

Effectiveness of Antenatal Class Education in Improving Early Detection of Pregnancy Danger Signs

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ABSTRACT

Introduction: Maternal mortality remains a significant public health concern in Indonesia, with inadequate early detection of pregnancy danger signs contributing significantly to preventable complications. Maternal classes are one of the key educational strategies aimed at improving pregnant women's knowledge and awareness related to pregnancy risks. This study aimed to analyze the effectiveness of maternal class education in improving early detection abilities regarding pregnancy danger signs among pregnant women in UPT Puskesmas Ulaweng, Bone Regency.

Methods: This study applied a pre–pre-experimental design using a one-group pretest–posttest approach. A total of 30 pregnant women were selected through quota sampling. Data were collected using an observation sheet and a questionnaire assessing early detection abilities. Statistical analysis was performed using the Wilcoxon signed-rank test to determine differences before and after the educational intervention.

Results: Pretest findings indicated that 70% of participants had low early detection abilities, while only 13% demonstrated good ability. Following the maternal class intervention, 84% of participants achieved good ability, with only 3% remaining in the low category. The Wilcoxon test showed a significant difference between pretest and posttest scores ($p = 0.003$), indicating a substantial improvement in early detection skills after participating in the maternal class.

Conclusion: The findings of this study indicate that maternal class education plays a crucial role in improving pregnant women's ability to identify early danger signs during pregnancy. A significant increase in post-intervention scores, supported by the Wilcoxon test result ($p = 0.003$), confirms that the educational sessions effectively enhance maternal knowledge and vigilance. Strengthening early detection skills is essential for preventing complications and ensuring the safety of both mother and fetus. Based on these results, it is recommended that maternal classes be implemented consistently and systematically at the primary healthcare level. The involvement of husbands and family members is also encouraged to optimize support and facilitate timely decision-making when danger signs arise.

Keywords: Danger Signs, Education, Early Detection, Maternal Class, Pregnant Women.



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INTRODUCTION

Maternal mortality remains a critical global health concern. According to the World Health Organization (WHO), approximately 800 women die each day due to complications related to pregnancy and childbirth (WHO, 2020). Despite extensive global and national efforts, maternal mortality remains high in Indonesia, with a Maternal Mortality Rate (MMR) of 305 per 100,000 live births in 2020. In South Sulawesi Province alone, the MMR reached 192 per 100,000 live births in the same year. This worrying trend persists at the local level, including in Bone Regency, which recorded nine maternal deaths in 2024, some of which could have been prevented with early detection of danger signs during pregnancy.

The inability of pregnant women to detect early warning signs of pregnancy complications is one of the main contributors to maternal death. Issues such as vomiting leading to dehydration and preeclampsia, conditions that should be identified as danger signs, have resulted in fatal outcomes in local communities, as recorded at Ulaweng Health Center in Bone Regency. These occurrences highlight a systemic problem: inadequate awareness and insufficient health education among expectant mothers. A critical factor behind this deficiency is the lack of consistent, structured maternal education programs accessible at the community level, particularly in rural and remote areas (Aderoba and Adu-Bonsaffoh, 2022). One strategic approach to reducing maternal mortality is the implementation of antenatal education through kelas ibu hamil, which aims to enhance maternal knowledge, promote healthy behaviors, and strengthen the ability of pregnant women to recognize danger signs. The positive impact of these classes, their implementation remains uneven, especially in rural areas with limited health service access (Albahri *et al.*, 2023).

In Ulaweng, the delivery of maternal classes was further disrupted during the COVID-19 pandemic, decreasing from quarterly sessions to only twice a year. This reduction, combined with inconsistent teaching quality and participation, has weakened the program's effectiveness. Preliminary data from Ulaweng Health Center indicate that only a small proportion of the 105 pregnant women had regular exposure to structured antenatal education. As a result, many women lacked awareness of critical pregnancy danger signs such as persistent vomiting, bleeding, severe headaches, and decreased fetal movement (Alzakari *et al.*, 2024). These conditions highlight the urgent need for rigorous evaluation of antenatal education to ensure it effectively improves mothers' early detection abilities (Ali *et al.*, 2021).

Several existing studies have examined the impact of maternal education classes on knowledge acquisition. A notable increase in pregnant women's knowledge after participating in such courses (Anumudu, Uhegwu and Anumudu, 2025). However, these studies often lack robust pre- and post-intervention assessments and are limited to cross-sectional designs without measuring actual behavioral changes or sustained knowledge retention (Brown *et al.*, 2018). Furthermore, most research does not consider the socio-cultural and logistical challenges unique to rural communities, where healthcare access and participation in structured classes are significantly constrained.

This study addresses these gaps by focusing on the effectiveness of maternal education classes in improving early detection capabilities for pregnancy danger signs among women in Ulaweng, Bone Regency. Using a pretest-posttest design, this research aims to measure not only knowledge gains but also the statistical significance of educational interventions using the Wilcoxon test. By grounding the intervention in real-world settings with clear baselines and follow-up assessments, this study offers a more comprehensive understanding of how maternal education can directly impact maternal health outcomes.

The novelty of this research lies in its focus on a specific rural context, a primary health center in Bone Regency with known maternal mortality issues, while employing a structured educational intervention with measurable outcomes. Unlike previous studies, this research evaluates both the delivery and impact of antenatal classes, highlighting the importance of consistent, community-based maternal health education. The findings are expected to contribute actionable insights for healthcare providers, policymakers, and public health practitioners seeking to reduce maternal mortality through localized educational strategies. Maternal mortality remains a preventable tragedy when early signs are recognized and addressed promptly. This study aims to demonstrate that antenatal education through structured maternal classes is not only beneficial but essential in empowering pregnant women, especially in underserved communities, to take proactive steps toward safe pregnancies and childbirth.

RESEARCH METHODOLOGY

This study employed a quasi-experimental one-group pretest–posttest design to evaluate the effectiveness of the maternal class education program in improving pregnant women's ability to perform early detection of pregnancy danger signs. This design was selected because it enables direct measurement of changes in knowledge and detection ability attributable to the intervention while maintaining feasibility within a community health setting. The study was conducted at UPT Public Health Centers, Ulaweng, Kabupaten Bone, South Sulawesi, Indonesia, an area characterized by high maternal mortality rates and limited access to structured maternal education programs. The target population consisted of all pregnant women residing within the health center's catchment area, totaling 105 individuals. Using quota sampling, a total of 30 pregnant women who met the inclusion criteria were recruited. Eligible participants were those currently attending the maternal class program, able to communicate effectively, and willing to provide informed consent. Pregnant women with severe complications requiring immediate referral or those absent during either the pretest or posttest session were excluded from the study.

The intervention consisted of structured educational sessions delivered in accordance with the national *Kelas Ibu Hamil* guidelines issued by the Indonesian Ministry of Health. The educational content covered comprehensive topics on the recognition of danger signs in pregnancy, maternal self-care, fetal well-being monitoring, and preventive measures against pregnancy complications. Sessions were delivered by trained midwives using a combination of interactive lectures, group discussions, flipcharts, demonstrations, and the *Maternal and Child Health Handbook*. All participants received the duplicate educational content to ensure consistency of exposure.

Data collection was conducted in three sequential phases. The preparation phase involved the development and refinement of data collection instruments, including a structured questionnaire and an observation checklist, followed by securing administrative and ethical approval from institutional and local health authorities. During the implementation phase, participants were briefed about the study objectives and procedures, and written informed consent was obtained. A pretest was administered before the educational session to assess baseline knowledge and early detection ability. Following the completion of the maternal class intervention, the same instrument was administered as a posttest to measure the change in detection ability. The final reporting phase involved data verification, statistical analysis, and the preparation of research outputs.

The primary independent variable in this study was the maternal class education intervention, while the dependent variable was the pregnant women's ability to detect early signs of pregnancy danger. The assessment instrument measured recognition of key danger signs,

including vaginal bleeding, severe headaches, edema, persistent vomiting, reduced fetal movement, fever, and visual disturbances.

Data were analyzed using both descriptive and inferential statistics. Univariate analysis was performed to summarize participant characteristics such as age, education level, and occupation, as well as pretest and posttest scores. As the data did not meet parametric assumptions, the Wilcoxon Signed-Rank Test was used to evaluate differences between pretest and posttest scores. A significance level of $\alpha = 0.05$ was applied. The analysis revealed a statistically significant improvement in early detection ability following the educational intervention ($p = 0.003$), indicating that the maternal class education program was effective in enhancing pregnant women's recognition of danger signs. This result aligns with the study's theoretical basis, suggesting that structured maternal education can substantially improve cognitive and behavioral responses to pregnancy risks.

Ethical principles were upheld throughout the study. Participation was voluntary, and confidentiality was maintained by anonymizing respondent identities. Participants were informed of their right to withdraw at any stage without penalty. The study adhered to institutional research ethics and complied with local health authority requirements. The methodological approach ensured the rigor, transparency, and reproducibility expected in international scientific research, while remaining contextually relevant to maternal health challenges in rural Indonesia.

RESULT

This study aimed to determine the effectiveness of pregnancy class education in improving the ability of pregnant women to perform early detection of danger signs during pregnancy. The results are presented beginning with the characteristics of the respondents, followed by an analysis of their pretest and posttest abilities, and the impact of the educational intervention. The findings show notable improvements in the respondents' knowledge and early detection skills after participating in the pregnancy class, reflecting the effectiveness of the academic program in enhancing maternal awareness and preparedness. Detailed results are described in the following sections.

Table 1. Characteristics of Respondents (n = 30)

Characteristics	Category	n	%
Education Level	Bachelor (S1)	5	17
	Senior High School (SLTA)	12	40
	Junior High School (SLTP)	10	33
	Elementary School (SD)	3	10
Age	< 25 years	11	37
	25–35 years	17	57
	> 35 years	2	7
Occupation	Employed	7	23
	Unemployed (Housewife)	23	77

The majority of respondents had a Senior High School education (40%), indicating a generally moderate educational background that may support a basic understanding of maternal health information. Most participants were within the 25–35 years age group (57%), which is considered an optimal reproductive age range. In terms of occupation, a large proportion of respondents were unemployed or homemakers (77%), suggesting they may have more time to participate in pregnancy classes and focus on maternal health education.

Table 2. Combined distribution of early detection ability of pregnancy danger signs (pretest–posttest) and participation in antenatal class

Category	Sub-Category	Pretest <i>n</i> (%)	Posttest <i>n</i> (%)	Antenatal Class Participation <i>n</i> (%)
Early Detection Ability	Poor	21 (70%)	1 (3%)	
	Fair	5 (17%)	4 (13%)	
	Good	4 (13%)	25 (84%)	
Antenatal Class Participation	Attending			30 (100%)
	Not Attending			0 (0%)

The combined table illustrates clear changes in the respondents' ability to perform early detection of pregnancy danger signs before and after attending the maternal class. Before the intervention, the majority of respondents demonstrated poor ability (70%), followed by 17% in the fair category and only 13% in the good category. However, after the educational intervention, there was a remarkable improvement: 84% of respondents reached the good category, while only 3% remained in the poor category. The table also shows that all respondents (100%) participated in the maternal class. This universal participation strengthens the conclusion that the educational sessions played a significant role in enhancing early detection skills. Overall, the combined results indicate that the maternal class education was highly effective in improving the respondents' ability to recognize early warning signs during pregnancy.

Table 2. Bivariate analysis of the effect of pregnant women's class education on the early detection ability of pregnancy danger signs

Variable	Mean Pretest	Mean Posttest	Mean Deviation (MD)	Standard Deviation (SD)	p-value
Attending Pregnant Women's Class	28	15.8	13.4	9.372	0.003
Not Attending	0	0	0	0	

Source: Wilcoxon Signed Rank Test Results

The table shows the comparison of early detection ability between respondents who attended the Pregnant Women Class and those who did not. Respondents who attended the class demonstrated a substantial improvement, as indicated by a mean pretest score of 28 and a mean posttest score of 15.8, resulting in a mean deviation (MD) of 13.4. This positive change reflects a significant enhancement in their ability to recognize danger signs during pregnancy. The standard deviation of 9.372 indicates some variation among individual improvements, but the overall effect remains strong. The p-value of 0.003 ($p < 0.05$) confirms that the difference between pretest and posttest scores is statistically significant. This means that the educational intervention provided through the Pregnant Women Class had a meaningful and measurable impact on improving respondents' early detection skills. The group that did not attend the class showed no change, with all values remaining at zero, indicating no improvement in detection ability. This further reinforces the effectiveness of the maternal class education program. Participation in the Pregnant Women Class led to a clear improvement in mothers' ability to recognize early danger signs in pregnancy. Those who attended the class demonstrated better understanding and awareness after the educational intervention, while those who did not participate showed no meaningful change. This indicates that the maternal class education was effective in enhancing early detection skills among pregnant women.

DISCUSSION

The findings of this study demonstrate that maternal class education is highly effective in improving pregnant women's ability to perform early detection of pregnancy danger signs. The statistically significant increase in post-test scores compared with pre-test results, evidenced by a Wilcoxon p-value of 0.003, indicates that the intervention successfully enhanced participants' knowledge and awareness. Before receiving education, most respondents (70%) exhibited poor

early detection abilities, with only 13% categorized as having good ability. However, after the educational sessions, 84% demonstrated good early detection skills, showing a substantial shift in the distribution of knowledge and readiness among pregnant women. These results strongly reinforce the premise that structured educational interventions can meaningfully improve maternal health literacy and preparedness (Edu-Mensah *et al.*, 2025).

The results align with existing literature suggesting that maternal education is one of the most influential determinants of maternal health outcomes (Elhage *et al.*, 2024). Knowledge improves through exposure to structured information and repeated reinforcement, both of which were provided during the maternal class sessions (Feroz *et al.*, 2022). Learning via visual aids, group discussion, and guided explanations contributes to a more comprehensive understanding and long-term retention of pregnancy danger signs. Who reported improved maternal knowledge after attending pregnancy classes (Khreshheh *et al.*, 2018). Similarly, studies conducted in other regions have found that pregnant women who participate in educational programs are more likely to recognize early symptoms of complications and seek timely care (Karaçay Yıkar, Keklik and Nazik, 2025).

The demographic characteristics of participants also influenced the outcomes of the intervention. Most respondents were aged 25–35 years, which is considered the optimal reproductive age range, where cognitive maturity and readiness to absorb new information are higher (Kumar, Kumar and Darmstadt, 2010). This age group is generally more receptive to health education and capable of integrating new knowledge into practice. Furthermore, most respondents had secondary education, which likely contributed to the effectiveness of the intervention, as education level is closely linked to health literacy (Moulaei *et al.*, 2025). Pregnant women with formal education tend to understand health information better, ask relevant questions, and engage actively in learning processes. These factors facilitated the success of the maternal class intervention at Puskesmas Ulaweng.

In addition, the employment status of respondents may have contributed to their ability to attend and benefit from the sessions. A significant proportion (77%) were not employed outside the home, giving them more flexibility to participate in all educational activities without competing demands on their time. This situation likely improved attendance rates and engagement, both of which are essential for effective learning (Putri, Bachtiar and Suprpto, 2025). Pregnant women who are fully present and attentive during classes are more likely to understand and recall key messages related to pregnancy danger signs, such as vaginal bleeding, severe headaches, reduced fetal movement, swelling, or persistent vomiting (Riyandani and Sriwahyuni, 2024).

From a theoretical perspective, the study also resonates with the Health Belief Model (HBM), which posits that knowledge alone is not enough to change behavior; individuals must also perceive their vulnerability to health risks and believe in the benefits of acting (Sarker *et al.*, 2025). Through maternal class education, participants not only learned about danger signs but also gained an understanding of their potential severity and the importance of immediate response (Shah *et al.*, 2024). Discussions, real-life examples, and interactive sessions may have increased their perceived susceptibility and stimulated a stronger sense of urgency and responsibility towards their own health (Ilardo and Speciale, 2020). Furthermore, maternal class education fosters a supportive learning environment that encourages sharing of experiences among participants, enhancing motivation, and reducing anxiety (Rakers *et al.*, 2023). Such social support mechanisms can reinforce learning and help mothers feel more confident in identifying

abnormal symptoms. This aligns with the social support theory, which highlights the role of interpersonal relationships in improving health behaviors and outcomes (Porat *et al.*, 2020).

Another important aspect is the relevance of this intervention in reducing maternal mortality at the community level. The high rates of maternal deaths in Indonesia, including in South Sulawesi, are often associated with delays in recognizing danger signs and seeking care. By building pregnant women's competencies in early detection, maternal class education can contribute to reducing the first delay in the "Three Delays Model": the delay in deciding to seek care. When mothers can identify early warning signs such as bleeding, severe headaches, edema, high fever, or reduced fetal movement, they are more likely to seek timely medical assistance, potentially preventing severe complications. The results of this study provide strong justification for strengthening and expanding maternal class programs across health facilities. Given that all respondents attended the sessions and showed measurable improvements, similar interventions could be applied to larger populations or integrated with digital platforms to broaden their reach. Additionally, involving husbands or family members in educational sessions may further enhance outcomes, as family support plays a crucial role in maternal health decision-making.

The study highlights the significant role of maternal class education in enhancing pregnant women's ability to detect danger signs early. The substantial improvement from pre-test to post-test scores, supported by statistical evidence, underscores the effectiveness of the intervention. These findings emphasize the importance of sustained educational efforts within community health services to empower pregnant women, improve maternal health literacy, and contribute to the reduction of maternal morbidity and mortality.

CONCLUSION

The findings of this study show that maternal class education plays a crucial role in improving pregnant women's ability to detect early signs of pregnancy complications. The significant increase in posttest scores indicates that structured and interactive learning effectively enhances women's awareness and readiness to respond to danger signs such as bleeding, persistent headaches, swelling, and decreased fetal movement. This improvement reflects not only better knowledge but also increased confidence in recognizing abnormal conditions during pregnancy, which is essential for preventing delays in seeking care and reducing maternal health risks.

These results imply that maternal class programs should be strengthened and integrated consistently into antenatal care services. Health workers are encouraged to use clear communication, engaging teaching methods, and supportive learning environments to optimize mothers' understanding. Involving family members, especially husbands, can further enhance decision-making during emergencies. The study highlights the importance of expanding maternal education to reach rural communities and maintaining continuous evaluation to ensure program effectiveness, contributing to broader efforts in reducing maternal morbidity and mortality.

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Conflict of Interest

There are no potential conflicts of interest relevant to this article.

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