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The Effect of Pregnant Women's Knowledge on Antenatal Care Visit Compliance: a Behavioral Analysis with the Health Belief Model

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ABSTRACT

Adherence to antenatal care (ANC) visits is a crucial indicator of efforts to reduce maternal and neonatal mortality. Various studies have examined demographic factors, but health behavior analyses using the Health Belief Model (HBM) in the context of ANC attendance in primary healthcare is still limited. To analyze the impact of the HBM dimensions (perceived vulnerability, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy) and knowledge of pregnant women on ANC visits using multivariate logistic regression. This is a quantitative analytical study with a cross-sectional design involving 240 pregnant women. The instruments used were the HBM and knowledge questionnaires. Variables that significantly influenced ANC adherence were knowledge (OR = 2.84; 95% CI: 1.62–4.97; $p < 0.001$), perceived benefits (OR = 3.11; $p = 0.002$), and self-efficacy (OR = 2.53; $p = 0.007$). The logistic regression model showed a good fit (Hosmer-Lemeshow $p = 0.34$). Knowledge level and components of the Health Belief Model (HBM) significantly contributed to ANC adherence. Health education and communication interventions grounded in the Health Belief Model (HBM) are strongly recommended.

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INTRODUCTION

Maternal and neonatal mortality remains a global health issue (WHO, 2022). Most maternal deaths are preventable through appropriate health services, including routine and complete antenatal care (ANC) visits (UNICEF, 2021). In Indonesia, although ANC coverage is relatively high, adherence to standard visit schedules still varies across regions (Ministry of Health of the Republic of Indonesia, 2024).

Maternal and child health is one of the key indicators in public health development. Efforts to reduce maternal mortality rates continue to be a global and national priority, including in Indonesia. One of the strategies proven effective in reducing pregnancy-related complications is the provision of high-quality antenatal care conducted regularly according to established standards.

Antenatal care is a health service provided to pregnant women periodically to monitor the health of both the mother and fetus during pregnancy. The World Health Organization (WHO) recommends a minimum of eight ANC visits throughout pregnancy to enable early

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detection of potential complications and to ensure optimal maternal and fetal health. Nevertheless, the level of adherence among pregnant women to ANC visits remains a challenge in various regions, particularly in areas with limited access and low knowledge.

One critical factor influencing pregnant women's adherence to ANC visits is knowledge. Adequate knowledge regarding the benefits of ANC, pregnancy risks, and warning signs can encourage pregnant women to be more aware and compliant with routine check-ups. Conversely, insufficient knowledge may lead to low awareness, causing women to neglect the importance of ANC visits.

In understanding health behaviors, a theoretical approach is essential. One widely used framework is the Health Belief Model (HBM), which explains that an individual's behavior is influenced by perceptions of susceptibility, severity, benefits, barriers, and cues to action. In the context of pregnancy, a woman's knowledge can shape these perceptions, thereby affecting her decision to attend ANC visits regularly.

Previous studies have found that demographic characteristics such as age, education, and distance to health facilities influence ANC adherence (Afulani et al., 2020; Nwankwo et al., 2022). However, research on health behaviors using the HBM, which includes perceptions of risk, benefits, barriers, and self-efficacy, remains limited.

Based on the discussion above, this study is important to analyze the influence of pregnant women's knowledge on adherence to antenatal care visits using a behavior-based approach through the Health Belief Model. The findings are expected to provide a foundation for developing more effective intervention strategies to improve ANC adherence, ultimately contributing to enhanced maternal and child health outcomes.

LITERATURE REVIEW

ANC Visit Adherence refers to the behavior of pregnant women in attending prenatal check-ups according to the schedule recommended by healthcare providers. Adherence is influenced by various internal and external factors. A 2024 study indicated that the level of non-adherence to ANC visits remains relatively high, with more than half of respondents not attending visits regularly. Contributing factors include limited knowledge, economic barriers, and restricted access to healthcare services.

The Health Belief Model (HBM) is a theoretical framework that explains why individuals engage in certain health behaviors, based on six perception dimensions:

1. Perceived Susceptibility (to the risk of complications)
2. Perceived Severity (seriousness of the impact)
3. Perceived Benefits (benefits of ANC)
4. Perceived Barriers (obstacles in accessing services)
5. Cues to Action (triggers for behavior)
6. Self-Efficacy (confidence in ability to attend visits)
   (Hochbaum, 1958; Rosenstock, 1974)

The HBM has been proven relevant in preventive behaviors and health service utilization (Janz & Becker, 1984; Carpenter, 2010). However, in the context of ANC in Indonesia, its application remains limited.

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Knowledge is the result of sensing and understanding information, which subsequently influences behavior in health-related decision-making. In the context of pregnancy, maternal knowledge of ANC includes understanding the benefits, visit schedules, warning signs during pregnancy, and the importance of early detection of complications.

2025 Study Findings

A study conducted in 2025 showed a significant association between the level of knowledge of pregnant women and the completeness of ANC visits ($p = 0.012$). Pregnant women with good knowledge were more likely to adhere to ANC visits compared to those with lower knowledge.

Previous Studies

1. Afulani et al. (2020) found that maternal health knowledge was associated with ANC utilization.
2. Tessema et al. (2021) reported that logistical barriers, such as cost and distance, significantly affected ANC adherence.
3. Nwankwo et al. (2022) highlighted the role of self-efficacy in health service-seeking behavior.
4. Rosdiana et al. (2025) emphasized that the Health Belief Model (HBM) is effective in understanding pregnant women's behavior in free nutritious food programs.

Research Method

This study employed an analytical quantitative approach with a cross-sectional design. The research was conducted in the working area of Puskesmas Matiti, Doloksanggul District, in 2025, with a sample of 240 pregnant women selected using purposive sampling based on the following inclusion criteria: 1) pregnancy of at least 12 weeks, 2) ability to read and understand the questionnaire, and 3) agreement to provide informed consent. The sample size was calculated using G*Power (power 80%, $\alpha = 0.05$, OR 2.0).

Instrument

The questionnaire consisted of:

1. Respondent characteristics
2. Knowledge scale (20 items, score range 0–20)
3. Health Belief Model (HBM) scale (Likert scale 1–5 for each dimension)

Validity was tested using item-total correlation, and reliability was assessed using Cronbach's alpha with a value greater than 0.80.

RESEARCH RESULTS

Table 1.1. Respondent Characteristics

Variable	n	%
Age 20–35 years	168	70%
Education ≥ Senior High School	156	65%
Multiparous	144	60%
Access to facilities ≤ 30 minutes	192	80%

Based on Table 1.1 "Respondent Characteristics (n = 240)", it can be observed that the majority of respondents were aged 20–35 years, totaling 168 individuals (70%). This

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indicates that most respondents were in the active reproductive age group, which generally has higher needs for and utilization of health services, particularly related to maternal and child health.

In terms of education, 156 respondents (65%) had at least a senior high school level of education. This relatively high educational level may influence respondents' ability to receive information, understand the importance of health services, and make more rational health-related decisions.

Based on parity, 144 respondents (60%) were multiparous (had given birth more than once). This suggests that most respondents had prior experience with pregnancy and childbirth, which may influence their knowledge, attitudes, and behaviors regarding the utilization of health facilities. Additionally, the majority of respondents (192 individuals or 80%) had access to health facilities within ≤ 30 minutes of travel time. This indicates that overall accessibility to health services is relatively good, which may contribute to increased utilization of these services.

Table 1.2. Distribution of Knowledge and Health Belief Model (HBM)

Variable	High Score	Low Score
Knowledge	144 (60%)	96 (40%)
Perceived Benefits	156 (65%)	84 (35%)
Self-Efficacy	132 (55%)	108 (45%)

Based on the table above, the distribution of Knowledge and HBM illustrates the distribution of respondents according to high and low score categories across three variables: knowledge, perceived benefits, and self-efficacy. For the knowledge variable, the majority of respondents fall into the high-score category, with 144 individuals (60%), while 96 respondents (40%) are in the low-score category. This indicates that most respondents have a relatively good level of knowledge.

For perceived benefits, respondents with high scores are more dominant, totaling 156 individuals (65%), compared to 84 respondents (35%) with low scores. This suggests that most respondents have a positive perception of the benefits being studied.

Meanwhile, for self-efficacy, 132 respondents (55%) are in the high-score category and 108 respondents (45%) are in the low-score category. Although still dominated by the high category, the difference is not as large as in the other variables, indicating that respondents' confidence in performing a particular behavior remains relatively varied. Overall, all three variables tend to be dominated by the high-score category, indicating that respondents generally have good knowledge, positive perceived benefits, and relatively high self-efficacy.

Table 1.3. ANC Adherence

Category	n	%
Adherent	168	70%
Non-adherent	72	30%

Based on the table above, ANC adherence shows that the majority of respondents were categorized as adherent, with 168 individuals (70%). Meanwhile, 72 respondents (30%) were classified as non-adherent. This indicates that most respondents complied with ANC visits, although approximately one-third were still non-adherent.

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The Logistic Regression Analysis table presents the relationship between variables and the outcome under study. The knowledge variable has an OR of 2.84 with a 95% CI of 1.62–4.97 and a p-value of <0.001. This indicates that knowledge has a statistically significant effect, where respondents with higher knowledge are approximately 2.8 times more likely to experience the outcome compared to those with lower knowledge. Meanwhile, perceived susceptibility has an OR of 1.51 with a 95% CI of 0.89–2.56 and a p-value of 0.12. Since the p-value is greater than 0.05 and the confidence interval includes 1, this variable does not show a statistically significant association.

Table 1.4. Logistic Regression Analysis

Variable	OR	95% CI	p-value
Knowledge	2.84	1.62–4.97	<0.001
Perceived Susceptibility	1.51	0.89–2.56	0.12
Perceived Severity	1.32	0.78–2.24	0.28
Perceived Benefits	3.11	1.52–6.35	0.002
Perceived Barriers	0.62	0.38–0.98	0.04
Self-Efficacy	2.53	1.28–4.99	0.007

Model Fit Hosmer–Lemeshow test: $p = 0.34$

indicating that the model fits the data well. The table presents the results of the analysis (likely logistic regression) examining factors influencing an outcome, reported as Odds Ratios (OR), 95% Confidence Intervals (CI), and *p*-values. The findings are as follows: Perceived Severity: OR = 1.32; $p = 0.28$ → not statistically significant, indicating no meaningful effect on the outcome. Perceived Benefits: OR = 3.11; $p = 0.002$ → statistically significant; higher perceived benefits increase the likelihood of the outcome by approximately 3.1 times. Perceived Barriers: OR = 0.62; $p = 0.04$ → statistically significant; higher perceived barriers decrease the likelihood of the outcome (approximately 38% lower). Self-Efficacy: OR = 2.53; $p = 0.007$ → statistically significant; higher self-efficacy increases the likelihood of the outcome by approximately 2.5 times.

Discussion

The results of this study indicate that knowledge and several dimensions of the Health Belief Model (HBM) perceived benefits, perceived barriers, and self-efficacy play a significant role in determining adherence to antenatal care (ANC) visits.

Knowledge

Mothers with higher levels of knowledge tend to have stronger perceptions of benefits and are better able to overcome barriers to attending ANC visits (Afulani et al., 2020; Nwankwo et al., 2022).

Perceived Benefits

This dimension shows that mothers who recognize the benefits of ANC are more likely to be adherent (OR = 3.11), consistent with Simkhada et al. (2019), who found that perceived benefits are a strong predictor of maternal health service utilization.

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Perceived Barriers & Self-Efficacy

Barriers such as cost, transportation, and time negatively affect ANC adherence, while self-efficacy has a positive influence. This is consistent with the literature indicating that self-confidence is a key factor in overcoming barriers to health behaviors (Janz & Becker, 1984). HBM-based education for pregnant women that emphasizes the benefits of ANC, strategies to overcome barriers, and the enhancement of self-efficacy is recommended for public health programs.

CONCLUSION

The knowledge possessed by pregnant women, along with the dimensions of the Health Belief Model (HBM) perceived benefits, perceived barriers, and self-efficacy are significant predictors of adherence to antenatal care (ANC) visits. Therefore, enhancing education and implementing theory-based health behavior interventions are necessary.

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