (Miller et al., 2016).

The involvement of competent health professionals and the use of appropriate educational media were key supporting factors for the success of the intervention. The use of leaflets as visual aids facilitated women's understanding of pregnancy danger signs (Nguyen et al., 2024). Simple yet attractive printed media can reinforce memory and recall of educational messages (Stacey et al., 2020). Moreover, lecture-based education combined with interactive discussion encourages respondents to think critically and share personal experiences (Megregian et al., 2020). Educational effectiveness is

also influenced by health professionals' communication skills in conveying information using clear and accessible language (Purwani et al., 2025). Educational activities conducted by experienced health workers foster trust among participants (Bohren et al., 2017). This study demonstrates that strong interpersonal communication skills play a crucial role in the success of maternal education (López-Toribio et al., 2021). Therefore, strengthening therapeutic communication training for health professionals is essential to improve the effectiveness of educational activities in practice (Chen et al., 2021).

The results of this study also support the importance of integrating health education into routine antenatal care services at public health centers. Services that combine clinical and educational components have been shown to yield more comprehensive benefits for maternal well-being (Miller et al., 2016). Non-clinical interventions such as education contribute to reducing unnecessary medical procedures and reinforcing evidence-based care practices (Chen et al., 2018). Actively involving women in educational activities helps them understand their rights, responsibilities, and risks during pregnancy and childbirth (Jacques et al., 2024). Primary-level health workers play a strategic role in ensuring that every pregnant woman receives accurate and understandable information (Pazandeh et al., 2015). As the frontline of community health services, public health centers should function as hubs for community-based maternal education (Bohren et al., 2017). The success of the educational intervention in this study suggests that similar programs can be replicated in other areas with comparable demographic characteristics (Chaillet et al., 2024). Thus, maternal education should be viewed as a long-term investment in improving maternal and child health outcomes (Souza et al., 2013).

Overall, the findings of this study demonstrate that health education has a significant effect on improving pregnant women's knowledge of pregnancy danger signs. This study strengthens global evidence that education-based interventions and shared decision making are key components of effective maternal health care (Elwyn et al., 2012). Increased knowledge is expected to translate into preventive behaviors and appropriate decision making during pregnancy (Nguyen et al., 2024). Furthermore, these findings support the expansion of community-based health education programs to ensure that benefits reach all pregnant women, including those in rural areas (Dumont et al., 2022). Primary health care providers should enhance their capacity to deliver evidence-based, patient-centered education (Kennedy et al., 2020). This study also recommends that health education be incorporated as a mandatory component of national antenatal care programs (Miller et al., 2016). In this way, health education can serve as an effective strategy for achieving maternal health development goals and reducing maternal mortality in Indonesia (Souza et al., 2013)

CONCLUSION

This study demonstrates that health education has a significant effect on improving pregnant women's knowledge of pregnancy danger signs. Following the educational intervention, which lasted approximately 45 minutes, there was a noticeable increase in the mean knowledge score. These findings confirm that an educational approach based on active communication, interactive discussion, and the use of leaflet media is effective in strengthening maternal health literacy. Health education delivered through participatory methods has been shown to enhance women's ability to recognize abnormal symptoms, understand pregnancy-related risks, and determine appropriate preventive actions. This study supports the importance of integrating health education programs into antenatal care services at primary health care facilities as a strategy to reduce the risk of complications and improve maternal preparedness during pregnancy. Conceptually, this research highlights that empowerment through knowledge represents a concrete form of promotive and preventive efforts in maternal nursing care, oriented toward the safety of both mother and fetus.

The findings of this study have important practical implications for health professionals, health service institutions, and policymakers. Health workers are encouraged to make educational activities an integral component of every antenatal visit, with delivery tailored to the mother's level of understanding and gestational age. Educational methods should combine lectures, discussions, simulations, and visual media to ensure that health messages are conveyed effectively and engagingly. Enhancing health workers' competencies in therapeutic communication and educational pedagogy is also essential to ensure that the educational process is empathetic and interactive. Public health centers can expand the reach of educational activities through collaboration with community health volunteers, pregnant women's groups, and community organizations so that the benefits of education are more evenly distributed at the community level. Strong support from local governments is needed to reinforce maternal health literacy programs as part of broader strategies to prevent pregnancy complications and improve the quality of maternal health services. Future research is expected to assess the long-term impact of health education on behavioral changes and maternal health outcomes, so that similar interventions can be implemented sustainably and in an evidence-based manner across Indonesia

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