
Determinants of Antenatal Care Adherence among Pregnant Women in a Midwifery Practice: A Cross-sectional study

Ita Haryanti¹⁾, Maya Sartika²⁾, Yeviza Puspitasari³⁾

^{1,2,3)}Program Studi S-1 Kesehatan Masyarakat, STIKes Al-Ma'arif Baturaja

*Corresponding Author

E-mail: Bidan.itabta@gmail.com, Mavabta02@gmail.com, yeviza.puspitasari1402@gmail.com

Abstract

Antenatal care adherence supports early identification and management of pregnancy-related complications. However, maternal and family-related factors may prevent women from completing the recommended antenatal care schedule. Objective: This study examined the associations of maternal age, educational attainment, occupational status, and husband support with antenatal care adherence. Methods: This analytical cross-sectional study included 34 women who had received antenatal care during their most recent pregnancy at an independent midwifery practice in Ogan Komering Ulu Regency, Indonesia. Data were collected using a demographic questionnaire, husband-support questionnaire, and antenatal care record checklist. Frequencies, percentages, and Pearson's chi-square test were used for data analysis. Results: Twenty participants (58.8%) did not adhere to the recommended antenatal care schedule. Maternal age was significantly associated with antenatal care adherence ($p = .003$). Educational attainment showed a significant association with adherence ($p < .001$), while occupational status was also significantly associated with adherence ($p = .003$). Husband support demonstrated a significant association with antenatal care adherence ($p = .001$). Conclusion: Maternal age, education, occupation, and husband support were associated with antenatal care adherence. Midwives should provide flexible services, individualized education, and husband-inclusive counseling to improve attendance.

Keywords: Antenatal Care; Adherence; Husband Support; Maternal Education; Maternal Health; Pregnancy

INTRODUCTION

Pregnancy requires continuous maternal and fetal surveillance because health risks may emerge throughout gestation and require timely management by skilled healthcare providers (Al Agili & Khalaf, 2023; Khan et al., 2025). Antenatal care provides a structured platform for clinical assessment, preventive counseling, nutritional support, and referral during pregnancy (Berhanu et al., 2025; Horino et al., 2024). Regular antenatal care attendance enables healthcare providers to identify pregnancy-related complications and reinforce protective health behaviors before childbirth (Al Agili & Khalaf, 2023; Anato & Reshid, 2025). Incomplete antenatal care attendance interrupts this continuum and limits pregnant women's access to essential maternal health interventions (Rizvi Jafree & Barlow, 2023; Khan et al., 2025).

Adherence describes the extent to which an individual's behavior corresponds with an agreed health recommendation, although previous studies have applied different definitions and measurements across healthcare settings (Burlson et al., 2025). Antenatal care adherence requires pregnant women to initiate care, complete the recommended contacts, attend visits at appropriate gestational periods, and maintain engagement with professional recommendations (Singh et al., 2023; Berhanu et al., 2025). Evidence from maternal supplementation programs demonstrates that intervention effectiveness depends substantially on consistent maternal participation within routine antenatal care services (Smith et al., 2025; Sauer et al., 2025). Studies on iron-folic acid and multiple micronutrient supplementation have reported persistent variations in maternal acceptance and utilization despite the availability of these interventions (Abebe et al., 2025; Abidah & Sumarmi, 2024; Ummair et al., 2025). These findings position adherence as a multidimensional behavioral and service-delivery outcome rather than a simple numerical count of healthcare visits (Burlson et al., 2025; Ba et al., 2025).

Pregnant women's adherence to antenatal care reflects sociodemographic conditions that influence health knowledge, risk perception, decision-making autonomy, and capacity to access healthcare services (Idris et al., 2023; Rizvi Jafree & Barlow, 2023). Maternal age may influence previous pregnancy experience and perceptions of vulnerability, while educational attainment may determine the ability to understand and apply maternal health information (Idris et al., 2023; Khan et al., 2025). Maternal employment may provide financial resources for healthcare utilization, but rigid working schedules may reduce the time available for scheduled antenatal care visits (Khan et al., 2025; Rizvi Jafree & Barlow, 2023). Studies in other adherence contexts have consistently associated knowledge and attitudes with treatment, medication, and supplementation adherence, which supports their relevance to maternal healthcare behavior (Akbar et al., 2024; Anggaraini & Lestari, 2025; Putri & Rosadi, 2025). Healthcare researchers should therefore examine individual characteristics together with the social and organizational circumstances surrounding pregnancy care (Burleson et al., 2025; Idris et al., 2023).

Husband and family support may strengthen antenatal care adherence by providing emotional encouragement, transportation, financial assistance, and support for healthcare decision-making (Idris et al., 2023; Aprita, 2024). Limited decision-making autonomy may delay maternal healthcare utilization when household members control healthcare choices and financial resources (Idris et al., 2023; Rizvi Jafree & Barlow, 2023). Healthcare providers may also influence antenatal care attendance through effective communication, respectful interactions, service accessibility, and continuity of care (Al Agili & Khalaf, 2023; Ba et al., 2025). Implementation studies have demonstrated that stakeholder readiness, workflow integration, and intervention fidelity determine whether pregnant women receive maternal health services consistently within routine antenatal care systems (Berhanu et al., 2025; Singh et al., 2023). Antenatal care adherence therefore emerges from interactions among maternal characteristics, household support, and healthcare service conditions (Khan et al., 2025; Ba et al., 2025).

Current maternal adherence research has predominantly examined nutritional supplementation, intervention acceptability, or health-system implementation across different country settings (Kissell et al., 2025; Labonté et al., 2025; Sauer et al., 2026). These studies provide important evidence about behavioral barriers, but they offer limited information about the combined associations of maternal age, education, occupation, and husband support with antenatal visit adherence in independent midwifery practices (Abebe et al., 2025; Sauer et al., 2025). A preliminary assessment at the study site found that 12 of 20 women who had recently completed pregnancy, or 60%, had not completed the recommended antenatal care schedule (Preliminary Survey, 2025). The participants attributed their non-adherence primarily to occupational demands (35%), low educational attainment (25%), maternal age (20%), and insufficient husband support (20%) (Preliminary Survey, 2025). This local pattern demonstrates a practical gap between the availability of midwifery services and women's sustained utilization of antenatal care throughout pregnancy (Khan et al., 2025; Rizvi Jafree & Barlow, 2023).

A focused analysis within an independent midwifery practice can generate context-specific evidence for targeted counseling, flexible appointment planning, and family-inclusive interventions (Al Agili & Khalaf, 2023; Ba et al., 2025). A cross-sectional assessment can identify maternal and household characteristics associated with antenatal care adherence within a defined service population (Akbar et al., 2024; Putri & Rosadi, 2025). This study therefore aimed to determine the associations of maternal age, educational attainment, occupation, and husband support with antenatal care adherence among pregnant women attending a midwifery practice in Baturaja Barat, Ogan Komering Ulu, Indonesia.

RESEARCH METHODS

This study used an analytical cross-sectional design to examine the associations between maternal age, educational attainment, occupational status, husband support, and antenatal care adherence. The researchers measured the dependent and independent variables during a single data-collection period. The study followed a quantitative correlational approach because it aimed to identify factors associated with antenatal care adherence without manipulating the participants' characteristics or healthcare exposure. The study was conducted at Ziadta Independent Midwifery Practice in Ogan Komering Ulu Regency, South Sumatra, Indonesia. The practice provides maternal health services, including antenatal examinations, childbirth assistance, postpartum care, pregnancy classes, maternal counseling, and other maternal and child health services. The researchers collected the data between October and December 2025.

The study population comprised 56 postpartum women who had received antenatal care during their most recent pregnancies and were registered at Ziadta Independent Midwifery Practice during the study period. Postpartum women were selected because their antenatal care records provided complete information regarding attendance across all three trimesters. The final sample included 34 women who met the eligibility criteria and agreed to participate in the study. The inclusion criteria required participants to be postpartum women without major pre-existing medical complications, possess the ability to read and write, have a husband, and provide written informed consent. The exclusion criteria included diabetes mellitus, hypertension, severe psychological disorders, and a history of uterine abnormalities. The researchers excluded women with incomplete antenatal care records because their adherence status could not be determined accurately. Antenatal care adherence served as the dependent variable. The researchers assessed adherence by reviewing the antenatal visit records documented in each participant's Maternal and Child Health Handbook. The researchers classified participants as adherent when they had completed at least six antenatal care visits according to the recommended gestational schedule, comprising at least two visits during the first trimester, one visit during the second trimester, and three visits during the third trimester. The researchers classified participants as non-adherent when they had completed fewer than six visits or had not attended the visits according to the recommended trimester schedule. Maternal age, educational attainment, occupational status, and husband support served as the independent variables.

The researchers classified maternal age as high-risk when participants were aged 20 years or younger or older than 35 years and as non-high-risk when participants were aged 21–35 years. The researchers classified educational attainment as higher education when participants had completed education above junior secondary school and as lower education when participants had completed junior secondary school or below. The researchers classified occupational status as employed when participants performed income-generating work and as unemployed when participants did not perform income-generating work. Husband support referred to the emotional, informational, practical, and financial assistance that participants received from their husbands during pregnancy. The researchers measured husband support using a structured questionnaire. The researchers classified a total score above three as supportive and a score of three or below as non-supportive. All variables were measured on a nominal scale. The researchers used a structured data-collection form consisting of a demographic questionnaire, a husband-support questionnaire, and an antenatal care record checklist. The demographic questionnaire collected information regarding maternal age, educational attainment, and occupational status. The husband-support questionnaire assessed emotional encouragement, health-related information, practical assistance, accompaniment to healthcare services, and financial support during pregnancy.

The antenatal care checklist recorded the number and timing of antenatal visits from the participants' Maternal and Child Health Handbooks. The researchers identified potentially eligible participants through the maternal service register at the study site. The researchers explained the study objectives, procedures, potential benefits, voluntary nature of participation, and confidentiality

safeguards to each eligible participant. Participants who agreed to join the study signed a written informed-consent form before data collection. The researchers obtained primary data through direct interviews and structured questionnaire administration. The researchers obtained secondary data from the Maternal and Child Health Handbooks, maternal service registers, and information recorded by the attending midwives. The researchers reviewed the completed instruments after each interview to identify missing or inconsistent responses.

The researchers processed the data through editing, coding, entry, and cleaning procedures. The researchers assigned numerical codes to each categorical response and entered the data into SPSS for Windows. The researchers checked the electronic dataset against the original questionnaires and checklists to identify missing values, duplicate entries, and coding errors. The researchers used univariate analysis to summarize each variable as frequencies and percentages. The researchers used Pearson’s chi-square test to examine the associations between antenatal care adherence and maternal age, educational attainment, occupational status, and husband support. The researchers interpreted an association as statistically significant when the two-sided p-value was less than or equal to 0.05 at a 95% confidence level.

RESULTS AND DISCUSSION

Participant Characteristics

The study included 34 women with complete data for all variables. Most participants did not adhere to the recommended antenatal care schedule (58.8%), while 41.2% completed the recommended visits. Most participants belonged to the high-risk age category (64.7%), had a lower educational level (52.9%), and were employed (58.8%). More than half of the participants reported insufficient husband support during pregnancy (55.9%).

Table 1. Characteristics of the participants (n = 34)

Characteristics	Category	n	%
Antenatal care adherence	Adherent	14	41.2
	Non-adherent	20	58.8
Maternal age	High-risk age	22	64.7
	Non-high-risk age	12	35.3
Educational attainment	Higher education	16	47.1
	Lower education	18	52.9
Occupational status	Employed	20	58.8
	Unemployed	14	41.2
Husband support	Supportive	15	44.1
	Non-supportive	19	55.9

Maternal Age and Antenatal Care Adherence

Among the 22 participants in the high-risk age category, 5 participants (22.7%) adhered to antenatal care, while 17 participants (77.3%) did not adhere to the recommended schedule. Among the 12 participants in the non-high-risk age category, 9 participants (75.0%) adhered to antenatal care, while 3 participants (25.0%) did not adhere. Pearson’s chi-square test indicated a significant association between maternal age and antenatal care adherence ($\chi^2 = 8.759, p = .003$). Because one expected cell count was below five, Fisher’s exact test was also examined and confirmed the association ($p = .005$).

Educational Attainment and Antenatal Care Adherence

Among the 16 participants with higher education, 12 participants (75.0%) adhered to antenatal care, while 4 participants (25.0%) did not adhere. Among the 18 participants with lower education, only 2 participants (11.1%) adhered to antenatal care, while 16 participants (88.9%) did not adhere. Pearson’s chi-square test demonstrated a statistically significant association between educational

attainment and antenatal care adherence ($\chi^2 = 14.275, p < .001$). Participants with higher education demonstrated substantially greater adherence than participants with lower education.

Occupational Status and Antenatal Care Adherence

Among the 20 employed participants, 4 participants (20.0%) adhered to antenatal care, while 16 participants (80.0%) did not adhere. Among the 14 unemployed participants, 10 participants (71.4%) adhered to antenatal care, while 4 participants (28.6%) did not adhere. Pearson’s chi-square test identified a statistically significant association between occupational status and antenatal care adherence ($\chi^2 = 8.993, p = .003$). Unemployed participants demonstrated a higher proportion of antenatal care adherence than employed participants.

Husband Support and Antenatal Care Adherence

Among the 19 participants who received insufficient husband support, 3 participants (15.8%) adhered to antenatal care, while 16 participants (84.2%) did not adhere. Among the 15 participants who received adequate husband support, 11 participants (73.3%) adhered to antenatal care, while 4 participants (26.7%) did not adhere. Pearson’s chi-square test demonstrated a statistically significant association between husband support and antenatal care adherence ($\chi^2 = 11.459, p = .001$). Participants who received adequate husband support demonstrated greater adherence than participants who received insufficient support.

Table 2. Associations between maternal characteristics, husband support, and antenatal care adherence (n = 34)

Variables	Categories	Adherent, n (%)	Non-adherent, n (%)	Test statistic	p-value
Maternal age	High-risk age	5 (22.7)	17 (77.3)	$\chi^2 = 8.759$	.003 ^a
	Non-high-risk age	9 (75.0)	3 (25.0)		
Educational attainment	Higher education	12 (75.0)	4 (25.0)	$\chi^2 = 14.275$	< .001
	Lower education	2 (11.1)	16 (88.9)		
Occupational status	Employed	4 (20.0)	16 (80.0)	$\chi^2 = 8.993$	.003
	Unemployed	10 (71.4)	4 (28.6)		
Husband support	Supportive	11 (73.3)	4 (26.7)	$\chi^2 = 11.459$	.001
	Non-supportive	3 (15.8)	16 (84.2)		

Note. Percentages represent row percentages. χ^2 = Pearson’s chi-square statistic.
^aOne expected cell count was below five; Fisher’s exact test produced $p = .005$.

The bivariate analyses demonstrated that maternal age, educational attainment, occupational status, and husband support were significantly associated with antenatal care adherence. Participants of non-high-risk age, participants with higher education, unemployed participants, and participants who received adequate husband support showed higher proportions of adherence. Educational attainment produced the largest chi-square statistic among the examined variables, followed by husband support, occupational status, and maternal age. These results represent unadjusted associations and should not be interpreted as independent causal effects because the study did not conduct multivariable analysis.

The analysis showed that maternal age, educational attainment, occupational status, and husband support were significantly associated with antenatal care adherence among women attending the midwifery practice. Women within the non-high-risk age category demonstrated greater adherence than women within the high-risk age category. Women with higher educational attainment completed the recommended antenatal care schedule more frequently than women with lower educational attainment. Unemployed women showed greater adherence than employed women, which indicated that occupational responsibilities could interfere with scheduled maternal healthcare visits. Women

who received adequate husband support also demonstrated substantially higher adherence than women who received insufficient support. These associations indicate that antenatal care adherence reflects interactions among maternal characteristics, daily responsibilities, family support, and access to healthcare services.

Regular antenatal care enables healthcare providers to monitor maternal and fetal conditions, deliver preventive interventions, and identify pregnancy-related complications before they progress into severe outcomes (Al Agili & Khalaf, 2023; Berhanu et al., 2025). Incomplete attendance can disrupt the continuity of pregnancy monitoring and reduce women's exposure to nutrition counseling, clinical assessment, and timely referral services (Khan et al., 2025; Rizvi Jafree & Barlow, 2023). Maternal adherence also determines whether women receive essential interventions consistently throughout pregnancy rather than only during isolated clinical encounters (Smith et al., 2025; Sauer et al., 2025). Previous supplementation studies have demonstrated that healthcare interventions produce optimal benefits when pregnant women maintain regular contact with antenatal care providers and follow recommended health practices (Abebe et al., 2025; Anato & Reshid, 2025). Healthcare systems must therefore assess adherence as a multidimensional behavior that incorporates attendance, timing, continuity, and engagement with professional recommendations (Burleson et al., 2025). The relatively high proportion of non-adherence in the study population underscores the need for locally responsive strategies that address both individual and service-related barriers (Ba et al., 2025; Berhanu et al., 2025).

Maternal age influenced antenatal care adherence because different age groups may possess different levels of pregnancy experience, risk awareness, decision-making capacity, and confidence in communicating with healthcare providers (Idris et al., 2023; Khan et al., 2025). Younger women may experience limited autonomy and dependence on family members when making decisions about healthcare utilization during pregnancy (Idris et al., 2023). Women older than 35 years may face additional family, occupational, or health-related responsibilities that complicate regular attendance at scheduled antenatal visits (Khan et al., 2025; Rizvi Jafree & Barlow, 2023). Women within the non-high-risk age group may demonstrate greater physical readiness, stronger health literacy, and greater independence in organizing maternal healthcare appointments (Idris et al., 2023). Healthcare providers should consequently identify age-related barriers during the initial antenatal contact and provide counseling that corresponds with each woman's developmental, social, and reproductive circumstances (Al Agili & Khalaf, 2023). Midwives should also involve trusted family members when maternal age limits healthcare autonomy or creates additional support needs during pregnancy (Idris et al., 2023; Rizvi Jafree & Barlow, 2023).

Educational attainment showed the strongest statistical association with antenatal care adherence in the study population. Higher education may strengthen women's capacity to understand antenatal schedules, recognize pregnancy danger signs, evaluate health information, and communicate their needs to healthcare providers (Khan et al., 2025; Idris et al., 2023). Studies across different adherence contexts have associated stronger health knowledge with better compliance with treatment, medication, and nutritional recommendations (Akbar et al., 2024; Anggaraini & Lestari, 2025; Putri & Rosadi, 2025). Lower educational attainment may restrict women's understanding of preventive care when healthcare providers deliver information through technical language or written materials that do not correspond with their literacy levels (Ba et al., 2025; Rizvi Jafree & Barlow, 2023). Midwives should therefore use simple language, visual media, repeated explanations, and teach-back techniques when they educate women about the recommended antenatal care schedule (Al Agili & Khalaf, 2023; Ba et al., 2025). Tailored education can strengthen women's risk perceptions and support their continued participation in antenatal care across all stages of pregnancy (Anato & Reshid, 2025; Sauer et al., 2026).

Occupational status also shaped antenatal care adherence because employed women showed a lower proportion of completed visits than unemployed women. Employment can improve women's financial capacity, but fixed schedules, workload demands, transportation difficulties, and limited

workplace flexibility can reduce the time available for antenatal appointments (Khan et al., 2025; Rizvi Jafree & Barlow, 2023). Pregnant workers may postpone routine care when appointment hours overlap with working hours or when employers do not provide adequate leave for maternal healthcare (Khan et al., 2025). Unemployed women may possess greater scheduling flexibility, although their healthcare access can still depend on household income and family decision-making structures (Idris et al., 2023). Midwifery practices should respond to occupational barriers by providing flexible appointment systems, reminder services, shorter waiting times, and alternative consultation hours for working women (Ba et al., 2025; Berhanu et al., 2025). Healthcare providers should also explore women's work conditions during antenatal counseling so that each care plan can accommodate occupational demands without compromising maternal surveillance (Al Agili & Khalaf, 2023; Singh et al., 2023).

Husband support demonstrated a strong association with antenatal care adherence because supportive husbands could facilitate transportation, finance healthcare expenses, provide emotional reassurance, and accompany women during clinical visits. Women's healthcare utilization often depends on household power relations and their autonomy to make decisions about personal health needs (Idris et al., 2023). Supportive family relationships can strengthen adherence by reducing practical burdens and reinforcing the perceived importance of recommended healthcare behaviors (Aprita, 2024; KK et al., 2024). Insufficient husband support may discourage attendance when women require permission, financial assistance, childcare arrangements, or transportation to reach maternal health services (Rizvi Jafree & Barlow, 2023; Khan et al., 2025). Midwives should consequently engage husbands in antenatal education and explain their practical responsibilities in supporting continuous maternal care (Al Agili & Khalaf, 2023). Family-inclusive counseling can transform antenatal care from an individual obligation into a shared household responsibility that protects maternal and fetal health (Idris et al., 2023; Ba et al., 2025).

The combined associations of age, education, occupation, and husband support indicate that midwifery practices require integrated strategies rather than a single educational intervention. Providers should conduct an early adherence-risk assessment that evaluates maternal characteristics, literacy needs, employment constraints, decision-making autonomy, and available family support (Khan et al., 2025; Idris et al., 2023). Providers should combine individualized counseling with appointment reminders, flexible scheduling, husband engagement, and follow-up communication for women who miss scheduled visits (Ba et al., 2025; Sauer et al., 2026). Practice managers should also integrate these strategies into routine workflows because implementation fidelity influences the consistency and accessibility of antenatal interventions (Berhanu et al., 2025; Singh et al., 2023). Researchers should interpret the present associations cautiously because the small single-site sample and bivariate analysis did not account for potential interactions or confounding variables among the examined determinants (Burleson et al., 2025). Future studies should apply larger multicenter samples, standardized adherence measurements, and multivariable analysis to determine the independent contributions of maternal, familial, and healthcare-related factors (Burleson et al., 2025; Smith).

CONCLUSION

Maternal age, educational attainment, occupational status, and husband support were significantly associated with antenatal care adherence among women attending the midwifery practice. Women within the non-high-risk age category, women with higher education, unemployed women, and women who received adequate husband support demonstrated greater adherence to the recommended antenatal care schedule. Midwives should identify women at risk of non-adherence during the first antenatal contact and provide individualized education according to their age, literacy level, occupational demands, and family circumstances. Midwifery practices should offer flexible

appointment hours, reminder systems, simplified educational materials, and husband-inclusive counseling to support continuous antenatal attendance. Healthcare managers should develop follow-up procedures for women who miss appointments and strengthen coordination between women, families, and maternal healthcare providers. Future research should use larger samples and multivariable analysis to identify the independent predictors of antenatal care adherence and guide more targeted interventions.

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