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The Relationship Between Participation In Pregnant Women's Classes And Mothers' Knowledge Of Danger Signs In Pregnancy

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Abstract
Pregnancy complications that are not recognized early can endanger both the mother and fetus. About 15% of pregnancies worldwide are estimated to involve complications. Limited awareness of danger signs may delay recognition of difficulties and timely seeking care. Pregnant Women's Classes are structured educational activities designed to improve maternal knowledge of pregnancy and its danger signs. This study examined the association between class participation and mothers' knowledge of pregnancy danger signs. A quantitative analytic cross-sectional study was conducted at the Bumidaya Palas Outpatient Health Center, South Lampung Regency, in February 2025. The population comprised 134 pregnant women. A minimum sample of 100 participants was calculated applying a 5% margin of error to the Slovin formula, and participants were recruited through consecutive sampling Women were classified as class participants if they had attended at least three sessions during the current pregnancy. Knowledge was assessed using a validated questionnaire with strong internal consistency (Cronbach's $\alpha = 0.94$). The chi-square test and descriptive statistics were employed in the analysis, with $p < 0.05$ being the threshold for statistical significance. Among respondents, 64% did not participate in the classes and 36% did. Poor knowledge was found in 76.6% of non-participants, while 77.8% of participants had good knowledge. Knowledge levels differed significantly by class participation ($p < 0.001$; OR = 11.433; 95 % CI: 4.310-30.331). Participation in Pregnant Women's Classes was significantly associated with better knowledge of pregnancy danger signs.

Keywords: Pregnant Women's Class, Knowledge, Danger sign in pregnancy.

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1. INTRODUCTION

Pregnancy complications can develop unexpectedly and threaten maternal and fetal health, and approximately 15% of pregnancies are estimated to experience complications. Important warning vaginal bleeding and intense headaches are symptoms or visual disturbance, facial swelling or hands, decreased movement of the fetus, seizures, fever, severe abdominal or epigastric pain, persistent vomiting, breathing difficulty, loss irregular vaginal discharge and loss of consciousness (Gesese et al., 2023). Failure to recognize these signs can delay the identification of complications and the decision to seek care. Structured maternal education can improve this recognition. In a cluster-randomized trial involving 1,070 pregnant women in southern Ethiopia, 68.7% of women who received community-based health education had good knowledge of obstetric danger signs compared with 36.2% in the control group; the intervention increased the probability of good knowledge by 71% and also improved birth preparedness and complication readiness (ARR = 1.71; 99% CI: 1.14–2.57) (Yoseph et al., 2024).

Delayed decisions to seek care have also been associated with unfavorable outcomes among women with obstetric complications, emphasizing the importance of early recognition and timely health-seeking behavior (Gelaw et al., 2023). International evidence consistently shows that recognition remains incomplete across settings. Studies in Ethiopia, Nigeria, Libya, and Somaliland reported low or uneven recognition of obstetric danger signs, with vaginal bleeding generally identified more often than less visible warning signs such as blurred vision or convulsions (Ahmed et al., 2026; Elhage et al., 2024; Mesele et al., 2023; Okoror & Omuemu, 2023)

In Indonesia, pregnant women's classes are group-based educational activities designed to increase moms' understanding of pregnancy, delivery, and postpartum care, complication prevention, newborn care, postpartum contraception, and pregnancy exercise (Kementerian Kesehatan Republik Indonesia, 2019). The need for effective maternal education remains important because advancements in lowering maternal mortality has slowed. Globally, the maternal mortality ratio declined to 223 per 100,000 live births in 2020, but this stays well above the 2030 Sustainable Development Goal target of fewer than 70 per 100,000 live births. (Berhan & Abeba, 2024). In Indonesia, According to the 2020 population census, The rate of maternal fatalities was 189 per 100,000 live births. In 2023, 4,482 maternal deaths were recorded, with Obstetric haemorrhage (360 instances), hypertensive problems during pregnancy (412 cases), and other obstetric complications (204 cases) among the leading causes. Antenatal care coverage in 2023 reached 85.6% for the fourth visit (K4), whereas sixth-visit coverage (K6) was only 74.4%, indicating that continuity of antenatal contact remains incomplete (Kementerian Kesehatan Republik Indonesia, 2024).

At the provincial and district levels, the burden of maternal complications remains relevant. Lampung province recorded 110 maternal deaths in 2023, corresponding to a maternal mortality ratio of 84.96 per 100,000 live births, compared with 92 deaths in 2022 and 187 in 2021. Obstetric hemorrhage and hypertensive disorders remained important causes of maternal death. In South Lampung Regency, the The ratio of maternal mortality dropped from 29.43 per 100,000 live births in 2022 to 27.92 in 2023 and 22.38 in 2024. Despite this decline, hemorrhage and hypertensive disorders continued to contribute to maternal mortality, supporting the need to strengthen early pregnancy problem identification, referral, and prompt treatment. (Kemenkes RI, 2024).

Local data from the Bumidaya Palas Outpatient Health Center further support this need. Coverage of high-risk pregnancy identification increased from 93.48% in 2022 to 94.78% in 2023 and 95.79% in 2024. However, the proportion of identified high-risk pregnancies requiring referral increased from 23.26% in 2022 to 36.26% in 2024. Referral conditions included previous cesarean section, malpresentation, placenta previa, anemia, preeclampsia, hyperemesis gravidarum, polyhydramnios, and infectious diseases. A preliminary survey

conducted in February 2025 found that 60% of pregnant women had not participated in pregnant women's classes and 60% had poor knowledge of pregnancy danger signs. Reported barriers to class participation included lack of awareness and time constraints, followed by limited interest and transportation or access difficulties. Women who had participated in the classes tended to recognize warning signs such as vaginal bleeding, symptoms of preeclampsia, and premature rupture of membranes more accurately. These local findings suggest a potential difference in knowledge between participants and non-participants and provide a direct basis for further investigation.

Previous evidence supports the relationship between maternal education, maternal characteristics, and awareness of obstetric warning indicators. A comprehensive analysis of 20 studies conducted in emerging nations found that awareness was associated with educational status, previous pregnancy experience, frequency of prenatal care appointments and hospital delivery. (Yunitasari et al., 2023). New international evidence from Bangladesh and Somaliland likewise shows that knowledge varies according to sociodemographic characteristics and access to media or health information ((Ahmed et al., 2026; Ijdi et al., 2025) Research has therefore moved beyond simply describing women's knowledge toward examining how structured maternal education and individual characteristics contribute to recognition of obstetric complications. Studies of Pregnant Women's Classes in Indonesia have also reported better knowledge among participating mothers, although knowledge may differ according to age, education, employment, and parity.

This pattern is also supported by recent international studies. New evidence from Zambia, Libya, Bangladesh, and Somaliland identifies education, obstetric experience, health-service access, media exposure, residence, and transport-related factors as determinants of knowledge (Elhage et al., 2024; Nyirenda et al., 2025). Evidence from Bhutan, which was already included in this article, also links knowledge with antenatal contact and use of maternal health information (Tamang et al., 2021)

Despite these findings, evidence on the relationship between active participation in regular Pregnant Women's Classes and knowledge of pregnancy danger signs remains limited in primary health-care settings in South Lampung. Findings from other settings may not fully represent the local population because participation in maternal education, access to health information, educational background, and obstetric experience can vary across communities. The combination of incomplete class participation and the increasing proportion of high-risk pregnancies requiring referral at the Bumidaya Palas Outpatient Health Center highlights the need for current local evidence. Consequently, this research aimed to assess The association between participation in Pregnant Women's Classes and mothers' knowledge of pregnancy danger signs at the Bumidaya Palas Outpatient Health Center, South Lampung Regency. It also examined the relationships between selected maternal characteristics, particularly age, educational level, and parity, and mothers' knowledge of pregnancy danger signs.

2. RESEARCH METHOD

This research utilized a quantitative, cross-sectional analytic framework to investigate the connection between maternal traits, involvement in pregnant women's classes, and maternal awareness of pregnancy danger signals. The cross-sectional method was chosen as it facilitates the measuring independent and dependent variables simultaneously at one moment, thus allowing effective analysis of relationships. (Syapitri et al ., 2021). The research took place at the Bumidaya Palas Outpatient Health Clinic in South Lampung Regency. The sample included all expectant mothers who attended the health center in February 2025 (N = 134). Slovin's formula was used to calculate the sample size, yielding: $n = 134 / (1 + 134(0.05^2) = 100.37$, thus, the final sample consisted of 100 respondents. Respondents were gathered through consecutive sampling by choosing individuals at the facility who satisfied The criteria for inclusion : pregnant women who had either participated in or not participated in Pregnant

Women's Classes and were ready to give written informed consent. Exclusion criteria comprised living outside the health center's service region and reluctance to take part.

The study variables included the independent variable, namely participation in maternal classes, and the dependent variable, namely pregnant women's knowledge of pregnancy danger signs, evaluated through a structured interview. The independent variable was maternal awareness of pregnancy danger signals, assessed through a validated questionnaire modified from (Mahadew et al., 2018), including queries about identification of bleeding, signs of hypertension, decreased fetal activity, early membrane rupture, and indications of infection. The tool showed a validity coefficient of $r \geq 0.6$ and Cronbach's Alpha of 0.94, signifying outstanding reliability. Knowledge was classified as 'Good' (score ≥ 60%) or 'Poor' (score < 60%).

Data analysis took place in two phases. Univariate analysis explained the distribution of frequency and proportions for each variable. Bivariate analysis employed the significance level of $\alpha = 0.05$ for the chi-square test to evaluate relationships between each variable pair. Odds Ratios (OR) with 95% confidence intervals were calculated for all notable relationships. The Research Ethics Committee of Universitas Malahayati Lampung granted ethical approval for the study (No. 470/EC/KEP_UNMAL/IV/2025).

3. RESULTS AND DISCUSSION

Table 1. Respondent Characteristics

Characteristics	Number	Percentage (%)
Mother's Age		
< 20 years	0	0
20-35 years	90	90
>35 years	10	10
Employment Status		
Working	3	3
Not Working	97	97
Educational Level		
Low education (≤ Junior High School)	60	60
High education (≥ Senior High School)	40	40
Parity		
Primigravida	23	23
Multigravida	77	77
Total	**100**	**100**

Based on Table 1, most respondents were aged 20 –35 years (90%), while 10% were older than 35 years, and none were younger than 20 years. In terms of employment status, the majority of respondents were not working (97%), whereas only 3% were employed. In terms of educational level, 60% of respondents had a low educational level (≤ junior high school), while 40% had a high educational level (≥ senior high school). Regarding parity, most respondents were multigravida (77%), whereas 23% were primigravida. This profile is important when interpreting the study findings. Although 90% of respondents were within the usual reproductive-age range, 60% had no education beyond junior high school and 97% were not formally employed. These characteristics may affect access to, comprehension of, and confidence in using maternal-health information; therefore, age alone should not be treated as a proxy for adequate knowledge.

Recent multilevel evidence from southern Ethiopia similarly demonstrated that awareness of obstetric warning indicators was shaped by both individual and community conditions. Exposure to mass media, participation in family-oriented health training, women's

autonomy, and urban residence were positively associated with knowledge (Yoseph et al., 2025). The predominance of multigravida women (77%) also does not necessarily imply sufficient knowledge. Previous pregnancy may provide experience, but inaccurate prior beliefs can persist unless they are corrected through structured and repeated counselling. Consequently, education in Pregnant Women's Classes should be adapted to literacy level, use simple visual examples, and assess understanding rather than assuming that older or multigravida women already know the danger signs.

Table 2. Frequency Distribution of Pregnant Women's Participation in Maternal Classes

Participation in Maternal Classes	Frequency	Percentage (%)
Did not participate (attended < 3 sessions)	64	64
Participated (attended ≥ 3 sessions)	36	36
Total	**100**	**100**

According to Table 2, it indicates that 64% of respondents did not engage (attended < 3 sessions) in Pregnant Women's Classes, whereas only 36% were active participants (attended ≥ 3 sessions).This finding is consistent with the declining participation trend observed at the Bumidaya Palas Health Center from 94.49% in 2022 to 92.90% in 2024). Participation challenges have also been reported internationally: in an evaluation of group antenatal care, 39.3% of eligible women declined participation, indicating that the availability of group education does not automatically ensure uptake or retention (Ahrne et al., 2023).

The low proportion of active participants suggests that availability of a class does not automatically ensure sustained attendance. The large proportion of multigravida respondents may partly explain this pattern because women with previous pregnancy experience may perceive repeated classes as less necessary or may face competing childcare and household responsibilities. In a 2025 national survey, multiparous women were less likely to plan class attendance, while practical barriers and variable accessibility also affected participation; women preferred accessible, comprehensive, and stage-relevant education (Larkai et al., 2025). These findings support offering flexible schedules, reminders through cadres or midwives, shorter topic-focused sessions, and make-up or hybrid options. Class invitations should also clearly communicate the added value for multigravida women, particularly updates on danger signs, referral pathways, and changes in recommended antenatal care.

Table 3. Frequency Distribution of Pregnant Women's Knowledge of Danger Signs

Knowledge Level	Frequency	Percentage (%)
Poor Knowledge	57	57
Good Knowledge	43	43
Total	**100**	**100**

Based on Table 3, among the 100 pregnant women at the Bumidaya Palas Outpatient Health Center, South Lampung Regency, 57% respondents had poor knowledge of pregnancy danger signs, while 43 % respondents had good knowledge. These findings indicate that most responders lacked enough understanding of pregnancy danger signs. Sufficient maternal understanding is crucial to avoid delays in identifying complications and obtaining suitable care, thus safeguarding the protection of the fetus and the mother. Mothers with good knowledge are better able to identify abnormal symptoms such as bleeding, severe headache, abdominal pain, edema, decreased fetal movement, and premature rupture of membranes (Dewie, 2021). In contrast, poor knowledge may delay recognition and appropriate care-seeking. Recent studies in Zambia and Somaliland found that 65.0% and 64.4% of pregnant women, respectively, had inadequate awareness of obstetric warning symptoms, indicating that insufficient awareness remains common across settings (Ahmed et al., 2026; Nyirenda et al., 2025).

The researcher also noted that the rise of digital media and social platforms has influenced information access among pregnant women. Platforms such as TikTok, Instagram, and YouTube provide health education content, including information about pregnancy danger signs. While this creates opportunities for mothers to obtain information without direct guidance from health workers, the accuracy of such information is not always reliable. Consequently, poor knowledge may also stem from limited ability to filter credible sources. Formal health education interventions delivered by trained health workers at health facilities are therefore essential to ensure accurate and comprehensive maternal knowledge (Koovimon et al., 2023). New international studies also show that antenatal-care education, media access, and contact with health services are associated with better recognition of obstetric danger signs (Ahmed et al., 2026; Elhage et al., 2024).

New international evidence indicates that media exposure is positively correlated with awareness of pregnancy warning symptoms, although access to and the ability to evaluate information may differ by residence, education, parity, and women's autonomy (Ahmed et al., 2026; Ijdi et al., 2025). The previously cited mobile health-literacy study remains relevant (Ahmed et al., 2026), while a new cluster-randomized implementation trial shows that community-based education can substantially improve awareness of obstetric risk indicators (Sanga et al., 2025).

Table 4. An Association Between Participation in Maternal Classes and Pregnant Women's Knowledge of Danger Signs of Pregnancy

Participation in Maternal Classes	**Knowledge Level**				**Total**		**p-value**	**OR 95% CI**
	Poor Knowledge		Good Knowledge					
	n	%	n	%	n	%		
Did not participate	49	76.6	15	23.4	64	100	< 0.001	11.433 (4.310-30.331)
Participated	8	22.2	28	77.8	36	100		
Total	57	57	43	43	100	100		

As shown in Table 4, among the 64 pregnant women who did not participate in maternal classes, 76.6% had poor knowledge, while 23.4% had good knowledge. In contrast, among the 36 women who participated in maternal classes, 77.8% had good knowledge, whereas 22.2% had poor knowledge. The chi-square test showed a statistically significant association between participation in maternal classes and knowledge of pregnancy danger signs ($p < 0.001$). The Odds Ratio of 11.433 (95% CI: 4.310–30.331) indicated that mothers who participated in maternal classes had approximately 11 times higher odds of having good knowledge than those who did not participate. However, several knowledge gaps were still identified. Many mothers lacked adequate knowledge regarding the ideal reproductive age of 20–35 years and the recommended minimum number of antenatal care visits. These results emphasize the necessity to enhance the quality and presentation of maternal classes in line with Ministry of Health standards. The original recent evidence remains relevant: antenatal contact and maternal education are associated with greater awareness of obstetric danger signs (Emeh et al., 2021; Yoseph et al., 2024). A newly added cluster-randomized trial further supports the effectiveness of community-based maternal education (Sanga et al., 2025). The article's existing recent studies show that maternal characteristics may influence knowledge (Bolanko et al., 2021; Setyaningsih et al., 2024), while newly added studies identify maternal age, education, media access, autonomy, and obstetric experience as important factors (Ahmed et al., 2026; Ijdi et al., 2025; Mesele et al., 2023). A 2024 cluster-randomized controlled study in Ghana provides further support: women receiving group antenatal care showed a significantly greater increase in the number of pregnancy danger signs recognized than women receiving individualized care (mean score increased from 1.8 to 3.4 versus 1.7 to 2.2; $p < 0.0001$) (Kukula et al., 2024).

The magnitude of the association is clinically relevant, but it should be interpreted carefully. An OR of 11.433 indicates substantially higher odds of good knowledge among class participants; it does not establish that class attendance caused the difference because exposure and outcome were measured at the same time. Self-selection is also possible: women who are more motivated, have greater family support, attend antenatal care more consistently, or already possess better health literacy may be more likely to attend three or more sessions. The wide confidence interval (4.310–30.331) indicates statistical significance but also considerable uncertainty in the exact effect size, likely reflecting the modest sample and the relatively small participant group. Future studies should use multivariable analysis or a prospective/quasi-experimental design to adjust for education, parity, antenatal-care frequency, access, media exposure, and baseline knowledge.

Nevertheless, being in the reproductive age group does not guarantee sufficient knowledge without formal education. Interestingly, the findings revealed that a small proportion of mothers who attended maternal classes still had poor knowledge (8%), while some non-participating mothers had good knowledge (15%). This indicates that the effectiveness of maternal classes depends on the quality of material delivery, teaching methods, and participant motivation. Mothers who did not attend but had good knowledge may have obtained information from other sources such as media, family, health books, or during antenatal visits. Therefore, beyond increasing participation, the quality of maternal classes should be improved through interactive and visual teaching methods tailored to women with lower educational backgrounds. Strengthening family support is also essential to encourage more active participation. Thus, maternal classes remain an important intervention to improve maternal knowledge of pregnancy danger signs, but program success requires high-quality educational delivery and reinforcement of alternative credible information sources. Nationwide evidence from the Democratic Republic of the Congo also showed that counselling during antenatal care and repeated ANC visits predicted greater awareness, while gaps between counselling delivery and women's recall highlighted the importance of educational quality (Nkamba et al., 2021). The present finding is consistent with broader evidence that simple exposure to antenatal care does not automatically ensure accurate recall or understanding. Women may recognize that a situation is urgent while still being unable to spontaneously name key danger signs (Tamang et al., 2021). Accordingly, education should combine repeated counselling, visual materials, comprehension checks, and clear instructions on when and where to seek care, consistent with international antenatal-care guidance (Organization, 2023).

4. CONCLUSION

Based on the study results, among the 100 pregnant women. 64 women (64%) did not participate in the Pregnant Women's Class, while 36 women (36%) participated. Furthermore, 57 women (57%) had poor knowledge of pregnancy danger signs, whereas 43 women (43%) had good knowledge. A statistically There was a strong correlation between participation and in the Pregnant Women's Class and mothers' knowledge of pregnancy danger signs at the Bumidaya Palas Outpatient Health Center, South Lampung Regency ($p < 0.001$; OR = 11.433; 95% CI: 4.310–30.331).

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