

Original Article

Effect of education through the pregnant women's class program on high-risk pregnancy knowledge and motivation for antenatal care visits

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Abstract:

Low knowledge about high-risk pregnancy and inadequate motivation to attend antenatal care (ANC) remain important barriers to early detection of maternal complications. Pregnant Women's Classes are structured health education sessions that may improve maternal understanding, risk recognition, and care-seeking behavior. This study analyzed the effect of education through the Pregnant Women's Class Program on knowledge of high-risk pregnancy and motivation for ANC visits among second-trimester pregnant women at Momalia Community Health Center. A pre-experimental one-group pretest-posttest study was conducted from January to February 2025. Fifty-four second-trimester pregnant women were selected using purposive sampling. Education was delivered through the Pregnant Women's Class Program using lectures, discussion, PowerPoint materials, and leaflets. Knowledge of high-risk pregnancy and motivation for ANC visits were measured before and after the intervention using structured questionnaires. Data were analyzed using descriptive statistics and the Wilcoxon signed-rank test. Before the intervention, most respondents had sufficient knowledge (55.6%) and moderate motivation for ANC visits (66.7%). After the intervention, 90.7% had good knowledge and 92.6% had strong motivation. Wilcoxon analysis showed significant improvements in both knowledge ($p < 0.001$; positive ranks = 43; ties = 11) and motivation for ANC visits ($p < 0.001$; positive ranks = 47; ties = 7). Education through the Pregnant Women's Class Program significantly improved knowledge of high-risk pregnancy and motivation for ANC visits. Strengthening antenatal education with clear visual materials and family involvement may support early risk detection and improve continuity of maternal care.

Keywords:

antenatal care, health education, high-risk pregnancy, maternal knowledge, pregnant women's class

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INTRODUCTION

Maternal mortality remains a major indicator of health system performance and social equity. Although the global maternal mortality ratio has declined over the last two decades, preventable maternal deaths continue to occur, especially in settings where access to quality antenatal, delivery, and postpartum care is uneven (World Health Organization, 2025). Antenatal care (ANC) is a critical

strategy for reducing maternal and neonatal morbidity because it provides opportunities for early risk detection, preventive counseling, supplementation, immunization, birth preparedness, and timely referral. The World Health Organization recommends an ANC model that emphasizes respectful, individualized, and information-rich contacts for a positive pregnancy experience (Tunçalp et al., 2017; World Health Organization, 2016).

In Indonesia, ANC services are integrated within primary health care and midwifery services. The Indonesian maternal health program has progressively strengthened ANC standards, including increased visit frequency, risk screening, laboratory examination, health education, and referral planning. However, program success depends not only on service availability but also on pregnant women's knowledge, motivation, family support, and confidence to use services consistently. Studies have shown that inadequate ANC timing, insufficient ANC contacts, and incomplete ANC content are associated with poorer pregnancy outcomes (Saaka & Sulley, 2023; Tesfay et al., 2023). In the eight-contact era, women's ability to attend recommended contacts is influenced by perceived need, transportation, household responsibilities, service quality, family support, and communication with health workers (Habte et al., 2024; Mwenebanda et al., 2024).

High-risk pregnancy is an important focus of ANC because many maternal deaths are preceded by delayed recognition of danger signs, delayed decision-making, and delayed access to appropriate care. The classic three-delay framework explains that poor outcomes can arise when women or families fail to recognize danger signs, delay deciding to seek care, experience transport barriers, or receive delayed care after reaching a facility (Thaddeus & Maine, 1994). Conditions such as bleeding, severe headache, hypertension, anemia, infection, reduced fetal movement, premature rupture of membranes, and severe abdominal pain require timely recognition and clinical assessment. Therefore, maternal education must be designed not merely to transfer information but also to strengthen risk perception, self-efficacy, and motivation to attend ANC.

Pregnant Women's Classes are a strategic platform for delivering structured maternal education in Indonesia. These classes provide information on physiological changes during pregnancy, danger signs, nutrition, ANC schedules, delivery preparation, postpartum care, newborn care, breastfeeding, contraception, and family support. Evidence from Indonesia indicates that participation in pregnancy classes is associated with greater use of maternal health services, including adequate antenatal care, skilled birth attendance, and facility-based delivery (Azhar et al., 2020). International studies also suggest that antenatal classes may reduce anxiety, increase partner involvement, and improve women's confidence and readiness for birth (Ferguson et al., 2013; Hassanzadeh et al., 2019; Spiby et al., 2022).

Education in antenatal classes can be strengthened by combining lectures, discussion, and simple printed media such as leaflets. This combination is useful because direct explanation allows clarification, while leaflets help mothers review key messages at home. Health education is most effective when it is understandable, culturally appropriate, visually supported, and connected to daily maternal experiences. Recent evidence shows that pregnancy classes significantly improve mothers' knowledge of pregnancy (Adisti et al., 2024), while education and communication interventions may improve maternal adherence to recommended health practices (Islami & Maulina, 2026). Research also demonstrates the importance of health service quality and childbirth companion readiness in maternal care contexts (Dewi et al., 2026; Determinants of husbands' readiness to provide birth support during childbirth in maternal care settings, 2026).

Motivation is central to ANC behavior. Knowledge may create awareness, but motivation determines whether women translate awareness into action. Motivation to attend ANC may be shaped by perceived susceptibility to pregnancy complications, perceived benefits of examination, social encouragement, service accessibility, previous pregnancy experience, and trust in providers. Studies on ANC utilization have repeatedly shown that service quality, health worker performance, family support, and health facility availability influence ANC attendance (Dewiyanti et al., 2026; Hussen & Worku, 2022; Tiya et al., 2025). In rural and semi-rural settings, community-based education is particularly important because household roles and distance to care may discourage routine visits even when women understand the importance of ANC.

A preliminary assessment at Momalia Community Health Center showed that participation in the Pregnant Women's Class Program and regular ANC attendance remained suboptimal. Interviews with 10 pregnant women indicated that only 4 had attended the class, while 6 had never participated, mainly due to work and household responsibilities. Mothers who had not attended the class also tended not to have regular ANC visits. In addition, several respondents showed limited understanding of high-risk pregnancy, danger signs, and prevention of complications. These findings indicate that strengthening education in pregnancy classes may be important for improving both knowledge and motivation.

In this context, this study aimed to analyze the effect of education through the Pregnant Women's Class Program on knowledge of high-risk pregnancy and motivation for ANC visits among second-trimester pregnant women at the Momalia Community Health Center, South Bolaang Mongondow. The findings are expected to provide practical evidence for improving antenatal education in primary health care settings.

METHOD

This study used a quantitative pre-experimental design with a one-group pretest-posttest approach. The design was selected to measure changes in knowledge of high-risk pregnancy and motivation for ANC visits before and after education through the Pregnant Women's Class Program. Although the design did not include a control group, it was appropriate for evaluating an educational intervention implemented as part of routine maternal health promotion at the community health center.

The study was conducted at the Momalia Community Health Center in South Bolaang Mongondow from January to February 2025. The target population consisted of 63 pregnant women in the second trimester registered in the maternal health service area. The sample comprised 54 pregnant women selected using purposive sampling. Respondents were included if they were in the second trimester, able to communicate in Indonesian, willing to participate, and able to attend the educational session and complete both pretest and posttest questionnaires. Pregnant women who were unable to complete the session or questionnaire were excluded from the analysis.

The intervention consisted of education delivered through the Pregnant Women's Class Program. The educational session used a structured lesson plan, standard operating procedure, PowerPoint materials, lectures, interactive discussion, and leaflets. The content focused on high-risk

pregnancy, danger signs, the importance of ANC visits, early detection, healthy pregnancy behavior, and when to seek help. The use of leaflets was intended to provide concise visual reinforcement, while discussion enabled respondents to clarify misunderstandings about ANC and pregnancy risk.

Two main variables were assessed: knowledge of high-risk pregnancy and motivation for ANC visits. Knowledge was measured using a structured questionnaire adapted from previous maternal health education studies. The questionnaire assessed understanding of pregnancy risk factors, danger signs, ANC schedules, blood pressure control, anemia risk, bleeding, and preventive care. Motivation for ANC visits was measured using a structured questionnaire assessing willingness to attend scheduled visits, perceived importance of ANC, readiness to seek care when symptoms occur, and commitment to maintain maternal and fetal health through regular examination.

The study procedure began with respondent recruitment during ANC services and maternal class scheduling. Eligible respondents were informed about the study purpose, voluntary participation, confidentiality, and the right to withdraw. After providing consent, respondents completed the pretest questionnaire. The researcher then conducted the educational session as part of the Pregnant Women's Class Program. After the session, respondents completed the posttest questionnaire. Data were checked for completeness before coding and analysis.

Descriptive statistics were used to summarize respondent characteristics, knowledge categories, and motivation categories. Changes in knowledge and motivation before and after the intervention were analyzed using the Wilcoxon signed-rank test because the data were ordinal and paired. Statistical significance was set at $p < 0.05$. The results were presented using frequency distributions, percentages, p-values, positive ranks, negative ranks, and ties. No ethical approval number was provided in the source manuscript; therefore, the ethical statement was written cautiously based on informed consent and confidentiality procedures.

RESULT

A total of 54 pregnant women in the second trimester participated in this study. Most respondents were aged 21-30 years (64.8%), followed by 31-40 years (29.6%) and 20 years or younger (5.6%). Based on parity, most respondents were multigravida (55.6%), followed by grand multigravida (29.6%) and primigravida (14.8%). These characteristics indicate that most respondents were in the active reproductive age group and had previous pregnancy experience.

Table 1. Respondent Characteristics (n = 54)

Characteristics	Frequency (n)	Percentage (%)
Age (years)		
≤ 20	3	5.6
21-30	35	64.8
31-40	16	29.6
Parity		
Primigravida	8	14.8
Multigravida	30	55.6
Grandmultigravida	16	29.6

Table 2. Knowledge of High-Risk Pregnancy and Motivation for Antenatal Care Visits Before and After Education (N = 54)

Variable	Category	Pretest, n (%)	Posttest, n (%)
Knowledge of high-risk pregnancy	Poor	15 (27.8)	0 (0.0)
	Sufficient	30 (55.6)	5 (9.3)
	Good	9 (16.7)	49 (90.7)
Motivation for ANC visits	Weak	13 (24.1)	0 (0.0)
	Moderate	36 (66.7)	4 (7.4)
	Strong	5 (9.3)	50 (92.6)
Total		54 (100.0)	54 (100.0)

The findings presented in Table 2 indicate substantial improvements in both knowledge and motivation following the Pregnant Women's Class Program. The proportion of respondents with good knowledge increased from 16.7% at pretest to 90.7% at posttest, while the proportion with poor knowledge decreased from 27.8% to 0.0%. A similar pattern was observed for motivation to attend ANC visits, with strong motivation increasing from 9.3% to 92.6% and weak motivation declining from 24.1% to 0.0%. These findings suggest that the class-based educational intervention was accompanied by marked improvements in maternal knowledge regarding high-risk pregnancy and readiness to attend ANC visits.

Table 3. Wilcoxon Signed-Rank Test of Knowledge of High-Risk Pregnancy and Motivation for Antenatal Care Visits (N = 54)

Variable	Negative ranks, n	Positive ranks, n	Ties, n	p
Knowledge of high-risk pregnancy	0	43	11	< 0.001
Motivation for ANC visits	0	47	7	< 0.001

The Wilcoxon signed-rank analysis demonstrated significant improvements in both outcomes following participation in the Pregnant Women's Class Program. For knowledge of high-risk pregnancy, all 43 non-tied participants showed positive changes, with no negative ranks ($p < 0.001$). Similarly, 47 participants demonstrated positive changes in motivation for ANC visits, with no negative ranks ($p < 0.001$). These findings indicate that the intervention was associated with statistically significant improvements in maternal knowledge and motivation to attend ANC visits.

DISCUSSION

This study demonstrated that education delivered through the Pregnant Women's Class Program significantly improved second-trimester pregnant women's knowledge of high-risk pregnancy and motivation for ANC visits. The findings are important because knowledge and motivation are closely linked to early detection of pregnancy complications. When pregnant women understand the danger signs and recognize the benefits of regular ANC, they are more likely to seek timely care and attend recommended visits. This is consistent with the WHO model of ANC, which emphasizes that women need timely information, psychosocial support, respectful communication,

and effective clinical practices at every contact (Tunçalp et al., 2017; World Health Organization, 2016).

Most respondents were aged 21-30 years and were multigravida. This profile indicates that the majority were in the biologically favorable reproductive age group and had previous pregnancy experience. However, previous experience alone does not always guarantee adequate knowledge or strong motivation for ANC. Some multigravida women may assume that their current pregnancy is similar to previous pregnancies and therefore feel less need for routine examination. In contrast, primigravida women may have limited experiential knowledge and may depend more heavily on health workers and family members for guidance. This supports the need for maternal education across all parity groups, not only for first-time mothers.

Before the educational intervention, more than half of the respondents had only sufficient knowledge, and more than one quarter had poor knowledge. This suggests that high-risk pregnancy messages had not been fully internalized before the class. The knowledge gaps in the source data included understanding of pregnancy trimesters, ideal weight gain, normal blood pressure, pregnancy bleeding, anemia, and blood pressure control. These are clinically meaningful gaps because they relate directly to risk recognition and decision-making. The three-delay framework explains that failure to recognize danger signs can delay the decision to seek care and increase the risk of severe maternal outcomes (Thaddeus & Maine, 1994).

After the Pregnant Women's Class Program, 90.7% of respondents achieved good knowledge. This improvement is consistent with previous evidence that pregnancy classes can improve maternal knowledge. Azhar et al. (2020) found that participation in pregnancy classes in Indonesia was positively associated with the use of maternal health services. Similarly, Adisti et al. (2024) reported that pregnancy classes increased mothers' knowledge regarding pregnancy. The current finding is also in line with Febriyanti et al. (2023), who found that educational activities improved pregnant women's knowledge of high-risk pregnancy. Together, these findings support the role of structured maternal education as a practical strategy to strengthen risk awareness in primary health care.

The effectiveness of the intervention may be explained by the combination of direct lectures, discussion, PowerPoint materials, and leaflets. Direct lectures allow health workers to organize information logically, while discussion allows mothers to ask questions about symptoms, ANC schedules, and health facility use. Leaflets serve as take-home materials that mothers can reread and share with family members. Education that combines verbal explanation and visual materials can strengthen memory and improve understanding. Evidence on booklet-based education also supports the role of printed educational media in improving pregnant women's knowledge (The effect of education using booklet media on pregnant women, 2025).

The study also found a statistically significant increase in motivation for ANC visits. Before the intervention, most respondents had moderate motivation, and 24.1% had weak motivation. After the class, 92.6% had strong motivation. This change indicates that education can influence not only cognitive understanding but also readiness to act. Motivation was likely strengthened because respondents received explanations about why ANC matters, what risks can be detected early, and how routine visits protect both mother and fetus. This finding aligns with studies showing that maternal motivation and attitudes are important determinants of ANC utilization (Dewiyanti et al., 2026; Matondang et al., 2022; Riyanto & Daryanti, 2023).

The results also support the broader evidence that health service quality, family support, and health worker communication influence ANC attendance. Dewiyanti et al. (2026) reported that midwife performance, family support, and health facilities are associated with ANC visits. Similarly, evidence highlights that service quality is associated with satisfaction and reduced anxiety among pregnant women (Dewi et al., 2026). If pregnant women perceive ANC as useful, respectful, and accessible, motivation to attend visits may increase. Therefore, improving maternal motivation requires both education and responsive service delivery.

Family involvement is also important. Pregnant women often make ANC decisions within family systems, especially when transportation, household responsibilities, finances, and childcare need to be negotiated. Evidence on childbirth companion readiness emphasizes that inadequate antenatal care and poor pregnancy readiness are relevant maternal care challenges (Determinants of husbands' readiness to provide birth support during childbirth in maternal care settings, 2026). In practice, classes for pregnant women should invite husbands or family members when feasible, so that education becomes a shared responsibility rather than an individual burden placed solely on the mother.

The findings are also relevant to community health literacy. Health literacy enables pregnant women to access, understand, appraise, and apply health information to daily decisions. A recent bibliometric study on community-based health literacy emphasizes that community health literacy is a growing public health concern (Ahmadi & Widyyati, 2026). In addition, highlights the importance of community and family support for health awareness in agricultural communities (Kurniyawan et al., 2023) and the relevance of community monitoring in health-risk contexts (Kurniyawan et al., 2026). Although these studies are not specific to pregnancy classes, they support the broader principle that community-based education and family engagement are essential for improving preventive health behavior.

The statistical results showed no negative ranks for either knowledge or motivation, meaning no respondent experienced a decline after education. However, ties were still present: 11 respondents for knowledge and 7 for motivation. This indicates that some respondents did not change despite the intervention. Possible explanations include limited baseline literacy, difficulty concentrating during the class, prior knowledge already near the ceiling, lack of personal relevance, or limited family support. Future implementation should therefore include repeated sessions, simplified messages, visual danger-sign cards, interactive demonstrations, and individual follow-up for mothers whose posttest scores remain low or unchanged.

The findings have practical implications for midwifery services. First, pregnancy classes should be strengthened as a routine component of ANC, especially in areas where K1, K4, or K6 coverage remains below target. Second, class materials should emphasize signs of high-risk pregnancy, adherence to ANC schedules, referral readiness, and emergency planning. Third, health workers should use simple language, local examples, and visual aids. Fourth, family members should be involved to reduce non-medical barriers such as transportation, household responsibilities, and decision-making delays. Fifth, the effect of education should be monitored not only through knowledge tests but also through actual ANC attendance records.

This study has limitations. The pre-experimental design without a control group limits causal inference because improvement may be influenced by testing effects or external information received outside the class. The study was conducted in one community health center with 54

respondents, which limits generalizability. In addition, motivation was measured by questionnaire rather than by subsequent verified ANC attendance. Future studies should use a controlled design, a larger sample, a longer follow-up, and objective ANC visit data to determine whether increased motivation leads to sustained service utilization.

CONCLUSION

Education through the Pregnant Women's Class Program significantly improved knowledge of high-risk pregnancy and motivation for ANC visits among second-trimester pregnant women at Momalia Community Health Center. After the intervention, the proportion of respondents with good knowledge increased to 90.7%, and the proportion with strong motivation for ANC visits increased to 92.6%. Wilcoxon analysis confirmed statistically significant improvements in both outcomes ($p < 0.001$). These findings support the integration of structured, visually supported, and interactive pregnancy classes into routine ANC services. Midwives should strengthen maternal classes, involve husbands or family members, and monitor whether improved motivation is followed by consistent ANC attendance.

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ETHICAL CONSIDERATIONS

All respondents were informed about the purpose and procedures of the study and participated voluntarily. Respondent confidentiality was maintained during data collection and reporting. The source manuscript did not provide a specific ethical approval number; therefore, no ethics approval number is stated in this revised manuscript.

AI USE DECLARATION

Artificial intelligence tools were used only to assist with language refinement, grammar checking, reference structuring, and improving manuscript clarity. The authors remain fully responsible for the content, data analysis, interpretation, and final version of the article.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

- Adisti, N. S., & Evelianti, M. (2024). The effect of pregnancy class on mothers' knowledge regarding pregnancy. *Health and Technology Journal (HTechJ)*, 2(1), 87–92. <https://doi.org/10.53713/htechj.v2i1.149>
- Ahmadi, A., & Widyyati, M. L. I. (2026). Global trends and research dynamics of community-based health literacy. *Health and Technology Journal (HTechJ)*, 4(2), 210–221. <https://doi.org/10.53713/htechj.v4i2.669>
- Azhar, K., Dharmayanti, I., Tjandrarini, D. H., & Hidayangsih, P. S. (2020). The influence of pregnancy classes on the use of maternal health services in Indonesia. *BMC Public Health*, 20, 372. <https://doi.org/10.1186/s12889-020-08492-0>
- Bick, D. (2020). Factors influencing attendance at antenatal classes. *Midwifery*, 88, 102733. <https://doi.org/10.1016/j.midw.2020.102733>
- Dewi, S. K., Silawati, V., Widowati, R., & Rukmaini. (2026). Analysis of the quality of health services on satisfaction, anxiety, and physical health of pregnant women. *Nursing and Health Sciences Journal (NHSJ)*, 6(1), 151–162. <https://doi.org/10.53713/nhsj.v6i1.598>
- Dewiyanti, S., Puspitasari, Y., & Kusumawati, P. D. (2026). Analysis of midwife performance, family support, and health facilities on antenatal care visits. *Health and Technology Journal (HTechJ)*, 4(2), 210–221. <https://doi.org/10.53713/htechj.v4i2.671>
- Determinants of husbands' readiness to provide birth support during childbirth in maternal care settings. (2026). *Nursing and Health Sciences Journal (NHSJ)*, 6(1). <https://doi.org/10.53713/nhsj.v6i1.599>
- Ferguson, S., Davis, D., & Browne, J. (2013). Does antenatal education affect labour and birth? A structured review of the literature. *Women and Birth*, 26(1), e5–e8. <https://doi.org/10.1016/j.wombi.2012.09.003>
- Febriyanti, M., Suryati, S., & Astuti, S. (2023). Peningkatan pengetahuan ibu hamil tentang kehamilan risiko tinggi melalui kelas ibu hamil. *Ahmar Metakarya: Jurnal Pengabdian Masyarakat*, 2(2), 91–96. <https://doi.org/10.53770/amjpm.v2i2.137>
- Grenier, L., Onguti, B., Whiting-Collins, L. J., Omanga, E., Suhowatsky, S., & Winch, P. J. (2022). Transforming women's and providers' experience of care for improved outcomes: A theory of change for group antenatal care in Kenya and Nigeria. *PLOS ONE*, 17(5), e0265174. <https://doi.org/10.1371/journal.pone.0265174>
- Gupta, A., & Khan, S. (2024). Importance of community health workers for maternal health care management. *Public Health Reviews*, 45, 1606803. <https://doi.org/10.3389/phrs.2024.1606803>
- Habte, A., Tamene, A., & Melis, T. (2024). Compliance towards WHO recommendations on antenatal care for a positive pregnancy experience: Timeliness and adequacy of antenatal care visit in Sub-Saharan African countries. *PLOS ONE*, 19(1), e0294981. <https://doi.org/10.1371/journal.pone.0294981>
- Hassanzadeh, R., Abbas-Alizadeh, F., Meedya, S., Mohammad-Alizadeh-Charandabi, S., & Mirghafourvand, M. (2019). Assessment of childbirth preparation classes: A parallel convergent mixed study. *Reproductive Health*, 16, 160. <https://doi.org/10.1186/s12978-019-0826-2>

- Hussen, M. A., & Worku, B. T. (2022). Quality of antenatal care service and factors associated with client satisfaction at public health facilities of Bele Gasgar District. *Journal of Patient Experience*, 9, 23743735221083163. <https://doi.org/10.1177/23743735221083163>
- Islami, N. W. Y., & Maulina, R. (2026). The effect of information, education, and communication on compliance with multiple micronutrient supplements consumption in pregnant women. *Health and Technology Journal (HTechJ)*, 4(2), 159–166. <https://doi.org/10.53713/htechj.v4i2.590>
- Khosravi, S., Babaey, F., Abedi, P., Kalahroodi, Z. M., & Hajimirzaie, S. S. (2022). Strategies to improve the quality of midwifery care and developing midwife-centered care in Iran: Analyzing the attitudes of midwifery experts. *BMC Pregnancy and Childbirth*, 22, 40. <https://doi.org/10.1186/s12884-022-04379-7>
- Kumalasari, I. (2022). Pendidikan kesehatan dengan ceramah dan leaflet untuk meningkatkan pengetahuan ibu hamil terhadap tanda bahaya kehamilan. *Jurnal Penelitian Kesehatan Suara Forikes*, 13(Khusus), 1–7. <https://doi.org/10.33846/sf13nk140>
- Kurniyawan, E. H., Balqis, M., Pratama, M. I. A., Hati, H. P. P., Isfadillah, O. E., Afandi, A. T., & Nur, K. R. M. (2023). Farm family support in increasing health awareness. *Health and Technology Journal (HTechJ)*, 1(6), 616–627. <https://doi.org/10.53713/htechj.v1i6.122>
- Kurniyawan, E. H., Afandi, A. T., Nur, K. R. M., Kurniawan, D. E., Aung, S. S., & Mukhtar, M. (2026). Health impacts of climate change on farmers in agricultural communities. *Health and Technology Journal (HTechJ)*, 4(2), 231–244. <https://doi.org/10.53713/htechj.v4i2.665>
- Linasari, D., Judistiani, R. T. D., Sunjaya, D. K., & Handono, B. (2025). Enhancing general practitioners' compliance with antenatal care standards and pregnant women's satisfaction through point-of-care quality improvement in Indonesian community health centers. *Patient Preference and Adherence*, 19, 3913–3929. <https://doi.org/10.2147/PPA.S548768>
- Matondang, H., Suroyo, R. B., & Hanum, R. (2022). Analysis of factors affecting obedience of pregnant women in conducting ANC visits during the COVID-19 pandemic. *Journal La Medihealthico*, 3(3), 188–200. <https://doi.org/10.37899/journallamedihealthico.v3i3.652>
- Mwenebanda, E., Machado, A., Patel, A. I., Nyondo-Mipando, A. L., & Chiumia, I. K. (2024). Factors influencing antenatal care attendance in the eight-contact era policy: A case of selected maternal health service facilities in Blantyre, Malawi. *BMC Pregnancy and Childbirth*, 24, 704. <https://doi.org/10.1186/s12884-024-06895-0>
- Novelia, S., Rukmaini, & Tohir, M. (2021). Analysis of antenatal care visit at the work area of Kilasah Health Centre Serang City in 2019. *Nursing and Health Sciences Journal (NHSJ)*, 1(3), 214–218. <https://doi.org/10.53713/nhs.v1i3.52>
- Rezaei, Z., Yazdanpanahi, Z., Asadollahi, A., Karimi, M., & Ghahremani, L. (2025). Evaluating the impact of an educational self-care intervention on the empowerment of primigravida pregnant women covered by the family medicine program in Estahban City. *BMC Pregnancy and Childbirth*, 25, 308. <https://doi.org/10.1186/s12884-025-07437-y>
- Riyanto, I. A., & Daryanti, M. S. (2023). Pregnant women's motivation in conducting antenatal care during the COVID-19 pandemic. *Menara Journal of Health Science*, 2(1), 88–97. <https://doi.org/10.36806/mjhs.v2i1.64>
- Saaka, M., & Sulley, I. (2023). Independent and joint contributions of inadequate antenatal care timing, contacts and content to adverse pregnancy outcomes. *Annals of Medicine*, 55(1), 2197294. <https://doi.org/10.1080/07853890.2023.2197294>
- Soares, I. M., Widyowati, A., & Gomes, L. (2023). The influence of pregnant women's motivation on the detection of danger signs of pregnancy. *Jurnal Kebidanan*, 13(1), 20–31. <https://doi.org/10.31983/jkb.v13i1.9377>

- Spiby, H., Stewart, J., Watts, K., Hughes, A. J., & Slade, P. (2022). The importance of face-to-face, group antenatal education classes for first-time mothers: A qualitative study. *Midwifery*, 109, 103295. <https://doi.org/10.1016/j.midw.2022.103295>
- Tesfay, N., Hailu, G., & Woldeyohannes, F. (2023). Effect of optimal antenatal care on maternal and perinatal health in Ethiopia. *Frontiers in Pediatrics*, 11, 1120979. <https://doi.org/10.3389/fped.2023.1120979>
- The effect of education using booklet media on pregnant women's knowledge about chronic energy deficiency. (2025). *Nursing and Health Sciences Journal (NHSJ)*, 5(3). <https://doi.org/10.53713/nhsj.v5i3.578>
- Thaddeus, S., & Maine, D. (1994). Too far to walk: Maternal mortality in context. *Social Science & Medicine*, 38(8), 1091–1110. [https://doi.org/10.1016/0277-9536\(94\)90226-7](https://doi.org/10.1016/0277-9536(94)90226-7)
- Tiyare, F. T., Dimore, A. L., & Marine, B. T. (2025). Assessing antenatal care service satisfaction and associated factors among pregnant women at health facilities in East Shewa zone, Ethiopia: A facility-based cross-sectional study. *Discover Medicine*, 2, 122. <https://doi.org/10.1007/s44337-025-00325-6>
- Tunçalp, Ö., Pena-Rosas, J. P., Lawrie, T., Bucagu, M., Oladapo, O. T., Portela, A., & Gülmezoglu, A. M. (2017). WHO recommendations on antenatal care for a positive pregnancy experience—Going beyond survival. *BJOG: An International Journal of Obstetrics & Gynaecology*, 124(6), 860–862. <https://doi.org/10.1111/1471-0528.14599>
- World Health Organization. (2016). *WHO recommendations on antenatal care for a positive pregnancy experience*. World Health Organization. <https://www.who.int/publications/i/item/9789241549912>
- World Health Organization. (2025). *Maternal mortality*. World Health Organization. <https://www.who.int/news-room/fact-sheets/detail/maternal-mortality>
- Wurihandayani, K., Fadhilah, S., & Kusumawardani, L. A. (2023). Pregnancy classes increase knowledge of early detection of high-risk pregnancy. *Jurnal Midpro*, 6(1), 1–5. <https://doi.org/10.56013/jurnalmidz.v6i1.2046>