PROFESIONAL HEALTH JOURNAL
Volume 8, No. 1, December 2026 (Page. 384-397)
Available Online at https://www.ojsstikesbanyuwangi.com/index.php/PHJ/index
E-ISSN 2715-6249
DOI: https://doi.org/10.54832/phj.v8i1.1473

Determinants of Antenatal Care Visit Compliance among Pregnant Women in Kualuh Hulu District, North Labuhanbatu Regency

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ARTICLE INFORMATION

Article history
Received (22 April 2026)
Revised (27 April 2026)
Accepted (29 April 2026)

Keywords
Keywords must contain at least three to five keywords representing the main content of the article

ABSTRACT

Background*: Antenatal care (ANC) is a core strategy for reducing maternal and neonatal mortality through early detection and management of pregnancy complications. However, ANC coverage in Kualuh Hulu District, North Labuhanbatu Regency, remains suboptimal, with fluctuating maternal and infant death rates signaling persistent service gaps. Identifying the local determinants of ANC compliance is essential for designing targeted interventions.*
Methods*: A cross-sectional study was conducted among 153 second- and third-trimester pregnant women recruited through total sampling from four public health centers in Kualuh Hulu District. Data were collected using a structured, validated questionnaire. Analysis included univariate description, bivariate analysis using Chi-square tests, and multivariate binary logistic regression to identify independent determinants.*
Results*: Among the 153 participants, high ANC compliance was observed in 65.4% (n=100) of participants. Bivariate analysis showed significant associations with six factors: knowledge (p<0.001; OR=4.97), attitude (p<0.001; OR=7.52), decision-making autonomy (p<0.001; OR=6.01), perceived service quality (p=0.002; OR=3.89), availability of staff and facilities (p=0.014; OR=2.90), and transportation and examination costs (p=0.006; OR=2.36). After multivariate adjustment, only knowledge (AOR=5.25; 95% CI: 2.17–12.68), attitude (AOR=4.38; 95% CI: 1.72–11.12), and decision-making autonomy (AOR=4.57; 95% CI: 1.87–11.16) remained significant independent predictors.*
Conclusions*: Knowledge, attitude, and decision-making autonomy are the strongest independent predictors (i.e., the key modifiable determinants) of ANC compliance in this rural setting, outweighing demographic and economic factors. Interventions should prioritize sustained, community-based health education using local languages and peer educators; household-level counseling sessions that actively engage husbands and families to support women's decision-making; and empowerment programs such as women's discussion groups to build self-efficacy. Service quality improvements and cost support (e.g., transport vouchers) remain essential enabling conditions but are not sufficient alone.*

Introduction

Antenatal care (ANC) is a fundamental component of maternal health services, designed to ensure safe pregnancy outcomes and healthy newborns. The provision of quality ANC enables early identification of risk factors and timely diagnosis of pregnancy complications such as preterm labor, preeclampsia, and hemorrhage (Islam et al., 2022). The positive impact of ANC is achieved through systematic screening of pregnancy problems, risk assessment, appropriate medical management, provision of supplements, health education, and physical and psychological preparation for childbirth and parenthood (Amponsah-Tabi et al., 2022). Despite this well-established evidence, a critical knowledge gap remains: most existing studies have focused on

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urban or nationally representative samples, leaving rural districts such as Kualuh Hulu where health infrastructure, transportation, and household decision-making dynamics differ substantially largely unexamined. Furthermore, while individual factors and system factors have been studied separately, their relative contribution and the potential mediation of system factors through internal cognitive factors have not been clarified in this specific socio-cultural context. Addressing this gap is essential because interventions effective in urban settings may fail in rural areas where women's autonomy and health-seeking behavior are shaped by distinct local norms.

During the first antenatal visit to a health facility, a pregnant woman typically receives an ANC card, which serves as the primary record of her pregnancy and is updated at each subsequent visit. After the initial contact, women are scheduled for follow-up visits to monitor for complications and manage them in a timely manner (Ika Primayanti et al., 2022). The first visit is particularly important because it provides a comprehensive assessment of gestational age and risk factors (Rajagukguk, 2020). A complete medical history is obtained, covering the current pregnancy, previous pregnancies, history of preterm labor, complications and outcomes, medical and psychiatric conditions, prior surgeries, family and genetic disorders, allergies, medication use, substance use, and social circumstances (Qomarasari, 2023). Physical examination includes general assessment (weight, height, heart rate, mucous membrane color, blood pressure, edema, lymph node palpation), systematic examination (teeth, gums, breasts, thyroid, cardiopulmonary function), and pregnancy-related examination (inspection and palpation of the pregnant uterus with symphysis-fundal height measurement). Essential screening investigations include syphilis serology, rhesus blood group, hemoglobin levels , and urine protein and glucose (Article et al., 2025; Estifanos et al., 2025). All pregnant women receive supplements including iron tablets to prevent anemia, calcium to prevent preeclampsia complications, folic acid, and tetanus toxoid to prevent neonatal tetanus. Numerous studies have identified inadequate ANC as a risk factor for maternal morbidity and mortality (Kolantung et al., 2021; Susaningtyas & Lisca, 2024). Because insufficient ANC is associated with poorer pregnancy outcomes, policymakers need a deeper understanding of the factors influencing appropriate and timely ANC utilization. The use of services during pregnancy encourages further utilization of additional maternal services such as facility-based delivery and seeking help for complications during labor and the postnatal period (Wulandari et al., 2024). Although several studies have highlighted multiple factors influencing ANC utilization in different contexts, these findings have not been collectively synthesized, necessitating ongoing research into specific local determinants.

Pregnancy is a condition in which a woman carries an embryo and fetus in her uterus, beginning at conception and lasting until birth, approximately 280 days (40 weeks) and not exceeding 300 days (43 weeks) (Gebrekirstos et al., 2025; Ikhwanudin et al., 2025). Factors associated with adherence to repeat ANC visits include husband's support and employment status (Ikhwanudin et al., 2025). Previous research has shown that a majority of working mothers with poor husband support tend to have reduced ANC adherence. Interestingly, some studies have found no relationship between pregnant women's knowledge (p-value 0.176) and attitude (p-value 0.060) with ANC visits. A survey through interviews with pregnant women revealed that 80% did not perform ANC routinely, citing reasons such as laziness, work obligations, absence of complaints, and poor economic (Arisanti et al., 2024). The achievement of maternal health services can be assessed using coverage indicators K1 and K6 (Cholishotin, 2024). K1 coverage represents the number of pregnant women receiving their first antenatal service by health workers compared to the total target of pregnant women in a working area over one year. This indicator reflects access to health services for pregnant women and their

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adherence to checking their pregnancies with health workers. Based on a preliminary survey conducted by the researcher in the working area of Kualuh Hulu Health Center, North Labuhanbatu Regency, it was found that some pregnant women had not completed full antenatal care visits. Of 12 pregnant women interviewed, 10 did not meet the minimum standard of ANC visits as recommended by the Indonesian Ministry of Health.

Data from the North Labuhanbatu District Health Office, as published by the Central Bureau of Statistics (BPS) of North Labuhanbatu Regency in 2023, show fluctuations in maternal and infant mortality during the period 2016–2021. Maternal deaths (including pregnant, delivering, and postpartum women) remain a serious health concern. In 2017, six maternal deaths were recorded, increasing to seven in 2018, then decreasing to three in 2019. However, in 2020 and 2021, the number rose again to a total of eight cases. This condition indicates that although maternal health services are available, there remain risks of maternal death due to pregnancy complications, delays in seeking help, and limited access to basic emergency obstetric facilities (BPS Kabupaten Labuhan Batu Utara, 2021). Meanwhile, infant mortality also shows an unstable trend. The highest number of infant deaths occurred in 2020 with 23 cases, a significant increase compared to the previous year which had only three cases in 2019. In 2021, this number decreased to seven cases. The increase in infant deaths in 2020 was likely caused by decreased access to health services during the COVID-19 pandemic, including low coverage of ANC and neonatal services. Overall, these data illustrate that despite various efforts to improve maternal and child health services, maternal and infant mortality rates in North Labuhanbatu Regency remain relatively high and require ongoing interventions through improving ANC service quality, health education for pregnant women, and strengthening maternal and neonatal referral systems (BPS Kabupaten Labuhan Batu Utara, 2021).

These facts demonstrate the need for in-depth research on factors influencing pregnant women's adherence to ANC visits in Kualuh Hulu, because research results from other areas may not reflect the social and cultural conditions of this region. This research is also important because studies examining the relationship between knowledge, husband's support, and attitudes toward ANC visit adherence using behavioral health theory approaches remain limited. Based on the Health Belief Model (HBM) and Lawrence Green's behavior model, a person's behavior in utilizing health services is influenced by perceptions of benefits and barriers, environmental support, and readiness to act. Therefore, understanding the perceptions and motivations of pregnant women in Kualuh Hulu is key to designing more effective community-based interventions to increase ANC coverage and reduce the risk of pregnancy complications.
Based on the background above, the specific objectives of this study are to describe the level of ANC compliance among pregnant women in Kualuh Hulu District; to identify the bivariate associations between ANC compliance and eleven potential determinants grouped into individual characteristics (age, education, occupation, parity, health insurance), cognitive and attitudinal factors (knowledge, attitude, decision-making autonomy), and health system/economic factors (service quality, staff and facility availability, transportation and examination costs); to determine which of these factors are independent predictors of ANC compliance after controlling for confounders using multivariate logistic regression; and to quantify the strength of association (adjusted odds ratios) for each independent determinant.

Methods

Study Design and Setting

A quantitative, cross-sectional design was employed to examine the determinants of antenatal care (ANC) visit compliance among pregnant women. This design allowed the simultaneous

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measurement of exposure and outcome variables at a single point in time, providing an efficient means of assessing associations and generating hypotheses about potential determinants (Islam et al., 2022; Kartika et al., 2024). The study was conducted in Kualuh Hulu District, North Labuhanbatu Regency, Indonesia, between October 2025 and March 2026. The district encompasses four public health centers (Puskesmas): Aek Kanopan, Londut, Sonomartani, and Sukarame. These facilities serve a mixed population ranging from urban residents in Aek Kanopan to rural communities in plantation areas with limited road infrastructure and public transportation, making the district a representative setting for studying barriers to ANC compliance in rural Indonesia.

Study Population and Sampling

The target population comprised all pregnant women in the second or third trimester registered at the four health centers in Kualuh Hulu District. Trimester II and III women were selected because they have had sufficient opportunity to make multiple ANC visits, allowing meaningful assessment of compliance patterns. A total sampling method was used, meaning all eligible pregnant women in the target population were invited to participate. The inclusion criteria were pregnancy in trimester II or III and willingness to provide written informed consent. The exclusion criteria were pregnancy in trimester I and refusal to participate. Based on health center records, 153 pregnant women met the inclusion criteria, and all agreed to participate, yielding a response rate of 100%.

Variables and Operational Definitions

The dependent variable was ANC compliance, defined as the degree of adherence to the recommended schedule of antenatal visits based on the Indonesian Ministry of Health standards (minimum four visits with appropriate timing). Compliance was measured using a five-item Likert scale (1 = strongly disagree to 5 = strongly agree), and scores were categorized as high (≥75% of maximum score) or low (<75%) following Arikunto's criteria (Arikunto, 2019). The independent variables included eleven potential determinants grouped into three broad categories. The first category comprised individual characteristics: maternal age (categorized as high-risk if younger than 20 years or older than 35 years, and low-risk if between 20 and 35 years), education level (dasar for elementary or junior high school, menengah for senior high school, and tinggi for university), occupation (working versus not working), parity (primigravida for first pregnancy versus multigravida for one or more previous pregnancies), and health insurance ownership (yes or no). The second category covered cognitive and attitudinal factors: knowledge about ANC measured with five Likert items (good knowledge defined as a score of ≥75%), attitude toward ANC also measured with five Likert items (positive attitude defined as a score of ≥75%), and decision-making autonomy assessed with five Likert items (independent defined as a score of ≥75%). The third category addressed health system and economic factors: perceived quality of health worker services (five Likert items; satisfied defined as a score of ≥75%), availability of staff and ANC facilities (five Likert items; adequate defined as a score of ≥75%), and affordability of transportation and examination costs (five Likert items; affordable defined as a score of ≥75%). All multi-item scales were adapted from previously validated instruments and modified to suit the local context.

Instrument Validation

The questionnaire was tested for validity and reliability before the main data collection. A pilot test was conducted in January 2026 with 30 pregnant women who had similar characteristics to the study population but were not included in the final sample. Validity was assessed using Pearson product-moment correlation; an item was considered valid if the calculated r-value

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exceeded the critical r-table value of 0.361 (for df = 28 at α = 0.05). All 35 items across the seven scales showed r-values ranging from 0.464 to 0.834, all above the threshold, indicating good validity. Reliability was assessed using Cronbach's alpha coefficient, with a scale considered reliable if α > 0.70. The Cronbach's alpha values ranged from 0.779 to 0.868 across the seven scales, demonstrating high internal consistency.

Data Collection Procedures

Data collection took place from January to March 2026 at the four participating health centers. Trained enumerators approached pregnant women during their scheduled ANC visits or while waiting for services. Each potential participant received a detailed explanation of the study's purpose, procedures, risks, and benefits, after which women who agreed to participate signed an informed consent form. The questionnaire was administered face-to-face in a private area of the health center to ensure confidentiality. Each interview lasted approximately 20–25 minutes. Enumerators read the questions aloud for participants with limited literacy, and responses were recorded directly on paper forms. Completed questionnaires were checked for completeness at the end of each day.

Data Analysis

Data were analyzed using SPSS version 25 (IBM Corp., Armonk, NY, USA) in three stages. Univariate analysis was performed to describe the frequency distribution of all variables, with categorical variables summarized as counts and percentages. Bivariate analysis was conducted using the Chi-square test to examine the association between each independent variable and ANC compliance; Fisher's exact test was applied when any expected cell count was less than five. Statistical significance was set at $p < 0.05$, and the strength of association was reported as odds ratios (OR) with 95% confidence intervals (CI). Multivariate analysis was performed using binary logistic regression with the enter method to identify independent predictors of ANC compliance while controlling for potential confounders. Variables with $p < 0.25$ in the bivariate analysis were entered into the model. The final model was assessed for goodness-of-fit using the Hosmer-Lemeshow test, with $p > 0.05$ indicating acceptable fit. Adjusted odds ratios (AOR) with 95% CI were reported for each predictor.

Ethical Considerations

Ethical approval was obtained from the Research Ethics Committee of the Faculty of Medicine, Universitas Prima Indonesia No.006/KEPK/UNPRI/III/2026. All procedures followed the principles of the Declaration of Helsinki. Before participation, each woman received written and verbal information about the study, including the voluntary nature of participation, the right to withdraw at any time without consequence, and measures taken to protect confidentiality. Written informed consent was obtained from each participant. To ensure anonymity, no personal identifiers were recorded on the questionnaires; instead, each participant was assigned a unique code number. All data were stored in locked cabinets and password-protected computer files accessible only to the research team. Results are reported in aggregate form only, with no individual identification possible.

Results

Participant Characteristics

A total of 153 pregnant women in their second or third trimester participated in the study, representing all eligible women registered at the four health centers in Kualuh Hulu District (response rate 100%). As shown in Table 1, the majority of participants (88.9%) were in the low-risk age range of 20 to 35 years, while only 11.1% were classified as high-risk (younger than 20 or older than 35 years). Regarding education, more than half of the women had completed senior

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high school (63.4%), followed by elementary or junior high school (19.6%) and university education (17.0%). Most participants were housewives (60.1%), with the remaining 39.9% engaged in paid employment. In terms of parity, multigravida women (those with at least one previous childbirth) constituted 65.4% of the sample, while primigravida women accounted for 34.6%. Nearly all participants (98.0%) possessed health insurance, predominantly through the national BPJS Kesehatan scheme.

Table 1. Sociodemographic characteristics of participants

Characteristic	Category	n	%
Age	High-risk (<20 or >35 years)	17	11.1
	Low-risk (20–35 years)	136	88.9
Education	Elementary or junior high school	30	19.6
	Senior high school	97	63.4
	University	26	17.0
Occupation	Not working (housewife)	92	60.1
	Working	61	39.9
Parity	Primigravida (first pregnancy)	53	34.6
	Multigravida (≥1 previous birth)	100	65.4
Health insurance	Yes	150	98.0
	No	3	2.0

Distribution of Determinant Factors and ANC Compliance

Table 2 presents the distribution of the eleven independent variables and the dependent variable. For the cognitive and attitudinal factors, the majority of women demonstrated good knowledge about ANC (67.3%), positive attitudes toward ANC (66.7%), and independent decision-making autonomy (67.3%). Regarding health system and economic factors, most participants reported satisfaction with service quality (83.0%), perceived the availability of staff and facilities as adequate (83.7%), and considered transportation and examination costs affordable (86.3%). Despite these favorable conditions, high ANC compliance was observed in only 65.4% of participants (100 women), while 34.6% (53 women) exhibited low compliance. This gap indicates that even when individual and system-level factors appear supportive, a substantial proportion of women still fail to adhere to the recommended ANC schedule.

Table 2. Distribution of determinant factors and ANC compliance

Variables	n	%
Knowledge		
Good	103	67.3
Poor	50	32.7
Attitude		
Positive	102	66.7
Negative	51	33.3
Decision-making autonomy		
Independent	103	67.3
Dependent	50	32.7
Service quality		
Satisfied	127	83.0
Not satisfied	26	17.0
Staff and facility availability		

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Adequate	128	83.7
Inadequate	25	16.3
Transport and examination costs		
Affordable	132	86.3
Not affordable	21	13.7
ANC compliance		
High	100	65.4
Low	53	34.6

Bivariate Associations with ANC Compliance

Chi-square tests were conducted to examine the relationship between each independent variable and ANC compliance (Table 3). Six factors showed statistically significant associations. Knowledge was strongly associated with compliance ($\chi^2 = 14.97$, $p < 0.001$); women with good knowledge had a compliance rate of 75.7% compared to only 44.0% among those with poor knowledge, yielding an odds ratio of 4.97 (95% CI: 1.94–8.14). Attitude showed the strongest unadjusted effect ($\chi^2 = 30.54$, $p < 0.001$), with 80.4% of women holding positive attitudes being compliant versus 35.3% of those with negative attitudes (OR = 7.52, 95% CI: 3.54–15.98). Decision-making autonomy was also highly significant ($\chi^2 = 24.56$, $p < 0.001$); independent women had a compliance rate of 78.6% compared to 38.0% among dependent women (OR = 6.01, 95% CI: 2.87–12.60). Regarding health system factors, perceived service quality was associated with compliance ($\chi^2 = 10.01$, $p = 0.002$), with satisfied women showing 70.9% compliance versus 38.5% among dissatisfied women (OR = 3.89, 95% CI: 1.62–9.36). Availability of staff and facilities also showed a significant association ($\chi^2 = 6.02$, $p = 0.014$); women who perceived facilities as adequate had a compliance rate of 69.5% compared to 44.0% among those who perceived them as inadequate (OR = 2.90, 95% CI: 1.21–6.97). Finally, affordability of transport and examination costs was significantly associated with compliance (p = 0.006, Fisher's exact test); women who found costs affordable had 68.2% compliance versus 47.6% among those who did not (OR = 2.36, 95% CI: 0.93–5.98).

In contrast, none of the sociodemographic variables ;age (p = 0.548), education (p = 0.302), occupation (p = 1.000), parity (p = 0.098), or health insurance ownership (p = 0.275)—showed statistically significant associations with ANC compliance. This suggests that in this relatively homogeneous population, individual cognitive and attitudinal factors are more influential than basic demographic characteristics.

Table 3. Bivariate associations between independent variables and ANC compliance

Variables	%	OR (95% CI)	p-value
Knowledge			
Good	75.7	4.97 (1.94–8.14)	<0.001
Poor	44.0		
Attitude			
Positive	80.4	7.52 (3.54–15.98)	<0.001
Negative	35.3		
Decision-making autonomy			
Independent	78.6	6.01 (2.87–12.60)	<0.001
Dependent	38.0		
Service quality			

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Satisfied	70.9	3.89 (1.62–9.36)	0.002
Not satisfied	38.5		
Staff and facility availability			
Adequate	69.5	2.90 (1.21–6.97)	0.014
Inadequate	44.0		
Transport and exam costs			
Affordable	68.2	2.36 (0.93–5.98)	0.006
Not affordable	47.6		

Multivariate Analysis of Independent Determinants

All six variables that showed p < 0.25 in the bivariate analysis (knowledge, attitude, autonomy, service quality, staff and facility availability, and transport costs) were entered into a binary logistic regression model using the enter method. The Hosmer-Lemeshow goodness-of-fit test yielded a p-value of 0.782, indicating that the model fitted the data well (i.e., no significant difference between observed and predicted values). As presented in Table 4, after controlling for all other variables, only three factors remained statistically significant independent predictors of ANC compliance: knowledge, attitude, and decision-making autonomy. Knowledge was the strongest predictor; women with good knowledge had 5.25 times higher odds of high compliance compared to those with poor knowledge (AOR = 5.25; 95% CI: 2.17–12.68; p < 0.001). Decision-making autonomy was the second strongest; women who made independent decisions had 4.57 times higher odds of compliance than those who were dependent (AOR = 4.57; 95% CI: 1.87–11.16; p = 0.001). Attitude also remained a significant independent predictor; women with positive attitudes had 4.38 times higher odds of compliance compared to those with negative attitudes (AOR = 4.38; 95% CI: 1.72–11.12; p = 0.002). In contrast, service quality (p = 0.693), staff and facility availability (p = 0.609), and transport and examination costs (p = 0.792) lost their statistical significance after adjustment. This indicates that the associations observed for these health system and economic factors in the bivariate analysis were largely mediated by the cognitive and attitudinal factors. In other words, the effect of service quality, facility availability, and costs on ANC compliance operates primarily through shaping women's knowledge, attitudes, and sense of autonomy.

Table 4. Multivariate logistic regression model for ANC compliance

Variable	B	Wald	p-value	B(exp)
Knowledge (good vs. poor)	1.658	13.57	<0.001	5.25
Attitude (positive vs. negative)	1.477	9.64	0.002	4.38
Decision-making autonomy (independent vs. dependent)	1.519	11.10	0.001	4.57
Service quality (satisfied vs. not)	0.237	0.16	0.693	1.27
Staff and facility availability (adequate vs. inadequate)	0.309	0.26	0.609	1.36
Transport and exam costs (affordable vs. not)	0.172	0.07	0.792	1.19
Constant	-7.928	31.58	<0.001	0.00

Discussion

Characteristics of Respondents and Prevalence of ANC Compliance

This study involved 153 pregnant women in their second and third trimesters in Kualuh Hulu District. The sociodemographic characteristics showed that most respondents were in the ideal reproductive age range (20–35 years), had secondary

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education, and were housewives. Although clinically ideal age is associated with lower obstetric risk, ANC compliance was not automatically higher in this group, as will be discussed in the bivariate analysis. The prevalence of high ANC compliance in this study reached 65.4%, which is fairly high but still leaves 34.6% of women with low compliance. This figure of 65.4% is consistent with findings in several low- and middle-income countries. An analysis of DHS data from 28 countries showed that the average coverage of at least four ANC visits ranged from 40% to 70% (Islam et al., 2022). The rate in Kualuh Hulu, at around 65%, indicates that although services are available, gaps remain that need to be addressed. Interestingly, although almost all respondents (98.1%) had health insurance, compliance did not reach 100%. This indicates that financial access is not the only determinant; non-financial factors such as knowledge, attitude, and autonomy are more decisive. Another notable characteristic is the proportion of multigravida women reaching 65.4%. Women with previous pregnancy experience tend to have different risk perceptions. A study found that a history of previous obstetric complications was a strong predictor of good pregnancy risk perception (AOR = 3.44; 95% CI: 1.73–6.83) (Alemu et al., 2022). However, in this study, parity was not significantly associated with compliance. A possible explanation is that previous pregnancy experience can provide excessive self-confidence, thereby reducing concern, or conversely, can create anxiety that drives compliance. Both mechanisms may cancel each other out in this population.

Factors Associated with ANC Compliance

Bivariate analysis showed that six factors had significant associations with ANC compliance: knowledge, attitude, decision-making autonomy, service quality, availability of staff and facilities, and transportation and examination costs. Meanwhile, age, education, occupation, parity, and health insurance ownership did not show significant associations.

Knowledge and Attitude as Foundations of Health Behavior

Knowledge and attitude are very strong predisposing factors in shaping compliance behavior. Women with good knowledge had nearly five times the odds of compliance, while a positive attitude increased the odds by more than seven times. This finding confirms the postulate in the Health Belief Model that perceived benefits and perceived barriers are strongly influenced by an individual's level of knowledge and attitude toward a health behavior. Good knowledge enables women to understand that ANC is not merely a routine but a tool for early detection of complications that can save the lives of mothers and babies (Islam et al., 2022). A systematic review found that knowledge of pregnancy danger signs is a significant predictor of comprehensive ANC service utilization. Knowledge also plays a role in shaping realistic expectations of health services, enabling women to better assess the quality of services received (Gebrekirstos et al., 2025). A positive attitude reflects an affective evaluation that supports ANC behavior. Women with positive attitudes not only know the benefits of ANC but also feel that ANC is part of their responsibility as pregnant women (Firdawsyi Nuzula et al., 2022). Within the Theory of Planned Behavior framework, attitude is a direct determinant of behavioral intention, which in turn predicts actual behavior (Ismail et al.,

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2024). This finding strengthens the need for an approach that is not only informative but also affective in health education.

Decision-Making Autonomy

Decision-making autonomy emerged as the factor with the second largest strength of association (OR = 6.007). Women who had independence in deciding to attend ANC had six times greater odds of compliance compared to those who depended on others. This finding is highly relevant to the issue of women's empowerment in reproductive health. A meta-ethnography identified autonomy, dignity, and agency as central themes in health service seeking by pregnant women from underserved groups (Dasgupta et al., 2025). That study emphasized that women's ability to make decisions respected by service providers and family members is a crucial component of ANC utilization. In the Kualuh Hulu context, 32.7% of women still depend on others, reflecting an imbalance of power relations within the household that can hinder access. Decision-making autonomy is also related to the concept of "joint negotiation" in the Candidacy Framework. Dasgupta et al. (2025) explained that maternal health service utilization is not an individual decision alone but the result of negotiation between the mother, family, and service providers. Therefore, interventions that target only the individual mother without involving the family have limitations in changing decision-making dynamics.

Service and Accessibility Factors as Enabling Factors

Service quality, availability of facilities, and transportation costs were also significantly associated with compliance in the bivariate analysis. Women satisfied with service quality had 3.9 times greater odds of compliance, while those who rated facilities as complete had 2.9 times greater odds. Transportation cost factors provided 2.4 times greater odds. This finding aligns with research that found that positive provider-patient interaction is associated with more comprehensive ANC utilization (RR = 1.22; 95% CI: 1.03–1.41) (Gebrekirstos et al., 2025). Service quality includes dimensions of responsiveness, empathy, and technical competence of health workers. When women feel heard, respected, and receive adequate explanations, they tend to be motivated to return and complete the series of visits. Transportation costs remain a concern even though almost all respondents have health insurance. This shows that although examination costs are covered, indirect costs such as transportation, time lost, and opportunity costs remain real barriers, especially for women living in areas with limited transport access.

Factors Not Significantly Associated

Interestingly, factors such as age, education, occupation, parity, and health insurance ownership did not show significant associations with ANC compliance. This finding differs from several previous studies that found associations between these sociodemographic factors and ANC utilization. An analysis of DHS data in Indonesia found that sociodemographic factors such as education and employment status play a role in ANC utilization (Kartika et al., 2024). However, this study actually shows that in a population with relatively homogeneous characteristics (mostly of productive age, secondary education, and almost all having insurance), internal factors such as knowledge and attitude become more determinant. In other words, when structural

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E-ISSN 2715-6249
DOI: https://doi.org/10.54832/phj.v8i1.1473

barriers such as cost and access are relatively overcome, individual factors become the main differentiator. The lack of association between insurance ownership and compliance (p = 0.275) is also interesting. Although only three respondents did not have insurance, statistically there was insufficient evidence to state a difference. However, other studies have shown that insurance ownership increases ANC utilization. A study found that education, parity, and age are associated with K1 visits (Wulandari et al., 2024). This difference may be due to different population characteristics (urban vs. rural) and different analytical methods.

4.3 Main Determinants of ANC Compliance

The multivariate analysis results in this study show that only three factors were independently associated with ANC compliance after controlling for confounding variables: knowledge (AOR = 5.248; p < 0.001), decision-making autonomy (AOR = 4.566; p = 0.001), and attitude (AOR = 4.378; p = 0.002). Knowledge was the factor with the greatest influence, where pregnant women with good knowledge about ANC had up to 5.2 times greater odds of compliance compared to those with poor knowledge. Decision-making autonomy was also very strong: women who were independent in deciding about pregnancy check-ups had 4.6 times greater odds of compliance than those who depended on others. Meanwhile, a positive attitude provided 4.4 times greater odds of compliance compared to a negative attitude. Interestingly, service quality, availability of facilities, and transportation costs, which were previously significant in the bivariate analysis, lost their significance when entered into the model together with the three internal factors. This indicates that the unique contribution of service and cost aspects does not stand alone but is strongly influenced by the level of knowledge, attitude, and autonomy of the mother.

This finding is consistent with various previous studies at both national and international levels. A systematic review by Islam et al. (2022) analyzing data from 28 low- and middle-income countries concluded that maternal knowledge is the strongest predictor of comprehensive ANC utilization, with pooled odds ratios ranging from 3.5 to 6.2. In Indonesia, Ismail et al. (2024) in Depok found a significant relationship between knowledge and ANC compliance (OR = 4.2; 95% CI: 1.9–8.7), which is almost identical to the finding in Kualuh Hulu (Islam et al., 2022; Ismail et al., 2024). However, research by Arisanti et al. (2024) in West Java reported no significant relationship between knowledge and compliance (p = 0.176). This difference is possibly due to high homogeneity of respondents in terms of information access or the dominance of other factors such as husband's support being more determinant. Regarding decision-making autonomy, a meta-ethnography by Dasgupta et al. (2025) identified autonomy, dignity, and agency as central themes in health service seeking by pregnant women from underserved groups. That study emphasized that women who lack control over reproductive health decisions tend to access ANC later and incompletely. At the regional level in North Sumatra, a study by Rajagukguk (2020) also found that women with high autonomy had 3.2 times greater ANC compliance. As for attitude, this result is consistent with the Theory of Planned Behavior, which has been widely tested in maternal health

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contexts. For example, research by Fauziah et al. (2023) reported that positive attitudes toward ANC significantly increased intention and visit behavior (Fauziah et al., 2023) (Dasgupta et al., 2025) (Rajagukguk, 2020).

The results of this study strengthen two main theoretical frameworks in health behavior. First, the Health Belief Model (HBM) developed by Becker and Rosenstock states that preventive behaviors such as ANC visits are influenced by perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. Good knowledge enables pregnant women to have high perceived benefits of ANC because they understand that routine check-ups can detect complications early such as preeclampsia, anemia, or abnormal fetal lie. Second, the Theory of Planned Behavior emphasizes the role of attitude, subjective norms, and perceived behavioral control. The findings that attitude and autonomy (which reflects perceived behavioral control) are strong predictors provide empirical support for this framework in the context of maternal health in rural Indonesia.

Conclusion

This study found that the majority of pregnant women in Kualuh Hulu District had good knowledge, positive attitudes, and independent decision-making regarding ANC, yet high compliance was achieved by only 65.4% of participants. Bivariate analysis identified six significant factors: knowledge, attitude, autonomy, service quality, staff and facility availability, and transport costs. However, multivariate analysis confirmed that only knowledge (AOR = 5.25), attitude (AOR = 4.38), and decision-making autonomy (AOR = 4.57) were independent determinants of ANC compliance. Health system and economic factors lost significance after adjustment, indicating their influence is mediated by internal cognitive factors. Therefore, interventions to improve ANC compliance should prioritize continuous health education, positive attitude formation through respectful care, and empowerment of women in household decision-making, complemented by improvements in service quality and cost affordability as enabling factors.

Acknowledgments

The author expresses sincere gratitude to the supervisory committee for their invaluable guidance and support throughout this research. Thanks are also extended to the Faculty of Medicine and Dentistry, Universitas Prima Indonesia, for providing the necessary facilities and resources. The author is deeply grateful to the head of the District Health Office of North Labuhanbatu Regency and the four health centers (Puskesmas Aek Kanopan, Londut, Sonomartani, and Sukarame) for granting permission and facilitating data collection. Special appreciation goes to all pregnant women who voluntarily participated in this study. Finally, the author wishes to thank her family for their unwavering encouragement and support.

References

Amponsah-Tabi, S., Dassah, E. T., Asubonteng, G. O., Ankobea, F., Annan, J. J. K., Senu, E., Opoku, S., Opoku, E., & Opare-Addo, H. S. (2022). An assessment of the quality of antenatal care and pregnancy outcomes in a tertiary hospital in Ghana. *PLOS ONE*, *17*(10), e0275933. https://doi.org/10.1371/journal.pone.0275933

Arikunto. (2019). *Prosedur Penelitian Suatu Pendekatan Praktik*. PT. Rineka Cipta Althof.

Arisanti, A. Z., Susilowati, E., & Husniyah, I. (2024). Hubungan Pengetahuan dan Sikap tentang

Antenatal Care (ANC) dengan Kunjungan ANC. *Faletehan Health Journal*, *11*(01), 90–96. https://doi.org/10.33746/fhj.v11i01.621

Article, O., Fatima, S., Zakar, R., Wali, U. F., Ilyas, A., Khalid, J., & Khan, A. (2025). *The Healer Journal of Physiotherapy and Rehabilitation Sciences*. *5*(1). https://doi.org/10.55735/hjprs.v5i1.311

Cholishotin, A. (2024). Pengelolaan Bok Puskesmas Dalam Upaya Peningkatan Cakupan Pelayanan Ibu Hamil K4 Di Puskesmas Bancar Kabupaten Tuban Tahun 2023. *Journal of Innovation Research and Knowledge*, *4*(5), 2569–2584. https://www.bajangjournal.com/index.php/JIRK/article/view/8683

Dasgupta, T., Rayment-Jones, H., Horgan, G., Begum, Y., Peter, M., Silverio, S. A., & Magee, L. A. (2025). Understanding care-seeking of pregnant women from underserved groups: a systematic review and meta-ethnography. *Frontiers in Public Health*, *13*. https://doi.org/10.3389/fpubh.2025.1683740

Estifanos, T. M., Sengal, K. T., Tekleab, E. E., & Mehari, F. A. (2025). Factors associated with late antenatal care booking in selected health facilities of Zoba Maekel , Eritrea : a cross - sectional study. *BMC Pregnancy and Childbirth*, *1*, 1–12. https://doi.org/10.1186/s12884-025-07531-1

Fauziah, A., Hilmi, I. L., & Salman, S. (2023). FAKTOR YANG BERHUBUNGAN DENGAN KEPATUHAN IBU HAMIL DALAM MELAKUKAN KUNJUNGAN ANTENATAL CARE : LITERATUR REVIEW. *Journal of Pharmaceutical and Sciences*, *6*(1), 127–131. https://doi.org/10.36490/journal-jps.com.v6i1.22

Firdawsyi Nuzula, Oktaviana, M. N., & Purwitaningtyas, R. Y. (2022). Membangun Kesadaran dalam Mendukung Keberlangsungan Pemberian ASI Eksklusif Sebagai Upaya untuk Meningkatkan Kualitas Hidup Perempuan. *Society : Jurnal Pengabdian Dan Pemberdayaan Masyarakat*, *2*(2), 89–102. https://doi.org/10.37802/society.v2i2.183

Gebrekirstos, L. G., Gebremedhin, M. H., Berhe, H., & Wube, T. B. (2025). Factors associated with antenatal care service content utilization in selected rural areas of Southern Ethiopia: Assessing the extent of compliance with World Health Organization recommendations—A mixed-methods study. *Women's Health*, *21*. https://doi.org/10.1177/17455057251375220

Ika Primayanti, Ario Danianto, Rizkinov Jumsa, NN Geriputri, & Marie Yuni Andari. (2022). GAMBARAN EPIDEMIOLOGI FAKTOR RISIKO PREEKLAMSIA PADA IBU HAMIL. *Unram Medical Journal*, *11*(1), 785–788. https://doi.org/10.29303/jk.v11i1.4304

Ikhwanudin, I., Nurhayati, N., & Wijayanti, N. P. (2025). Implementasi pendampingan suami terhadap istri yang mengalami kecemasan pada kehamilan trimester III di Klinik Barokah Medika Kemiling Bandar Lampung. *Borobudur Nursing Review*, *5*(1), 83–91. https://doi.org/10.31603/bnur.13861

Islam, M. A., Sathi, N. J., Abdullah, H. M., Naime, J., & Butt, Z. A. (2022). Factors Affecting the Utilization of Antenatal Care Services During Pregnancy in Bangladesh and 28 Other Low- and Middle-income Countries: A Meta-analysis of Demographic and Health Survey Data. *Dr. Sulaiman Al Habib Medical Journal*, *4*(1), 19–31. https://doi.org/10.1007/s44229-022-00001-2

Ismail, M. A., Marindawati, M., Sugiarto, S., & Sunarto, A. (2024). Hubungan Pengetahuan Pemeriksaan Antenatal Ibu Hamil dengan Kepatuhan Kunjungan Pemeriksaan Kehamilan di Puskesmas Cimpaeun Depok. *Muhammadiyah Journal of Midwifery*, *5*(1), 31–39. https://doi.org/10.24853/myjm.5.1.31-39

Kartika, Rukmini, S. D., Haksama, S., Ismuntania, & Rakhman, F. (2024). Determinant factors of antenatal care used by pregnant women in Indonesia: A systematic review. *African Journal of Reproductive Health* , *28*(10), 26–238. https://doi.org/10.29063/ajrh2024/v28i10s.27

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E-ISSN 2715-6249
DOI: https://doi.org/10.54832/phj.v8i1.1473

Kolantung, P. M., Mayulu, N., & Kundre, R. (2021). Hubungan Tingkat Pengetahuan Ibu Hamil Tentang Tanda Bahaya KehKolantung, P.M., Mayulu, N. and Kundre, R. (2021) 'Hubungan Tingkat Pengetahuan Ibu Hamil Tentang Tanda Bahaya Kehamilan Dengan Kepatuhan Melakukan Antenatal Care (Anc) : Systematic Review', J. *Jurnal Keperawatan*, *9*(2), 40.

Qomarasari, D. (2023). *Monograf Kejadian Anemia pada Kehamilan*. Penerbit NEM.

Rajagukguk, M. (2020). Analisis Penatalaksanaan Asuhan Kebidanan Kehamilan Pada Ny.A Dengan Ketuban Pecah Dini Di Puskesmas Pagar Merbau Kabupaten Deli Serdang Tahun 2019. *Ilmiah Kohesi*, *4*(4), 87–96.

Susaningtyas, V., & Lisca, S. M. (2024). Hubungan Kunjungan Anc, Emesis Gravidarum Dan Pola Makan Terhadap Anemia Pada Ibu Hamil Di Wilayah Kerja Puskesmas Majasari Kabupaten Pandeglang Tahun 2022. *Jurnal Ilmiah Bidan*, *8*(1), 1–11. https://doi.org/10.61720/jib.v8i1.384

Wulandari, R. D., Laksono, A. D., Rohmah, N., Matahari, R., & Antonio, C. A. (2024). Factors related to intrapartum/delivery care in Southeast Asia: A cross-sectional study in the Philippines and Indonesia. *Heliyon*, *10*(6), e27718. https://doi.org/10.1016/j.heliyon.2024.e27718