

Health Information Exposure and Obstetric Emergency Knowledge Among Pregnant Women: A Cross-Sectional Study in Makassar, Indonesia

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ABSTRACT

Introduction: Maternal mortality remains a significant public health concern, particularly in low- and middle-income countries where delays in recognizing obstetric danger signs contribute to preventable complications. Adequate maternal knowledge regarding obstetric emergencies is essential for timely care-seeking. This study aimed to examine the association between exposure to health information and knowledge of obstetric emergencies among pregnant women attending antenatal care services.

Research Methodology: An analytical cross-sectional study was conducted at the Antenatal Care (ANC) clinic of Labuang Baji Hospital, Makassar, Indonesia, from August to September 2025. A total of 45 pregnant women were recruited using accidental sampling. Data were collected using validated questionnaires measuring health information exposure (10 Likert-scale items; Cronbach's $\alpha = 0.856$) and obstetric emergency knowledge (20 true-false items; Cronbach's $\alpha = 0.876$). Descriptive statistics were used to summarize respondent characteristics. Fisher's Exact Test and logistic regression analysis were performed to examine associations between variables. Statistical significance was set at $\alpha = 0.05$.

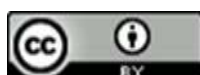
Results: Exposure to maternal health information was significantly associated with knowledge of obstetric emergencies. Pregnant women exposed to health information were nearly seven times more likely to demonstrate good knowledge compared with those who were not exposed (OR = 6.93; 95% CI: 1.18–40.55; $p = 0.026$). Multivariate logistic regression confirmed that information exposure remained the strongest predictor of obstetric emergency knowledge (OR = 6.96; 95% CI: 1.11–43.41; $p = 0.038$).

Conclusion: Exposure to health information plays a critical role in improving pregnant women's knowledge of obstetric emergencies. Strengthening structured maternal health education within antenatal care services, complemented by community and digital health communication strategies, may enhance maternal awareness and support early recognition of obstetric complications.

Keywords: Health information exposure; maternal health literacy; obstetric emergencies; pregnancy; antenatal care.



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INTRODUCTION

Maternal mortality remains a major global public health challenge and reflects the quality of health systems and the availability of timely obstetric care (Anumudu et al., 2025). Despite significant progress in maternal health services, many countries continue to face difficulties in reducing preventable maternal deaths (Atkin et al., 2024). According to the World Health Organization, the majority of maternal deaths are caused by obstetric emergencies such as hemorrhage, hypertensive disorders of pregnancy, sepsis, and obstructed labor (Axmon et al., 2025). Early recognition of obstetric danger signs and prompt health-seeking behavior are therefore essential components of maternal survival strategies. However, pregnant women's ability to recognize these warning signs is highly dependent on their level of knowledge and access to reliable health information (Baker, 2026).

Indonesia continues to report a maternal mortality ratio that is considerably higher than the Sustainable Development Goals target. National data indicate that maternal mortality remains above the expected global threshold, reflecting persistent gaps in maternal health awareness and in the timely utilization of health services (Benhalima et al., 2026). Delays in recognizing obstetric danger signs at the household level contribute significantly to the first delay in the well-known “three delays model” of maternal mortality (Chaudhary et al., 2025). Pregnant women who fail to identify symptoms such as severe bleeding, severe headache, blurred vision, reduced fetal movement, or premature rupture of membranes are more likely to postpone seeking professional care, which increases the risk of severe complications (Choi et al., 2026).

Previous studies have identified knowledge of obstetric emergency signs as a key determinant of maternal health behavior (Cohen et al., 2025). Research conducted in various low- and middle-income countries demonstrates that women with adequate knowledge of pregnancy danger signs are significantly more likely to utilize antenatal care services and seek emergency care promptly (Dalugoda et al., 2025). Exposure to health information through antenatal counseling, community health education programs, and digital media has been widely recognized as an important pathway to improving maternal knowledge (Dos Santos et al., 2025). In recent years, the rapid expansion of digital health communication has further diversified the sources pregnant women use to obtain health information, including social media, mobile applications, and online health platforms (ElHassan et al., 2026).

Nevertheless, the relationship between information exposure and maternal knowledge is not always linear. Several studies suggest that exposure to health information alone does not guarantee adequate knowledge or appropriate health behavior (Goldberg et al., 2026). Multiple factors, including educational background, health literacy, prior pregnancy experience, and the credibility of information sources, influence the effectiveness of information exposure. In the digital era, pregnant women are frequently exposed to large volumes of health-related content, some of which may be inaccurate or misleading. Consequently, understanding how information exposure translates into knowledge remains an important research challenge in maternal health communication (Hayati et al., 2025).

Despite the growing literature on maternal health education, empirical evidence examining the direct relationship between information exposure and knowledge of obstetric emergencies among pregnant women remains limited, particularly in Indonesian hospital-based settings. Most previous studies have focused on community-based educational interventions or general knowledge of pregnancy danger signs. At the same time, relatively few have analyzed the influence of structured and informal information exposure on maternal knowledge in clinical

antenatal care settings. This gap limits health systems' ability to design targeted communication strategies that effectively improve maternal awareness of obstetric emergencies.

Therefore, this study addresses this research gap by examining the association between information exposure and knowledge of obstetric emergencies among pregnant women attending antenatal care services at a tertiary hospital in Makassar, Indonesia. The novelty of this study lies in its attempt to critically analyze not only the presence of information exposure but also its relationship with maternal knowledge within a real clinical service environment. By focusing on pregnant women attending antenatal care clinics, this research provides practical insights into how disseminating health information in healthcare settings enhances maternal awareness of obstetric emergencies. The objective of this study is to determine the relationship between exposure to health information and pregnant women's knowledge of obstetric emergencies at Labuang Baji Hospital, Makassar.

RESEARCH METHODOLOGY

Study Design

This study used an analytical observational design with a cross-sectional approach. The design was selected to evaluate the association between exposure to maternal health information and the level of knowledge regarding obstetric emergencies among pregnant women within a defined population at a single point in time. A cross-sectional design is appropriate for identifying relationships between exposure and outcome variables in population-based health research and is widely applied in maternal health literacy studies.

Setting and Participants

The study was conducted at the Antenatal Care (ANC) outpatient clinic of Labuang Baji Hospital, a tertiary referral hospital in Makassar, Indonesia. Data collection was carried out from August to September 2025. The study population consisted of all pregnant women who attended ANC services during the study period. According to hospital records, the accessible population during the reference period comprised 63 pregnant women. Inclusion criteria were: (1) pregnant women registered as ANC patients at Labuang Baji Hospital; (2) ability to communicate in Indonesian; and (3) willingness to participate in the study by signing written informed consent. Exclusion criteria included: (1) pregnant women with severe communication or hearing impairments and (2) respondents who declined participation. Sampling was conducted using an accidental sampling technique, in which eligible participants present during the data collection period were consecutively recruited. Sample size was estimated using the Slovin formula with a 5% margin of error. Based on this calculation, the minimum required sample size was 54 respondents. However, due to participant availability during the data collection period, 45 eligible respondents were successfully recruited and included in the final analysis.

Variables and Measurement

The independent variable was exposure to health information regarding obstetric emergencies. The dependent variable was the level of knowledge of pregnant women about obstetric emergency conditions. Health information exposure was operationally defined as the frequency and diversity of maternal health information received by pregnant women through formal and informal sources, including healthcare providers, antenatal counseling, printed educational materials, community health programs, electronic media, and interpersonal communication networks. This variable was measured using the Information Exposure Questionnaire consisting of 10 items with a five-point Likert scale ranging from 1 (never) to 5 (very often). Total scores were categorized into "exposed" and "not exposed" groups using

predetermined cutoffs. Knowledge of obstetric emergencies was defined as the respondent's ability to correctly identify danger signs and symptoms, and to provide appropriate initial responses to obstetric emergencies during pregnancy. Knowledge was assessed using a 20-item true–false questionnaire covering major obstetric danger signs such as severe bleeding, severe headache, blurred vision, reduced fetal movement, premature rupture of membranes, and signs of infection.

Instrument Validity and Reliability

Both instruments were adapted from previously validated questionnaires used in maternal health research. Maternal health experts reviewed content validity before data collection. Reliability testing demonstrated good internal consistency, with Cronbach's alpha values of 0.856 for the information exposure questionnaire and 0.876 for the obstetric emergency knowledge questionnaire.

Data Source

The study used primary data collected directly from respondents via structured, self-administered questionnaires during ANC visits.

Data Collection Procedure

Data collection was conducted in the ANC clinic waiting area. Trained research assistants explained the study objectives and procedures to potential participants, and pregnant women who agreed to participate signed written informed consent before completing the questionnaire. Completed questionnaires were checked immediately for completeness and consistency. If incomplete responses were identified, clarification was requested directly from respondents during data collection. Data were coded and entered into a statistical database using a double-entry verification procedure to minimize data-entry errors.

Data Analysis

Statistical analysis was performed using IBM SPSS statistical software. Descriptive statistics were used to summarise respondent characteristics and study variables, with results presented as frequencies and percentages. Bivariate analysis was conducted to examine the association between health information exposure and knowledge level using Fisher's Exact Test. This test was chosen instead of Pearson's Chi-square test because several cells in the contingency table had expected frequencies below five, violating Chi-square assumptions. Because the primary objective of this study was to assess the relationship between two variables, multivariable regression analysis was not performed. Statistical significance was determined using a two-tailed test with a confidence level of 95% and a significance threshold of $\alpha = 0.05$.

Ethical Approval

This study received ethical approval from the Health Research Ethics Committee of Institut Ilmu Kesehatan Pelamonia, Makassar. All procedures were conducted in accordance with ethical principles for human research. Before participation, respondents received a clear explanation regarding the objectives, procedures, potential risks, and benefits of the study. Written informed consent was obtained from all participants. Confidentiality and anonymity were ensured by assigning coded identifiers to each respondent, and all collected data were used solely for research purposes.

RESULT

A total of 45 pregnant women participated in this study. The results are presented in three sections: respondent characteristics; a bivariate analysis examining the association between exposure to health information and knowledge of obstetric emergencies; and a multivariate

analysis identifying factors associated with maternal knowledge. Descriptive statistics are first presented to describe the participants' sociodemographic profile, followed by inferential statistical analysis. Table 1 presents the distribution of respondents according to age, occupation, education level, and gravidity status. The majority of participants were within the optimal reproductive age group (20–35 years), most were homemakers, and more than half were multigravida, indicating prior pregnancy experience.

Table 1. Characteristics of Respondents (n = 45)

Variable	Category	n	%
Age	20–35 years	31	68.9
	<20 or >35 years	14	31.1
Occupation	Housewife	39	86.7
	Employee	6	13.3
	Elementary School	2	4.4
Education	Junior High School	19	42.2
	Senior High School	18	40.0
	Bachelor Degree	6	13.3
Gravidity	Primigravida	17	37.8
	Multigravida	28	62.2

The majority of respondents were aged 20–35 years (68.9%), representing the optimal reproductive age group. Most participants were housewives (86.7%). In terms of education, the largest proportion had completed junior high school (42.2%), followed by senior high school (40.0%). More than half of respondents were multigravida (62.2%), indicating prior pregnancy experience that may have contributed to their maternal knowledge.

Table 2. Association Between Information Exposure and Knowledge of Obstetric Emergencies (n = 45)

Information Exposure	Good Knowledge n (%)	Poor Knowledge n (%)	Total	OR	95% CI	p-value
Exposed	26 (100.0)	0 (0.0)	26	6.93	1.18 – 40.55	0.026
Not Exposed	15 (78.9)	4 (21.1)	19	Reference		

Pregnant women exposed to obstetric emergency information were significantly more likely to have good knowledge compared with those who were not exposed. The odds of having good knowledge were approximately seven times higher among women with information exposure (OR = 6.93; 95% CI: 1.18–40.55; p = 0.026).

Table 3. Logistic Regression Analysis of Factors Associated with Knowledge of Obstetric Emergencies

Variable	β	OR	95% CI	p-value
Information Exposure	1.94	6.96	1.11 – 43.41	0.038
Education Level	0.88	2.41	0.71 – 8.15	0.152
Gravidity	0.73	2.07	0.61 – 7.01	0.243
Age	0.59	1.80	0.49 – 6.52	0.372

Logistic regression analysis indicated that information exposure remained the strongest predictor of obstetric emergency knowledge. Pregnant women who received health information were nearly seven times more likely to demonstrate good knowledge compared with those who were not exposed (OR = 6.96; 95% CI: 1.11–43.41; p = 0.038). Other variables, including education level, gravidity, and age, were not statistically significant predictors after adjustment.

The findings of this study indicate that access to maternal health information plays a pivotal role in shaping pregnant women's understanding of obstetric emergency conditions. Participants who interacted more with health information sources demonstrated a more consistent ability to recognize warning signs during pregnancy. This suggests that exposure to credible health communication channels strengthens maternal awareness and preparedness in the event of potential complications. The pattern observed in this study also reflects the broader influence of informational environments in maternal health literacy development. Pregnant women are increasingly embedded in multiple information ecosystems, including healthcare services, family networks, and digital media platforms. These interconnected channels appear to support the gradual accumulation of knowledge that helps women interpret symptoms and recognize situations that require immediate medical attention.

Importantly, the findings suggest that maternal knowledge is not solely dependent on formal education or demographic characteristics but is strongly shaped by the accessibility and quality of health information available during pregnancy. When pregnant women are exposed to structured health education, particularly within antenatal care services, the information received can serve as a cognitive framework that guides risk perception and decision-making. Overall, the results highlight the strategic importance of strengthening maternal health communication systems. Integrating consistent obstetric emergency education into antenatal care services and expanding reliable health information dissemination through community and digital platforms may substantially enhance maternal awareness and contribute to earlier recognition of obstetric complications.

DISCUSSION

This study examined the relationship between exposure to health information and knowledge of obstetric emergencies among pregnant women attending antenatal care services at a tertiary hospital in Makassar, Indonesia. The findings demonstrate that exposure to maternal health information is significantly associated with better knowledge of obstetric emergency conditions. Pregnant women who reported receiving health information through various channels were substantially more likely to demonstrate adequate knowledge than those with limited exposure (Hodge et al., 2026).

These findings highlight the importance of access to information during pregnancy. Knowledge of obstetric danger signs is widely recognized as a critical component of maternal health literacy, as it enables pregnant women to recognize early warning signs and seek timely medical care (Jackson et al., 2024). In contexts where maternal mortality remains relatively high, improving women's awareness of obstetric emergencies can help reduce delays in decision-making and healthcare utilization (Lichtsztajn et al., 2025). Importantly, this study also revealed that knowledge among pregnant women is shaped not only by individual demographic characteristics but also by the availability and accessibility of reliable health information. The results reinforce the idea that health communication plays a central role in strengthening maternal preparedness for pregnancy-related complications (Ning et al., 2026).

The results of this study are consistent with previous research demonstrating that exposure to information is a key determinant of maternal health knowledge (Okonta & Umeora, 2024). Several studies conducted in low- and middle-income countries have reported that pregnant women who receive structured health education during antenatal care visits tend to have greater awareness of obstetric danger signs than those who do not (Peters et al., 2025). Maternal health promotion has shown that health education interventions significantly improve pregnant

women's understanding of pregnancy complications. Similarly, other studies have reported that counseling provided during antenatal care services can increase maternal awareness of warning signs such as severe bleeding, severe headaches, visual disturbances, and reduced fetal movement (Russell & King, 2025).

In addition to formal health education, recent literature also highlights the growing role of digital information sources in shaping maternal knowledge (Sarkodie et al., 2025). Pregnant women increasingly rely on online health platforms, social media, and mobile applications to obtain pregnancy-related information (Scaiola et al., 2025). These digital channels can serve as supplementary sources of knowledge, complementing information provided by healthcare professionals (Soussan et al., 2026). However, previous studies also emphasize that the effectiveness of information exposure depends on the credibility and clarity of the information received (Suprpto, 2026). Exposure to inaccurate or misleading health information may lead to confusion and inappropriate health behaviors. Therefore, ensuring that pregnant women have access to evidence-based and reliable maternal health information remains an important challenge for healthcare systems (Trostian et al., 2025).

The association between information exposure and maternal knowledge can be explained through several theoretical perspectives in health promotion and behavioral science. One relevant framework is the Health Belief Model, which suggests that individuals are more likely to recognize health risks and adopt preventive behaviors when they receive cues to action, such in health information. Exposure to maternal health information may increase perceived susceptibility and perceived severity of pregnancy complications, thereby motivating pregnant women to pay greater attention to warning signs (Zheng et al., 2026).

Another relevant concept is health literacy, which refers to an individual's ability to access, understand, evaluate, and apply health information in decision-making processes. When pregnant women are exposed to reliable health information, they are better equipped to interpret symptoms and determine when professional medical care is necessary. Furthermore, experiential learning and social learning mechanisms may also contribute to maternal knowledge acquisition. Pregnant women often obtain information not only from healthcare providers but also from family members, community networks, and peers who have experienced pregnancy. These informal sources of knowledge can reinforce awareness of obstetric emergencies and complement formal health education programs.

The findings of this study have important implications for maternal health promotion strategies. Strengthening the dissemination of maternal health information should be considered a key component of antenatal care services. Healthcare providers, particularly midwives and obstetric nurses, play a central role in delivering structured health education during routine ANC visits. Integrating comprehensive education on obstetric danger signs into every antenatal consultation can help ensure that pregnant women receive consistent and reliable information. In addition, community-based health promotion programs may further extend the reach of maternal health information beyond clinical settings. Digital health platforms also offer promising opportunities for expanding maternal health education. Mobile health applications, online educational materials, and social media campaigns can serve as accessible tools for disseminating evidence-based pregnancy information to a broader population. At the policy level, strengthening maternal health communication strategies may improve early recognition of obstetric emergencies and reduce delays in seeking care. Ultimately, improving maternal awareness of pregnancy complications may support broader efforts to reduce maternal morbidity and mortality.

Strengths and Limitations

This study has several strengths. First, it provides empirical evidence regarding the relationship between information exposure and obstetric emergency knowledge among pregnant women in a hospital-based antenatal care setting. Second, the use of validated questionnaires with good reliability strengthens the credibility of the findings. Third, the study contributes to the growing body of research examining maternal health literacy in the context of information access. Nevertheless, several limitations should be acknowledged. The cross-sectional design limits the ability to establish causal relationships between exposure to information and knowledge levels. Additionally, the relatively small sample size may restrict the generalizability of the findings to broader populations. The use of accidental sampling may also introduce selection bias, as participants who received antenatal care during the study period may differ from those who did not. Future studies with larger samples and longitudinal designs may provide deeper insights into how maternal knowledge evolves and how exposure to information influences health-seeking behavior during pregnancy. Further research is needed to explore the role of different information sources in shaping maternal health knowledge. Comparative studies examining the influence of digital media, healthcare providers, and community networks could provide a more comprehensive understanding of maternal information environments. In addition, intervention studies evaluating the effectiveness of targeted health education programs may help identify strategies that most effectively improve maternal awareness of obstetric danger signs. Integrating digital health innovations with traditional antenatal education may also represent a promising direction for future maternal health promotion initiatives.

CONCLUSION

This study aimed to examine the relationship between exposure to health information and knowledge of obstetric emergencies among pregnant women attending antenatal care services at Labuang Baji Hospital, Makassar. The findings indicate that exposure to maternal health information is significantly associated with better knowledge of obstetric emergency conditions. Pregnant women who received health information through various channels demonstrated a higher level of awareness and understanding of obstetric danger signs compared with those who reported limited information exposure. These results emphasize the critical role of accessible, reliable health information in strengthening maternal health literacy during pregnancy. When pregnant women are adequately informed about obstetric emergencies, they are better prepared to recognize warning signs and seek timely medical care, which may help prevent severe complications and reduce delays in accessing health services.

Based on these findings, strengthening maternal health communication should become a priority within antenatal care programs. Healthcare providers should ensure that structured education on obstetric danger signs is consistently integrated into routine ANC services. In addition, expanding community-based health education and utilizing digital health platforms may further enhance the dissemination of evidence-based maternal health information. Such strategies may improve maternal awareness and support broader efforts to reduce preventable maternal morbidity and mortality.

Acknowledgement

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Conflict of Interest

The authors declare that there are no conflicts of interest related to this study, including financial, personal, or institutional relationships that could influence the research outcomes.

Ethical Approval

The Health Research Ethics Committee of Institut Ilmu Kesehatan Pelamonia, Makassar, approved this study. All research procedures were conducted in accordance with the ethical principles of the Declaration of Helsinki. Written informed consent was obtained from all participants before their inclusion in the study. Participants were assured that their participation was voluntary, and the confidentiality and anonymity of their information were strictly maintained.

Data Availability

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request. Data are not publicly available due to privacy and ethical considerations.

Authors' Contributions

Alamsyah conceived and designed the study, supervised the research process, and critically revised the manuscript. Arfinayanti conducted data collection, performed statistical analysis, and drafted the initial manuscript. Ruqaiyah contributed to the study design and data interpretation. Samsir assisted with methodological development and manuscript review. Tut Handayani supported data validation and literature review. Ayatullah Harun contributed to data analysis and critical revision of the manuscript. All authors read and approved the final version of the manuscript.

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