

Original Article

Factors influencing low antenatal care visit coverage

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Abstract:

Adequate antenatal care (ANC) is essential for reducing maternal morbidity and mortality, yet utilization remains suboptimal in remote areas of Indonesia. This study aimed to identify factors associated with low ANC visit coverage among pregnant women in the service area of the West Simeulue Community Health Center, Indonesia. A community-based analytical cross-sectional study was conducted among 67 third-trimester pregnant women selected using total population sampling. Data were collected using structured questionnaires and analyzed using the Chi-square test at a 95% confidence level, with statistical significance set at $p < 0.05$. ANC visit coverage was significantly associated with maternal knowledge ($p = 0.001$), husband's support ($p < 0.001$), and healthcare workers' role ($p = 0.030$). In contrast, access to information was not significantly associated with ANC visit coverage ($p = 0.096$). Maternal knowledge, husband's support, and healthcare worker involvement were significantly associated with ANC utilization among pregnant women in West Simeulue. Strengthening maternal health education, encouraging husband and family involvement, and expanding healthcare workers' outreach activities may improve ANC utilization in underserved communities and support better maternal health outcomes.

Keywords:

antenatal care, healthcare workers, husband support, maternal health, maternal knowledge

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INTRODUCTION

Maternal mortality remains one of the most important indicators of health system performance and socioeconomic development worldwide. Despite substantial progress over the past two decades, preventable maternal deaths continue to pose a major public health challenge, particularly in low- and middle-income countries (LMICs). According to the World Health Organization (WHO), approximately 287,000 women died from pregnancy- and childbirth-related causes in 2020, equivalent to nearly 800 maternal deaths every day. The global maternal mortality ratio (MMR) was estimated at 223 maternal deaths per 100,000 live births in 2020, considerably higher than the Sustainable Development Goal (SDG) target of fewer than 70 maternal deaths per 100,000 live births by 2030 (WHO, 2023a). Furthermore, approximately 95% of maternal deaths occurred in LMICs, highlighting persistent inequalities in access to quality maternal healthcare services (WHO, 2023a).

Reducing maternal mortality requires a comprehensive approach that addresses both direct obstetric complications and broader determinants of maternal health, including education, socioeconomic status, healthcare accessibility, and family support. Among the evidence-based interventions for preventing maternal and neonatal morbidity and mortality, antenatal care (ANC) is recognized as one of the most effective strategies. ANC provides an opportunity for healthcare providers to monitor pregnancy progression, identify complications early, promote healthy behaviors, and prepare women and their families for childbirth and postpartum care (WHO, 2016). Timely and adequate ANC utilization has been associated with reductions in maternal complications, stillbirths, preterm births, and neonatal mortality (Carroli et al., 2001; Kuhnt & Vollmer, 2017).

Recognizing the critical role of ANC, WHO revised its recommendations in 2016, increasing the minimum number of recommended antenatal contacts from four to eight throughout pregnancy. This change was based on evidence demonstrating that more frequent contacts improve maternal satisfaction, facilitate early detection of pregnancy complications, and reduce perinatal mortality (WHO, 2016; WHO, 2016b). The revised ANC model emphasizes a woman-centered approach that promotes positive pregnancy experiences while ensuring continuity of care and timely management of potential health risks. Increased interactions between pregnant women and healthcare providers create more opportunities for health education, risk screening, nutritional counseling, and psychosocial support, all of which contribute to improved maternal and neonatal outcomes.

Despite global recommendations, ANC coverage remains inadequate in many developing countries. Numerous studies have reported disparities in ANC utilization due to socioeconomic, cultural, geographical, and health-system-related barriers (Titaley et al., 2010; Fagbamigbe & Idemudia, 2015; Birmeta et al., 2013). Women living in remote and underserved regions often experience difficulties accessing healthcare facilities because of transportation limitations, financial constraints, and shortages of healthcare personnel. These barriers may delay the identification and management of pregnancy complications, ultimately increasing the risk of adverse maternal and neonatal outcomes.

Indonesia has made significant progress in improving maternal health indicators; however, maternal mortality remains a concern. According to the Ministry of Health of the Republic of Indonesia, maternal mortality continues to exceed the SDG target, and disparities persist across provinces and districts. Although the number of maternal deaths declined in 2022 compared with previous years, the coverage of complete ANC services remains suboptimal. National data indicate that only 70.9% of pregnant women received complete K6 antenatal care services in 2022, suggesting that a substantial proportion of women still do not receive the recommended continuum of maternal healthcare (Ministry of Health of the Republic of Indonesia, 2023). These findings indicate that improving ANC utilization remains an essential strategy for accelerating progress toward maternal health targets.

Previous studies have identified several determinants influencing ANC utilization. Andersen's Behavioral Model of Health Services Use suggests that healthcare utilization is influenced by predisposing factors, enabling factors, and need factors (Andersen, 1995). Predisposing factors include maternal age, education, knowledge, and attitudes toward healthcare services. Enabling factors involve financial resources, transportation availability, accessibility of healthcare facilities, and family support. Need factors refer to perceived or evaluated health conditions that motivate healthcare-seeking behavior. Within this framework, maternal knowledge has consistently emerged

as an important determinant of ANC attendance because women with greater awareness of pregnancy risks and ANC benefits are more likely to seek regular prenatal care (Acharya et al., 2015; Simkhada et al., 2008).

Knowledge influences maternal decision-making processes and health behaviors throughout pregnancy. Women who understand the importance of routine prenatal examinations are more likely to comply with recommended ANC schedules and seek professional care when complications arise. Conversely, limited knowledge regarding pregnancy danger signs may lead to delayed healthcare utilization and increased risk of adverse outcomes (Simkhada et al., 2008). Health education interventions have therefore been recognized as critical components of maternal health programs aimed at increasing ANC attendance and improving maternal outcomes.

In addition to maternal knowledge, family support, particularly husband support, plays a significant role in determining ANC utilization. In many cultural settings, husbands are primary decision-makers regarding household finances, transportation, and healthcare expenditures. Their involvement can substantially influence women's access to maternal healthcare services (Yargawa & Leonardi-Bee, 2015). Emotional support, informational support, and practical assistance from husbands have been associated with increased attendance at ANC and skilled birth attendance, as well as utilization of postpartum care. A review by Yargawa and Leonardi-Bee (2015) demonstrated that male involvement positively affects maternal healthcare utilization and improves maternal and neonatal health outcomes. Therefore, strengthening husband participation in maternal health programs may represent an effective strategy for increasing ANC coverage.

Healthcare workers also play a pivotal role in promoting ANC utilization. The quality of interactions between healthcare providers and pregnant women can significantly influence health-seeking behavior and continuity of care. Positive communication, respectful maternity care, effective counseling, and community outreach activities have been shown to enhance women's trust in health services and encourage regular ANC attendance (Benova et al., 2018). Conversely, negative experiences, inadequate counseling, and poor service quality may discourage women from utilizing maternal healthcare services. Consequently, healthcare worker engagement is increasingly recognized as a key determinant of successful maternal health interventions.

Although numerous studies have examined determinants of ANC utilization in urban and semi-urban settings, evidence remains limited for geographically isolated districts such as Simeulue. Rural and remote communities often face unique challenges related to transportation infrastructure, healthcare accessibility, cultural beliefs, and socioeconomic conditions. Local health reports indicate that maternal mortality remains a concern in the study area. Furthermore, ANC coverage indicators, including K1, K4, and K6 visits, have not yet achieved national targets. Preliminary observations at the West Simeulue Community Health Center revealed that some pregnant women did not attend regular ANC visits because they perceived themselves as healthy, lacked encouragement from family members, particularly their husbands, or felt anxious about their examination results. These findings suggest that both individual and social factors may contribute to inadequate ANC utilization in the region.

Understanding context-specific determinants of ANC utilization is essential for developing targeted interventions that address barriers faced by pregnant women in underserved communities. While national policies emphasize the importance of comprehensive ANC services, evidence-based

local strategies require a clear understanding of factors influencing service utilization at the community level. Therefore, this study aimed to examine the association between maternal knowledge, access to information, husband support, and healthcare worker involvement with ANC visit coverage among pregnant women in the service area of the West Simeulue Community Health Center. The findings are expected to contribute to the development of effective maternal health promotion programs and support efforts to improve ANC utilization and maternal health outcomes in remote areas of Indonesia.

METHOD

Study Design and Setting

This study used an analytical cross-sectional design to examine factors associated with coverage of antenatal care (ANC) visits among pregnant women. The study was conducted in the service area of Dolik Community Health Center (Puskesmas Dolik), Northwest Gane District, South Halmahera Regency, North Maluku Province, Indonesia, from July to August 2025.

Study Population and Sampling

The study population comprised all third-trimester pregnant women registered at Dolik Community Health Center during the study period. Third-trimester pregnancy was defined as gestational age ≥ 28 weeks. Total population sampling was used, and all eligible women were invited to participate. A total of 67 pregnant women were included in the study. Eligible participants were third-trimester pregnant women registered within the health center's service area who were willing to participate and able to communicate effectively during the interview. Women with severe medical conditions that prevented participation or those who did not provide informed consent were excluded.

Variables and Measurement

The dependent variable was ANC visit coverage, categorized as adequate or inadequate according to applicable Indonesian Ministry of Health recommendations. The independent variables were maternal knowledge, husband's support, access to information, and the role of healthcare workers. Data were collected using a structured questionnaire developed from relevant literature and national maternal health guidelines. Maternal knowledge assessed understanding of pregnancy, pregnancy danger signs, and the importance of ANC. Husband's support covered emotional, informational, instrumental, and motivational support during pregnancy. Access to information assessed the availability and use of maternal health information from healthcare providers, mass media, and community sources. The role of healthcare workers assessed counseling, communication, education, and support provided by healthcare professionals. Responses were scored and categorized according to predefined criteria established during questionnaire development.

The questionnaire was reviewed by experts in maternal and public health to assess content validity. A pilot test was subsequently conducted among pregnant women with characteristics like

those of the study population. Internal consistency was assessed using Cronbach's alpha, with a coefficient ≥ 0.70 considered acceptable.

Data Collection

Data were collected through face-to-face interviews conducted by trained research assistants. Participants received information regarding the study objectives, procedures, confidentiality, voluntary participation, and their right to withdraw at any time. Written informed consent was obtained before data collection.

Statistical Analysis

Data were entered, checked for completeness, cleaned, and analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were presented as frequencies and percentages. Bivariate analysis was performed using the Chi-square test to examine the associations between maternal knowledge, husband's support, access to information, healthcare workers' role, and ANC visit coverage. Statistical significance was assessed at a 95% confidence level, with $p < 0.05$ considered statistically significant.

RESULT

Table 1. Characteristics of Pregnant Women (n = 67)

Characteristic	Category	n	%
Maternal age	High risk	54	80.6
	Not at risk	13	19.4
Education	Higher education	13	19.4
	Senior high school	43	64.2
	Junior high school	11	16.4
Occupation	Employed	24	35.8
	Housewife	43	64.2
Parity	Primipara	19	28.4
	Multipara	48	71.6

Table 1 presents the characteristics of the 67 pregnant women included in the study. Most participants were classified as having high-risk maternal age (54, 80.6%). Regarding education, the majority had completed senior high school (43, 64.2%), while 13 (19.4%) had higher education and 11 (16.4%) had junior high school education. Most participants were housewives (43, 64.2%), while 24 (35.8%) were employed. Regarding parity, the majority were multiparous (48, 71.6%), compared with 19 (28.4%) who were primiparous.

Table 2. Distribution of ANC Visit Coverage and Associated Factors Among Pregnant Women (N = 67)

Variable	Category	n	%
ANC visit coverage	Complete	30	44.8
	Incomplete	37	55.2
Maternal knowledge	Good	19	28.4
	Moderate	33	49.3
	Poor	15	22.4
Husband's support	Supportive	29	43.3
	Not supportive	38	56.7
Healthcare workers' role	Supportive role	43	64.2
	Non-supportive role	24	35.8

Table 2 presents the distribution of ANC visit coverage and the study variables. More than half of the pregnant women had incomplete ANC visits (37, 55.2%). Regarding maternal knowledge, 33 participants (49.3%) had moderate knowledge, followed by good knowledge (19, 28.4%) and poor knowledge (15, 22.4%). Most participants reported inadequate support from their husbands (38, 56.7%), whereas 29 (43.3%) reported receiving adequate support. Healthcare workers were perceived to have a supportive role by 43 participants (64.2%), while 24 (35.8%) reported a non-supportive role.

Table 3. Association Between Maternal Knowledge, Husband's Support, Healthcare Workers' Role, and ANC Visit Coverage (N = 67)

Variable	Category	Complete ANC, n (%)	Incomplete ANC, n (%)	Total, n (%)	p-value
Maternal knowledge	Good	15 (78.9)	4 (21.1)	19 (100)	0.001
	Moderate	12 (36.4)	21 (63.6)	33 (100)	
	Poor	3 (20.0)	12 (80.0)	15 (100)	
Husband's support	Supportive	21 (72.4)	8 (27.6)	29 (100)	<0.001
	Not supportive	9 (23.7)	29 (76.3)	38 (100)	
Healthcare workers' role	Supportive	24 (55.8)	19 (44.2)	43 (100)	0.030
	Not supportive	6 (25.0)	18 (75.0)	24 (100)	

Table 3 shows significant associations between maternal knowledge, husband's support, healthcare workers' role, and ANC visit coverage. Among mothers with good knowledge, 15 (78.9%) completed ANC visits, compared with 12 (36.4%) of those with moderate knowledge and 3 (20.0%) of those with poor knowledge ($p = 0.001$). Husband's support was also significantly associated with ANC coverage; 72.4% of women receiving support completed their ANC visits, compared with 23.7% among those without support ($p < 0.001$). Similarly, 55.8% of women who perceived healthcare workers as supportive completed ANC visits, compared with 25.0% among those reporting a non-supportive role ($p = 0.030$).

DISCUSSION

This study examined factors associated with coverage of antenatal care (ANC) visits among pregnant women in the service area of the Dolik Community Health Center, Northwest Gane District, South Halmahera. The findings revealed that maternal knowledge, husband's support, and the role of healthcare workers were significantly associated with ANC visit coverage, whereas access to information was not significantly associated with ANC utilization. These findings provide important insights into the individual, interpersonal, and health system factors influencing maternal healthcare utilization in rural and underserved communities.

The present study found a significant association between maternal knowledge and ANC visit coverage. Pregnant women with better knowledge regarding pregnancy, danger signs, and the benefits of ANC were more likely to complete the recommended antenatal visits than women with limited knowledge. This finding supports the premise that knowledge serves as a fundamental determinant of health-seeking behavior and plays a central role in maternal healthcare utilization.

According to Andersen's Behavioral Model of Health Services Use, knowledge functions as a predisposing factor that influences an individual's decision to access healthcare services (Andersen, 1995). Women who understand the importance of ANC are more likely to perceive pregnancy monitoring as a necessity rather than an optional activity. Knowledge enables pregnant women to recognize the potential risks associated with pregnancy and motivates them to seek preventive healthcare services before complications occur.

The findings are consistent with previous studies conducted in low- and middle-income countries. A systematic review by Simkhada et al. (2008) reported that maternal knowledge significantly influences ANC attendance across developing countries. Similarly, Acharya et al. (2015) found that women with greater awareness of pregnancy complications and higher birth preparedness were more likely to use maternal healthcare services. Titaley et al. (2010), in a nationally representative study in Indonesia, also demonstrated that inadequate knowledge regarding maternal health was associated with underutilization of ANC services.

One possible explanation for this relationship is that knowledgeable mothers are better equipped to recognize early warning signs of pregnancy complications, including hypertension, bleeding, edema, and reduced fetal movement. Consequently, they are more likely to perceive ANC visits as beneficial for monitoring maternal and fetal health. In contrast, women with limited knowledge may only seek care when symptoms become severe, thereby reducing opportunities for early detection and intervention.

Furthermore, knowledge influences maternal attitudes and perceptions regarding healthcare services. Women who understand the benefits of ANC may develop greater trust in healthcare providers and be more willing to comply with recommended schedules. This observation aligns with evidence from Pell et al. (2013), who found that positive perceptions of maternal healthcare services are strongly associated with consistent ANC attendance.

The findings suggest that improving maternal knowledge should remain a priority within maternal health programs. Community-based health education initiatives, counseling during ANC visits, and health promotion through community health workers may strengthen pregnant women's

understanding of pregnancy risks and increase ANC utilization, particularly in remote areas where health literacy remains limited.

This study also demonstrated a significant association between the husband's support and ANC visit coverage. Women who reported receiving support from their husbands were more likely to complete ANC visits than those lacking such support. This finding highlights the importance of family involvement in maternal healthcare utilization and supports growing evidence that male participation contributes positively to maternal and child health outcomes.

In many communities, husbands play a central role in household decision-making, including decisions about healthcare expenditures, transportation, and access to medical services. Consequently, husband support can directly influence whether pregnant women attend health facilities regularly. Support may be provided in various forms, including emotional encouragement, financial assistance, transportation, accompaniment during clinic visits, and assistance with household responsibilities.

The present findings are consistent with the systematic review conducted by Yargawa and Leonardi-Bee (2015), which concluded that male involvement significantly improves maternal healthcare utilization, including ANC attendance, skilled birth attendance, and postpartum care utilization. Similarly, Tokhi et al. (2018) reported that interventions promoting male participation in maternal health programs were associated with increased utilization of maternal healthcare services across several low-resource settings.

Emotional support from husbands may be particularly important during pregnancy because pregnancy is often accompanied by anxiety, physical discomfort, and uncertainty regarding maternal and fetal well-being. Women who feel supported by their spouses may experience greater confidence in seeking healthcare services and may be more willing to adhere to recommended ANC schedules. Conversely, lack of support may reduce motivation and increase barriers to healthcare utilization.

Financial support also represents a critical mechanism through which husbands influence ANC attendance. Although maternal healthcare services may be subsidized in some settings, indirect costs such as transportation expenses, lost work time, and additional medical examinations can still pose challenges. Husbands who prioritize maternal health and allocate household resources accordingly may facilitate more consistent attendance at ANC.

The findings underscore the importance of incorporating husbands into maternal health promotion programs. Strategies such as couple-based health education, family-centered counseling, and community outreach targeting men may strengthen male engagement in maternal healthcare and improve ANC coverage. Such interventions are particularly relevant in rural communities where cultural norms often position husbands as primary decision-makers regarding healthcare utilization.

The study further revealed a significant association between healthcare workers' roles and ANC visit coverage. Women who perceived stronger support and engagement from healthcare providers were more likely to complete ANC visits. This finding emphasizes the critical contribution of healthcare professionals in promoting maternal healthcare utilization and improving pregnancy outcomes.

Healthcare workers represent the primary interface between pregnant women and the healthcare system. Their ability to provide accurate information, effective counseling, emotional support, and respectful care can significantly influence maternal healthcare-seeking behavior. Positive interactions with healthcare providers may enhance trust, improve satisfaction with services, and encourage women to return for subsequent visits.

The findings align with previous studies indicating that service quality influences ANC utilization. Benova et al. (2018) reported that the quality and content of ANC services are as important as service coverage in determining maternal health outcomes. Similarly, Downe et al. (2018) found that respectful and woman-centered maternity care increases maternal satisfaction and improves continuity of care throughout pregnancy.

One explanation for the observed association is that healthcare workers serve as important sources of health information. During ANC visits, providers educate women regarding nutrition, supplementation, birth preparedness, danger signs, and healthy behaviors during pregnancy. Such information may reinforce women's understanding of pregnancy risks and strengthen their commitment to attending future visits.

In addition to information provision, healthcare workers contribute to maternal motivation through supportive communication and interpersonal relationships. Respectful treatment, empathy, and responsiveness to women's concerns can create a positive healthcare experience and reduce fear or anxiety associated with clinical examinations. Conversely, negative experiences, poor communication, or perceived discrimination may discourage women from utilizing healthcare services.

The significance of healthcare worker involvement is particularly relevant in geographically isolated regions where healthcare providers often function as trusted community figures. Strengthening provider communication skills, community outreach activities, and patient-centered care approaches may therefore contribute substantially to improving ANC attendance in rural populations.

Interestingly, access to information was not significantly associated with ANC visit coverage in this study. This finding differs from several previous studies that reported a positive relationship between exposure to maternal health information and healthcare utilization (Acharya et al., 2015; Simkhada et al., 2008).

Several explanations may account for this result. First, information exposure alone may not necessarily translate into behavioral change. Women may receive information regarding ANC through media, community campaigns, or informal sources, but still face practical barriers such as transportation difficulties, financial constraints, or limited family support. Therefore, the availability of information may be insufficient to influence healthcare utilization in the absence of enabling factors.

Second, the quality and credibility of information sources may vary considerably. Information obtained from social media, peers, or non-professional sources may not always be accurate or persuasive enough to motivate behavior change. In contrast, direct counseling from healthcare workers may have a greater impact because it provides personalized guidance and opportunities for clarification.

Third, the relatively homogeneous distribution of information access among respondents may have reduced the statistical ability to detect significant differences. Future studies employing larger sample sizes and more detailed measurements of information exposure may provide a clearer understanding of this relationship.

The findings of this study have several practical implications. First, maternal health programs should prioritize health education interventions aimed at improving pregnant women's knowledge regarding ANC and pregnancy danger signs. Second, strategies to increase husband involvement should be integrated into maternal healthcare services, including couple counseling and male-focused educational activities. Third, healthcare providers should receive ongoing training in communication, counseling, and respectful maternity care to strengthen patient-provider relationships and improve service utilization.

These interventions are particularly important in rural and underserved communities where maternal mortality remains a significant public health concern. Strengthening community engagement, family participation, and healthcare workers' capacity may substantially increase ANC coverage and improve maternal and neonatal outcomes.

This study provides valuable evidence on the determinants of ANC utilization in a geographically isolated region of Indonesia, where empirical data remain limited. However, several limitations should be acknowledged. The cross-sectional design precludes causal inference because exposure and outcome variables were measured simultaneously. The relatively small sample size may limit generalizability beyond the study setting. In addition, self-reported data may be subject to recall bias and social desirability bias. Future studies employing longitudinal designs and larger sample sizes are recommended to further explore the causal pathways influencing ANC utilization.

Overall, the present findings demonstrate that maternal knowledge, husband's support, and healthcare worker involvement are important determinants of ANC visit coverage. Strengthening these factors through targeted interventions may contribute to improved maternal healthcare utilization and support efforts to reduce maternal morbidity and mortality in underserved communities.

CONCLUSION

This study found that maternal knowledge, husband's support, and the role of healthcare workers were significantly associated with coverage of antenatal care (ANC) visits among pregnant women in the Dolik Community Health Center service area, Northwest Gane District, South Halmahera. Pregnant women with better knowledge, stronger support from their husbands, and greater engagement from healthcare workers were more likely to complete recommended ANC visits. These findings highlight the importance of addressing individual, family, and health system factors to improve maternal healthcare utilization. Strengthening maternal health education, promoting male involvement in pregnancy care, and enhancing healthcare workers' capacity to provide effective counseling and supportive services may increase ANC attendance. Future maternal health programs should adopt integrated, community-based strategies to improve ANC

utilization and improve maternal and neonatal health outcomes, particularly in rural and underserved settings.

CONFLICT OF INTEREST

There is no conflict of interest.

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