



Factors Associated with K4 Antenatal Care Coverage at Wanggarasi Primary Health Center

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Abstrak. Background : Completion of at least four antenatal care visits (K4) is an important indicator of maternal health service performance, contributing to the early detection of pregnancy complications and the reduction of maternal and neonatal morbidity and mortality. Despite continuous improvements in antenatal care programs, K4 coverage remains suboptimal in several regions. Multiple factors are believed to influence pregnant women's adherence to the recommended antenatal visit schedule. Methods : A quantitative cross-sectional analytical study was conducted involving 60 pregnant women selected through proportional random sampling. Primary data were collected using a structured questionnaire, while K4 status was verified through Maternal and Child Health (MCH) books and medical records. Data were analyzed using descriptive statistics, Chi-square tests, and binary logistic regression, with statistical significance set at $p < 0.05$. Results : Of the participants, 70.0% completed the recommended K4 visits. Bivariate analysis revealed significant associations between K4 coverage and maternal knowledge ($p=0.001$), education ($p=0.028$), husband's support ($p<0.001$), access to health services ($p=0.011$), and quality of antenatal care ($p=0.003$). Multivariate analysis identified husband's support as the strongest predictor of K4 completion (OR=6.73; 95% CI=2.11–21.44; $p=0.001$). Conclusion : K4 coverage is influenced by the interaction of maternal characteristics, family support, and health service quality. Strengthening maternal health education, promoting husband involvement, and improving access to and quality of antenatal services are essential strategies for increasing K4 compliance. These findings provide evidence that may assist primary healthcare providers and policymakers in developing more effective maternal health interventions.

Keywords: Antenatal Care; Health Services; Husband's Support; K4 Coverage; Pregnant Women.

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1. INTRODUCTION

Antenatal care is one of the key components in efforts to improve maternal and neonatal health. An important indicator of antenatal service utilization is the coverage of at least four antenatal visits (K4), which reflects the level of compliance of pregnant women in obtaining continuous healthcare services throughout pregnancy. K4 visits enable healthcare providers to perform early detection of risk factors, provide health education, monitor fetal growth, and prevent pregnancy-related complications. Therefore, improving K4 coverage is considered a strategic indicator within Indonesia's maternal health program (World Health Organization [WHO], 2023; Ministry of Health of the Republic of Indonesia, 2023).

Although antenatal care coverage in Indonesia has shown an increasing trend, the achievement of the K4 indicator remains uneven across regions. Several areas continue to face challenges related to the low compliance of pregnant women in completing all recommended antenatal visits according to national standards. This condition may lead to delays in detecting pregnancy complications, thereby increasing the risk of maternal and neonatal morbidity and mortality. Consequently, identifying the factors that influence K4 coverage is an important step toward improving the effectiveness of maternal healthcare services (Ministry of Health of the Republic of Indonesia, 2023).

Previous studies have shown that K4 coverage is influenced by multidimensional factors, including individual characteristics, socioeconomic conditions, family support, access to healthcare facilities, quality of healthcare services, and maternal knowledge regarding the importance of antenatal examinations. In addition, educational level, occupation, maternal age, parity, family income, and health insurance ownership have also been reported to be associated

with maternal compliance in completing antenatal visits. These factors interact with one another and influence health-seeking behavior during pregnancy (WHO, 2023; United Nations Children's Fund, 2023).

Maternal knowledge regarding the benefits of antenatal care is one of the determinants most frequently associated with K4 coverage. Women who understand the objectives, benefits, and schedule of antenatal visits tend to have higher motivation to utilize healthcare services. Conversely, limited information may reduce awareness of the importance of antenatal care, resulting in incomplete antenatal visits. Therefore, health education constitutes an essential component in improving pregnant women's adherence to antenatal care services (Notoatmodjo, 2018; Ministry of Health of the Republic of Indonesia, 2023).

In addition to individual factors, husband and family support plays a major role in determining the completion of K4 visits. Such support may include emotional encouragement, accompaniment during antenatal examinations, assistance with transportation costs, and participation in decision-making regarding healthcare utilization. Several studies have reported that pregnant women who receive adequate family support are more likely to attend antenatal care regularly compared with those who receive insufficient support. This finding indicates that the success of maternal health programs depends not only on the individual but also on the surrounding social environment (Friedman, Bowden, & Jones, 2014).

The availability and accessibility of healthcare services are also important determinants of K4 coverage. Distance to health facilities, geographical conditions, transportation availability, travel time, and the quality of healthcare services may influence a pregnant woman's decision to attend antenatal care. Accessible, respectful, and high-quality services can increase patient satisfaction and encourage women to complete the recommended schedule of antenatal examinations. In contrast, barriers to access are often associated with low K4 coverage, particularly in rural areas or regions with difficult geographical conditions (WHO, 2023).

Previous studies generally examined the relationship between one or two factors—such as knowledge, education, or access to services—and K4 coverage. However, most of these studies were conducted in urban settings or districts with different socioeconomic characteristics. To date, information regarding the factors influencing K4 coverage in the working area of Wanggarasi Primary Health Center remains very limited. This situation indicates the existence of a research gap that needs to be addressed in order to obtain evidence that reflects the characteristics of the local community.

The novelty of this study lies in the comprehensive analysis of multiple factors, including maternal characteristics, level of knowledge, family support, access to healthcare services, and the quality of antenatal care, within a single analytical model of K4 coverage in the Wanggarasi Primary Health Center working area. This approach is expected to provide a more comprehensive understanding of the determinants of K4 visits and to serve as a basis for developing more targeted intervention strategies that are appropriate to local conditions.

This study has high urgency because improving K4 coverage is one of the important indicators for achieving maternal health development targets and reducing maternal and neonatal mortality. Identifying the factors associated with K4 coverage will help healthcare providers and policymakers design educational programs, strengthen antenatal care services, increase family involvement, and improve access to healthcare services. Therefore, the findings are expected to contribute meaningfully to improving the quality of maternal healthcare services at the primary healthcare level.

Based on the foregoing, this study aims to analyze the factors influencing the coverage of K4 antenatal visits among pregnant women in the working area of Wanggarasi Primary Health Center. The findings are expected to provide scientific evidence regarding the determinants of K4 coverage, offer evidence-based recommendations for healthcare providers to improve adherence to antenatal visits, and serve as a consideration for local governments in developing more effective, sustainable, and community-oriented maternal health policies and programs.

2. LITERATURE REVIEW

Antenatal Care (ANC) refers to a series of healthcare services provided to pregnant women throughout pregnancy to monitor maternal and fetal health, facilitate the early

detection of risk factors, deliver health education, and prepare women for safe childbirth. One of the key indicators of antenatal care quality in Indonesia is K4 coverage, defined as the proportion of pregnant women who receive at least four antenatal care visits in accordance with the national minimum service standards. K4 coverage reflects the effectiveness of maternal healthcare services because it indicates the continuity of pregnancy monitoring until the later stages of gestation. Completion of the recommended antenatal visits enables healthcare providers to perform early detection of pregnancy complications, administer immunizations, provide iron supplementation, deliver nutritional counseling, and arrange timely referrals when risk factors are identified (World Health Organization, 2023).

This study is based on the Behavioral Model of Health Services Use developed by Ronald M. Andersen. This model explains that healthcare utilization is influenced by three groups of determinants: predisposing factors (such as age, education, knowledge, occupation, and cultural background), enabling factors (including income, access to healthcare services, availability of health facilities, and health insurance coverage), and need factors (both perceived healthcare needs and needs evaluated by healthcare professionals). In the context of this study, K4 coverage is influenced by the interaction of these determinants, indicating that pregnant women's utilization of antenatal care is shaped not only by individual characteristics but also by their social environment and the healthcare system.

In addition to Andersen's model, this study is also grounded in the Health Belief Model (HBM) developed by Irwin M. Rosenstock. The HBM proposes that health-related behaviors are influenced by individuals' perceptions of susceptibility, perceived severity of illness, perceived benefits of health actions, perceived barriers, cues to action, and self-efficacy. Pregnant women who understand the risks associated with pregnancy complications and recognize the benefits of completing the recommended antenatal care schedule are more likely to attend all recommended K4 visits than those with lower perceptions of risk (Rosenstock, 1974).

Knowledge is recognized as one of the most important determinants of health behavior. According to Soekidjo Notoatmodjo, adequate knowledge regarding the objectives, benefits, schedule, and procedures of antenatal care promotes positive attitudes that encourage consistent health-seeking behavior. In maternal healthcare, pregnant women with a higher level of knowledge concerning pregnancy danger signs and the importance of routine antenatal examinations are more likely to comply with the recommended antenatal visit schedule and successfully achieve K4 coverage (Notoatmodjo, 2018).

In addition to knowledge, family support, particularly support from husbands, plays a significant role in improving adherence to antenatal care visits. Such support may include emotional encouragement, informational assistance, positive reinforcement, and instrumental support, such as providing transportation costs and accompanying women during antenatal visits. According to social support theory, a supportive family environment enhances maternal motivation to utilize healthcare services consistently. Therefore, family involvement is considered an essential component of successful maternal health programs (Friedman, Bowden, & Jones, 2014).

Access to healthcare services is another important determinant of K4 coverage. Accessibility to healthcare facilities, availability of healthcare professionals, travel time, transportation conditions, service costs, and the quality of antenatal care all influence pregnant women's decisions to attend antenatal visits according to the recommended schedule. Accessible, high-quality, and patient-centered healthcare services increase maternal satisfaction and encourage the continuation of antenatal care until delivery (World Health Organization, 2023).

Numerous previous studies have reported that maternal education, knowledge, age, parity, family support, employment status, household income, health insurance ownership, and access to healthcare facilities are associated with K4 coverage. However, the magnitude of these associations varies across regions due to differences in sociocultural characteristics, geographical conditions, and local healthcare systems. Consequently, findings from previous studies cannot be directly generalized to all healthcare settings.

A study conducted by Retno Dewi Prisusanti demonstrated that improving maternal knowledge through health education and strengthening maternal healthcare services significantly enhanced healthcare-seeking behavior during pregnancy. The study emphasized that successful maternal healthcare depends not only on clinical services but also on the quality

of health education, effective communication between healthcare providers and pregnant women, family support, and community participation. These findings support the importance of strengthening promotive and preventive approaches to improve pregnant women's adherence to antenatal care services.

Despite the existing body of evidence, a research gap remains regarding the comprehensive analysis of determinants of K4 coverage within the working area of Wanggarasi Primary Health Center. Most previous studies have examined only one or two determinants independently, providing limited understanding of the combined influence of maternal characteristics, knowledge, family support, healthcare accessibility, and the quality of antenatal care on K4 coverage. This gap highlights the need for research that integrates multiple determinants within a single analytical framework.

Conceptually, this study assumes that the achievement of K4 coverage results from the interaction of individual, social, and healthcare service factors. Adequate maternal knowledge, strong family support, accessible healthcare services, and high-quality antenatal care are expected to increase pregnant women's adherence to the recommended schedule of antenatal visits. Therefore, this study is expected to provide scientific evidence regarding the dominant factors influencing K4 coverage and to serve as a foundation for developing strategies aimed at improving the quality of maternal healthcare services in the working area of Wanggarasi Primary Health Center.

3. RESEARCH METHODS

Methods

This study employed a quantitative approach using an analytical observational design with a cross-sectional method. This design was selected because the study aimed to analyze the relationships between various factors presumed to influence K4 antenatal care coverage among pregnant women in the working area of Wanggarasi Primary Health Center. Both the independent and dependent variables were measured simultaneously, allowing the relationships among variables to be systematically examined based on the participants' conditions at the time of data collection (Creswell & Creswell, 2018; Polit & Beck, 2021).

The study was conducted at Wanggarasi Primary Health Center, Pohuwato Regency, Gorontalo Province, Indonesia, from April to June 2026. The study population consisted of all women who had completed their pregnancies and had documented antenatal care records within the working area of Wanggarasi Primary Health Center during the study period. Participants were selected using proportional random sampling, ensuring that all eligible respondents had an equal probability of being included in the study. A total of 100 respondents were recruited. The sample size was determined using an analytical study sample size calculation based on a 95% confidence level, adequate statistical power, and an anticipated dropout rate.

The inclusion criteria comprised women who possessed a Maternal and Child Health (MCH) Handbook or medical records documenting complete antenatal care histories, resided within the working area of Wanggarasi Primary Health Center, were able to communicate effectively, and voluntarily agreed to participate by providing written informed consent. Respondents with incomplete medical records, communication difficulties, or unwillingness to participate were excluded from the analysis.

The dependent variable (Y) was K4 antenatal care coverage, categorized as achieved or not achieved according to the Indonesian national antenatal care standards. The independent variables (X) included maternal age (X₁), educational level (X₂), occupation (X₃), knowledge of antenatal care (X₄), parity (X₅), husband's support (X₆), access to healthcare facilities (X₇), and the quality of antenatal care services (X₈). These variables were selected based on theoretical frameworks and previous empirical studies demonstrating their associations with antenatal care utilization.

Data were collected using a structured questionnaire consisting of sections on respondents' characteristics, knowledge of antenatal care, husband's support, access to healthcare services, and perceptions of antenatal care quality. Information regarding K4 coverage status was verified through the Maternal and Child Health (MCH) Handbook and medical records maintained at Wanggarasi Primary Health Center. The research instrument

underwent content validity assessment by experts in midwifery, public health, and research methodology. Subsequently, empirical validity testing was conducted among respondents outside the study area, and all questionnaire items met the validity criteria. Reliability testing yielded a Cronbach's alpha coefficient of 0.91, indicating excellent internal consistency and confirming that the instrument was appropriate for data collection.

Data analysis was performed in several stages. Univariate analysis was used to describe respondents' characteristics through frequency distributions, percentages, means, and standard deviations. Associations between each independent variable and K4 coverage were analyzed using the Chi-square test, as most variables were categorical. Variables meeting the criteria in the bivariate analysis were subsequently included in a binary logistic regression model to identify the most influential factors associated with the achievement of K4 coverage after controlling for potential confounding variables. All statistical analyses were performed using a significance level of $\alpha = 0.05$ with statistical software commonly used in health research (Field, 2018).

The conceptual framework of this study assumes that the achievement of K4 antenatal care coverage is influenced by the interaction of individual, social, and healthcare service factors. Maternal characteristics, level of knowledge, husband's support, access to healthcare services, and the quality of antenatal care are hypothesized to influence pregnant women's adherence to completing the recommended antenatal care visits. The relationships among these variables were analyzed to determine the factors that contributed most substantially to the achievement of K4 coverage.

Conceptual Framework of the Study

Independent Variables

X₁ = Maternal Age

X₂ = Educational Level

X₃ = Occupation

X₄ = Knowledge of Antenatal Care

X₅ = Parity

X₆ = Husband's Support

X₇ = Access to Healthcare Services

X₈ = Quality of Antenatal Care Services



Dependent Variable (Y)

K4	Antenatal	Care	Coverage
<i>(Achieved / Not Achieved)</i>			

Conceptual Framework Description: The dependent variable (Y) represents the achievement of K4 antenatal care coverage according to the national antenatal care standards. The independent variables include maternal age (X₁), educational level (X₂), occupation (X₃), knowledge of antenatal care (X₄), parity (X₅), husband's support (X₆), access to healthcare services (X₇), and the quality of antenatal care services (X₈). All independent variables were analyzed to determine their associations and relative contributions to the achievement of K4 coverage using binary logistic regression analysis.

4. RESULTS ANDA DISCUSSION

Data Collection Process

This study was conducted at Wanggarasi Primary Health Center, Pohuwato Regency, Gorontalo Province, Indonesia, between April and June 2026. Prior to data collection, ethical approval was obtained from the Health Research Ethics Committee, research permission was granted by the Pohuwato District Health Office, and institutional approval was obtained from the Head of Wanggarasi Primary Health Center. All participants received a detailed

explanation regarding the objectives, benefits, study procedures, and participants' rights before providing written informed consent.

A total of 60 respondents who met the inclusion criteria were selected using proportional random sampling. Primary data were collected through face-to-face interviews using a structured questionnaire covering respondents' characteristics, level of knowledge, husband's support, access to healthcare services, and perceptions of the quality of antenatal care. Secondary data on K4 antenatal care coverage were obtained through verification of the Maternal and Child Health (MCH) Handbook and medical records at Wanggarasi Primary Health Center. All collected data were checked for completeness (editing), coded, entered into statistical software, and analyzed according to the study objectives.

Respondent Characteristics

Table 1. Respondent Characteristics (n = 60).

Characteristics	Frequency	Percentage (%)
Age		
<20 years	5	8.3
20–35 years	43	71.7
>35 years	12	20.0
Educational Level		
Primary/Junior High School	16	26.7
Senior High School	31	51.7
College/University	13	21.6
Parity		
Primigravida	24	40.0
Multigravida	36	60.0

Source: Research data, 2026.

As presented in Table 1, the majority of respondents were within the healthy reproductive age group (20–35 years), had completed senior high school education, and were multigravida. These characteristics indicate that most respondents belonged to a population with relatively favorable opportunities to utilize antenatal care services.

Distribution of K4 Antenatal Care Coverage

Table 2. Distribution of K4 Antenatal Care Coverage.

K4 Coverage Status	Frequency	Percentage (%)
Achieved	42	70.0
Not Achieved	18	30.0

Source: Research data, 2026.

As shown in Table 2, 70.0% of respondents completed antenatal care according to the national K4 standard, whereas 30.0% did not achieve the recommended number of visits. These findings indicate that a considerable proportion of pregnant women still require additional support to improve adherence to antenatal care services.

Association Between Study Variables and K4 Coverage

Table 3. Bivariate Analysis of Factors Associated with K4 Coverage.

Variable	<i>p</i> -value
Knowledge	0.001
Educational Level	0.028
Husband's Support	<0.001
Access to Healthcare Services	0.011
Quality of Antenatal Care	0.003
Parity	0.187
Age	0.216

Statistical test: Chi-square

Source: Research data, 2026.

As presented in Table 3, maternal knowledge, educational level, husband's support, access to healthcare services, and the quality of antenatal care were significantly associated with the achievement of K4 coverage ($p < 0.05$). In contrast, maternal age and parity were not significantly associated with K4 coverage.

Binary Logistic Regression Analysis

Table 4. Dominant Factors Associated with K4 Coverage.

Variable	OR	95% CI	p-value
Good Knowledge	5.84	1.89–18.02	0.002
Husband's Support	6.73	2.11–21.44	0.001
Good Access to Healthcare Services	3.56	1.22–10.38	0.019
Good Quality of Antenatal Care	4.18	1.46–11.98	0.008
Nagelkerke R² = 0.57			

Source: Research data, 2026.

The binary logistic regression analysis identified husband's support as the strongest determinant of K4 antenatal care coverage (OR = 6.73; $p = 0.001$). Pregnant women who received support from their husbands were approximately 6.7 times more likely to achieve K4 coverage than those who did not receive such support. The regression model explained 57% of the variation in K4 coverage (Nagelkerke R² = 0.57).

Factors Associated with K4 Coverage ($p < 0.05$)

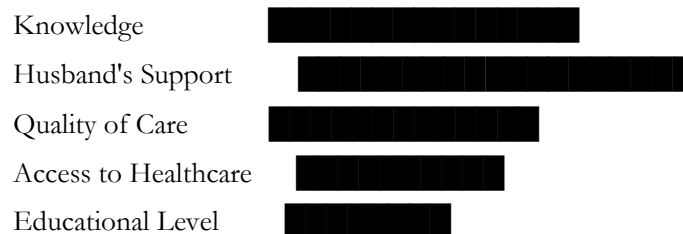


Figure 1. Relative Contribution of Factors Associated with K4 Coverage.

Source: Research data, 2026.

As illustrated in Figure 1, husband's support and maternal knowledge demonstrated the strongest contributions to the achievement of K4 coverage compared with the other significant variables. This visualization reinforces the statistical findings, highlighting the importance of both individual factors and social support in promoting adherence to antenatal care.

Interpretation of the Findings

The findings indicate that the achievement of K4 antenatal care coverage is influenced by several factors, particularly maternal knowledge, husband's support, access to healthcare services, and the quality of antenatal care. Adequate knowledge enables pregnant women to understand the benefits of routine antenatal examinations, thereby increasing their motivation to complete the recommended schedule of visits. Husband's support serves as an important facilitator in healthcare decision-making, whereas healthcare accessibility and service quality influence women's convenience and willingness to utilize antenatal care services.

These findings are consistent with the Behavioral Model of Health Services Use, which explains that healthcare utilization results from the interaction of predisposing, enabling, and need factors. Maternal knowledge represents a predisposing factor, family support and healthcare accessibility constitute enabling factors, and the perceived need for antenatal examinations motivates pregnant women to utilize antenatal care services consistently.

The results are also consistent with previous studies demonstrating that educational level, maternal knowledge, family support, and the quality of healthcare services are significantly associated with adherence to antenatal care visits. However, unlike several previous studies, maternal age and parity were not significantly associated with K4 coverage in the present study. These differences may be attributable to variations in sociocultural characteristics, healthcare service coverage, and sample characteristics across study settings.

Implications of the Study

From a theoretical perspective, these findings reinforce the concept that the utilization of antenatal care services is determined by the interaction of individual characteristics, social environmental factors, and the healthcare delivery system.

From a practical perspective, the findings suggest that Wanggarasi Primary Health Center should strengthen health education for pregnant women, promote greater involvement of husbands in antenatal care services, improve access to healthcare facilities, and continuously enhance the quality of midwifery services. These interventions are expected to increase K4 antenatal care coverage, facilitate the early detection of pregnancy complications, and ultimately contribute to reducing maternal and neonatal morbidity and mortality.

DISCUSSION

The findings of this study showed that 70.0% of respondents achieved the recommended fourth antenatal care (K4) visit coverage, whereas 30.0% did not complete the recommended number of visits. Statistical analysis demonstrated that maternal knowledge, husband's support, access to healthcare services, quality of antenatal care, and educational level were significantly associated with K4 coverage. In contrast, maternal age and parity were not significantly associated with K4 achievement. These findings indicate that successful K4 coverage is influenced not only by maternal biological characteristics but also by behavioral factors, the social environment, and the quality of healthcare services. According to the researchers, improving K4 coverage requires a comprehensive approach involving health education, family support, and strengthening of the healthcare delivery system (World Health Organization, 2023).

The association between maternal knowledge and K4 achievement supports health behavior theory, which states that knowledge forms the foundation for an individual's attitudes and behaviors in utilizing healthcare services. According to Soekidjo Notoatmodjo, individuals with adequate knowledge regarding the benefits of healthcare services are more likely to demonstrate positive health-seeking behaviors. In the present study, pregnant women with better knowledge regarding the objectives and benefits of antenatal care were more consistent in completing the recommended K4 visits than those with limited knowledge. These findings indicate that health education during pregnancy plays a crucial role in improving adherence to antenatal care visits (Notoatmodjo, 2018).

Husband's support emerged as the most dominant factor influencing K4 achievement in this study. Women who received emotional support, information, accompaniment, and assistance in decision-making were more likely to complete the recommended antenatal care visits. These findings are consistent with social support theory, which emphasizes that the family serves as a source of motivation, reinforcement, and practical assistance in addressing health-related needs. According to the researchers, husband involvement not only helps overcome transportation and financial barriers but also enhances maternal confidence and motivation to utilize healthcare services regularly (Friedman, Bowden, & Jones, 2014).

This study also demonstrated that access to healthcare services was significantly associated with K4 coverage. Easy access to healthcare facilities, availability of transportation, shorter travel time, and convenient healthcare services encouraged pregnant women to attend antenatal visits according to the recommended schedule. These findings are consistent with the Behavioral Model of Health Services Use developed by Ronald M. Andersen, which explains that enabling factors, including access to healthcare services and the availability of health facilities, are essential determinants of healthcare utilization. According to the researchers, improving healthcare accessibility within the Puskesmas service area is expected to positively contribute to increased K4 coverage.

The quality of antenatal care was also significantly associated with K4 achievement. Friendly, communicative, timely, and competent healthcare services enhanced maternal satisfaction and encouraged women to return for subsequent antenatal visits according to schedule. These findings suggest that positive healthcare experiences constitute an important determinant of maternal adherence to antenatal care. Therefore, improving healthcare provider competency and implementing patient-centered maternal healthcare should remain priorities in efforts to enhance the quality of maternal health services (World Health Organization, 2023).

Conversely, maternal age and parity were not significantly associated with K4 achievement in this study. These findings differ from those of several previous studies reporting that women of optimal reproductive age or multiparous women are generally more likely to adhere to antenatal care schedules. This discrepancy may be attributed to differences in respondent characteristics, the relatively homogeneous sample distribution, and the stronger influence of other factors, such as maternal knowledge, family support, and healthcare accessibility, on

antenatal care utilization. According to the researchers, these findings suggest that demographic characteristics are not necessarily the primary determinants when supported by an effective healthcare system and a favorable social environment.

The findings of this study are consistent with those reported by Retno Dewi Prisusanti, who demonstrated that improvements in health education and strengthening maternal healthcare services contribute to increased utilization of maternal healthcare among pregnant women. That study emphasized the importance of effective communication between healthcare providers and pregnant women in enhancing understanding of the benefits of antenatal care. In the present study, adequate maternal knowledge, family support, and high-quality healthcare services complemented one another in promoting adherence to the recommended K4 schedule. These findings further reinforce the importance of promotive and preventive approaches in maternal healthcare.

Overall, the findings suggest that improving K4 coverage requires strategies that extend beyond the provision of healthcare services to include maternal and family empowerment through health education, improved healthcare accessibility, and enhanced quality of antenatal care services. Nevertheless, these findings should be interpreted with caution because the study employed a cross-sectional design, which does not permit causal inference. Furthermore, the relatively small sample size and the implementation of the study in a single primary healthcare center limit the generalizability of the findings. Future studies are therefore recommended to employ longitudinal or cohort designs with larger sample sizes and multiple healthcare facilities to provide more comprehensive evidence regarding the determinants of K4 coverage (Polit & Beck, 2021; Creswell & Creswell, 2018).

5. CONCLUSION, RECOMMENDATIONS, AND ACKNOWLEDGMENTS

Conclusion and Recommendations

The findings of this study demonstrated that the achievement of the recommended fourth antenatal care (K4) visit coverage in the working area of Wanggarasi Primary Health Center was influenced by several factors, including maternal knowledge, educational level, husband's support, access to healthcare services, and the quality of antenatal care. Among all variables analyzed, husband's support was identified as the most influential determinant of K4 achievement. In contrast, maternal age and parity were not significantly associated with K4 coverage in this study. Therefore, the objective of identifying the factors influencing K4 coverage was successfully achieved, and the findings provide evidence that completion of recommended antenatal care visits results from the interaction of individual characteristics, social support, and the quality of the healthcare delivery system.

Nevertheless, these findings should be interpreted with caution. The cross-sectional study design only describes associations among variables at a single point in time and therefore cannot establish causal relationships. In addition, maternal utilization of antenatal care services may also be influenced by other factors that were not examined in this study, including sociocultural conditions, household income, trust in healthcare services, previous pregnancy experiences, psychological status, and local healthcare policies. Consequently, the findings cannot be broadly generalized to other populations without considering differences in population characteristics and healthcare service contexts.

Based on these findings, efforts to improve K4 coverage should extend beyond the provision of antenatal care services and should also focus on strengthening maternal health education, increasing the involvement of husbands and families throughout pregnancy, improving access to healthcare services, and enhancing the quality of midwifery services at primary healthcare facilities. Continuous health education programs, antenatal classes involving both pregnant women and their partners, strengthened interpersonal communication between healthcare providers and pregnant women, and the delivery of patient-centered maternal healthcare are expected to improve adherence to the recommended antenatal care schedule.

This study has several limitations that should be considered when interpreting the findings. The relatively small sample size and the inclusion of only one primary healthcare center limit the generalizability of the results to other settings. Data collection using questionnaires also introduces the possibility of recall bias or information bias due to differences in respondents' ability to recall their pregnancy experiences accurately.

Furthermore, several potentially important variables, including socioeconomic status, local cultural factors, anxiety levels, the quality of communication between healthcare providers and patients, and community support, were not comprehensively evaluated. Therefore, other determinants of K4 achievement may still exist and warrant further investigation.

Future studies are recommended to employ cohort or longitudinal study designs with larger sample sizes and multiple primary healthcare centers or districts to improve the generalizability of the findings. Future research should also develop analytical models incorporating socioeconomic and cultural factors, the quality of healthcare provider communication, the utilization of digital health information technologies, and the effectiveness of various educational interventions aimed at improving adherence to antenatal care visits. Such investigations are expected to provide more comprehensive scientific evidence to support the development of policies and maternal healthcare strategies that sustainably improve K4 coverage and contribute to accelerating the reduction of maternal and infant morbidity and mortality in Indonesia.

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reference for healthcare professionals, researchers, and policymakers in developing more effective strategies to improve K4 coverage, strengthen maternal healthcare services, and support ongoing efforts to reduce maternal and infant morbidity and mortality in Indonesia.

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