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Original Research Article

Assessment of Knowledge Regarding Antenatal Care Among Pregnant Women Attending Antenatal Clinic at a Tertiary Care Hospital

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Abstract: *Antenatal care is essential for maternal and fetal health because it supports early risk identification, counselling, supplementation, immunization, routine investigations, and timely referral. Knowledge regarding antenatal care helps pregnant women attend scheduled visits, recognize danger signs, and adopt safe pregnancy practices.* ***Objective:*** *To assess knowledge regarding antenatal care among pregnant women attending the antenatal clinic at a tertiary care hospital.* ***Methods:*** *This descriptive cross-sectional study was conducted at the antenatal clinic of a tertiary care hospital from January to June 2025. A total of 120 pregnant women were enrolled through non-probability consecutive sampling. Data were collected using a structured, pretested questionnaire covering demographic characteristics, obstetric profile, antenatal care practices, and knowledge regarding ANC components. Knowledge scores were categorized as poor, moderate, or good. Data were analyzed using IBM SPSS Statistics version 26.0.* ***Results:*** *The mean age of participants was 27.8 ± 5.2 years, and the mean gestational age was 24.6 ± 8.1 weeks. The overall mean knowledge score was 13.4 ± 3.4 out of 20. Good knowledge was observed in 39 participants (32.5%), moderate knowledge in 57 (47.5%), and poor knowledge in 24 (20.0%). Higher education, urban residence, booked ANC status, and prior ANC counselling were significantly associated with higher knowledge scores. In multivariable analysis, intermediate/graduate education, booked ANC status, and prior ANC counselling were independent predictors of good ANC knowledge.* ***Conclusion:*** *Most pregnant women had moderate knowledge regarding antenatal care, but important gaps remained in early booking, recommended ANC contacts, danger signs, and birth preparedness. Structured counselling during routine ANC visits may improve maternal awareness and promote safer pregnancy outcomes.*

Keywords: Antenatal Care, Pregnant Women, Health Knowledge, Attitudes, Practice, Maternal Health Services, Pregnancy, Health Education

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Introduction

Antenatal care (ANC) is a central component of maternal and neonatal health services because it provides opportunities for early risk identification, prevention of pregnancy-related complications, nutritional counselling, immunization, screening for anemia and hypertension, fetal assessment, birth preparedness, and timely referral. Globally, preventable maternal morbidity and mortality remain closely linked with gaps in timely access to care, quality counselling, continuity of maternal health services, and responsive health systems. Recent evidence has emphasized that reductions in maternal mortality require not only facility-based care but also informed care-seeking behavior, women's empowerment, effective counselling, and accessible maternal health services (1). In Pakistan, maternal mortality has declined over time; however, the country continues to face a substantial burden of preventable maternal deaths. Midhet et al. reported that Pakistan's maternal mortality ratio was 186 per 100,000 live births in 2019, with postpartum hemorrhage, hypertensive disorders, postpartum infection, and post-abortion complications among the leading causes (2).

The contemporary ANC model emphasizes adequate contact, respectful communication, risk detection, and health education rather than attendance alone. Studies assessing ANC quality have shown that clinical actions such as blood pressure measurement, hemoglobin testing, urine testing, ultrasound assessment, tetanus vaccination, iron and folic acid supplementation, and counselling on danger signs are essential components of effective pregnancy care (3). Although the World Health Organization recommends a minimum of eight ANC contacts for a positive pregnancy experience, evidence from low- and middle-income countries shows that adherence to the eight-contact schedule remains suboptimal and is influenced by education, distance from health facilities, residence, socioeconomic status, and health-system factors (4,5). Early ANC booking is also important because late initiation reduces opportunities for early screening, preventive supplementation, counselling, and identification of high-risk pregnancies (6).

Knowledge regarding ANC among pregnant women is therefore an important determinant of service utilization and pregnancy safety. Women with better ANC knowledge are more likely to attend scheduled visits, recognize warning symptoms, comply with supplementation, avoid harmful practices, and prepare for childbirth. In South Asian and other low-resource settings, maternal education, employment status, household autonomy, previous obstetric experience, and quality of provider communication have been associated with ANC knowledge and practice (7,8). In Pakistan, Asim et al. reported that quality ANC coverage and consultation remain low, while women's empowerment is associated with improved ANC utilization (9). Similarly, evidence from the Pakistan Maternal Mortality Survey indicates that ideal ANC and skilled birth attendance are influenced by women's education, household characteristics, and healthcare access (10).

Recognition of obstetric danger signs is another essential component of ANC knowledge. Vaginal bleeding, severe headache or blurred vision, convulsions, reduced fetal movements, fever, abdominal pain, and leakage of fluid require prompt medical attention. However, knowledge of danger signs remains variable in many developing countries, and lack of awareness contributes to delays in seeking care (11). Effective ANC counselling can reduce these delays by improving women's ability to identify danger signs and make timely care-seeking decisions.

In the Pakistani context, knowledge gaps among pregnant women may be intensified by low female literacy, rural–urban disparities, variable counselling quality, financial constraints, dependence on family decision-makers, and uneven access to structured maternal health education. Therefore, assessing ANC knowledge among pregnant women attending tertiary care antenatal clinics is important for identifying modifiable gaps in awareness, counselling, and service delivery. The present study was conducted to assess the level of knowledge regarding antenatal care among pregnant women attending the antenatal clinic at a tertiary care hospital and to determine demographic and obstetric factors associated with good ANC knowledge.

Methodology

This descriptive cross-sectional study was conducted at the antenatal clinic of a tertiary care hospital from January to June 2025. The study was designed to assess knowledge regarding antenatal care among pregnant women attending routine antenatal services. The reporting approach followed STROBE recommendations for observational studies to improve transparency, reproducibility, and completeness of reporting. Pregnant women of any gestational age who attended the antenatal clinic during the study period and provided informed consent were considered eligible. Women who were critically ill, unwilling to participate, unable to understand the questionnaire, or had incomplete responses were excluded.

The sample size was calculated using an anticipated proportion of 50% adequate knowledge regarding antenatal care, as this provides the maximum sample size when the true prevalence is uncertain. Using a 95% confidence level, 9% absolute precision, and adjustment for possible non-response, the final sample size was rounded to 120 participants. A non-probability consecutive sampling technique was used, and eligible women were recruited until the required sample size was achieved.

Data were collected using a structured, pretested questionnaire developed after reviewing WHO antenatal care recommendations and relevant published literature. The questionnaire included demographic characteristics, obstetric profile, ANC booking status, previous counselling exposure, and knowledge-related items covering timing of the first ANC visit, recommended ANC contacts, nutritional supplementation, tetanus vaccination, routine investigations, ultrasound assessment, danger signs in pregnancy, birth preparedness, and avoidance of self-medication. The questionnaire was reviewed by subject experts for content validity and was pretested on a small group of pregnant women before final data collection. These pretest participants were not included in the final analysis. Internal consistency of the knowledge section was assessed using Cronbach's alpha, and a value above 0.70 was considered acceptable.

Each correct knowledge response was assigned one point, while incorrect or "don't know" responses were assigned zero. The total knowledge score ranged from 0 to 20. Knowledge was categorized as poor for scores below 10, moderate for scores between 10 and 14, and good for scores of 15 or above. Trained data collectors obtained information through face-to-face interviews in a private area of the antenatal clinic to reduce response bias and maintain confidentiality.

Data were entered and analyzed using IBM SPSS Statistics version 26.0. Continuous variables were assessed for normality and presented as mean ± standard deviation where appropriate. Categorical variables were summarized as frequencies and percentages. The independent samples t-test and one-way ANOVA were used to compare mean knowledge scores across demographic and obstetric groups. Chi-square or Fisher's exact test was used for categorical associations where applicable. Variables showing clinical relevance or $p < 0.20$ on bivariate analysis were considered for multivariable logistic regression to identify independent predictors of good ANC knowledge. Adjusted odds ratios with 95% confidence intervals were reported, and a p-value of <0.05 was considered statistically significant.

Ethical approval was obtained from the institutional review board of the hospital before data collection. Written informed consent was obtained from all participants after explaining the study purpose, voluntary nature of participation, confidentiality of responses, and the right to withdraw at any stage without affecting their clinical care. No personal identifiers were used in the final dataset.

Results

A total of 120 pregnant women attending the antenatal clinic were included in the analysis. The mean age of participants was 27.8 ± 5.2 years, with most women aged 25–29 years. All participants were female, as pregnancy was part of the eligibility criteria. The mean gestational age was 24.6 ± 8.1 weeks. Most participants were multigravida, urban residents, and housewives. Regarding education, 38 participants had secondary/matric-level education, while 16 had graduate-level education. The demographic profile of the study participants is summarized in Table 1.

Table 1. Demographic and obstetric characteristics of pregnant women attending the antenatal clinic (n = 120)

Variable	Frequency	Percentage
Age group		
18–24 years	36	30.0
25–29 years	46	38.3
30–34 years	28	23.3
≥35 years	10	8.3
Mean age, years	27.8 ± 5.2	—
Residence		
Urban	68	56.7
Rural	52	43.3
Educational status		
No formal education	18	15.0
Primary	24	20.0
Secondary/Matric	38	31.7
Intermediate	24	20.0
Graduate or above	16	13.3
Employment status		
Housewife	99	82.5
Employed	21	17.5
Monthly household income		
<50,000 PKR	46	38.3

50,000–100,000 PKR	52	43.3
>100,000 PKR	22	18.3
Gravidity		
Primigravida	42	35.0
Multigravida	78	65.0
Trimester		
First trimester	22	18.3
Second trimester	55	45.8
Third trimester	43	35.8
ANC booking status		
Booked	86	71.7
Unbooked	34	28.3

The overall mean knowledge score was 13.4 ± 3.4 out of 20, corresponding to 67.0% of the total score. Good knowledge was observed in 39 participants, moderate knowledge in 57 participants, and poor knowledge in 24 participants. Most participants had awareness regarding the importance of iron and folic acid supplementation, tetanus vaccination, balanced diet, and blood pressure monitoring during pregnancy. However, knowledge was comparatively lower regarding the WHO-recommended eight ANC contacts, decreased fetal movements, birth preparedness, and the appropriate timing of the first ANC visit. The distribution of correct responses across ANC knowledge domains is presented in Table 2.

Table 2. Knowledge regarding antenatal care among pregnant women (n = 120)

Knowledge item	Correct response, n	Percentage
ANC is important for maternal and fetal health	90	75.0
First ANC visit should preferably occur in the first trimester	70	58.3
Awareness of recommended ANC contact schedule	38	31.7
Importance of tetanus toxoid vaccination	92	76.7
Importance of iron and folic acid supplementation	95	79.2
Need for balanced diet during pregnancy	93	77.5
Importance of blood pressure monitoring	87	72.5
Need for hemoglobin and urine testing	80	66.7
Role of ultrasound in pregnancy assessment	84	70.0
Vaginal bleeding as a danger sign	88	73.3
Severe headache/blurred vision as a danger sign	76	63.3
Decreased fetal movement as a danger sign	64	53.3
Convulsions as a danger sign	72	60.0
Importance of birth preparedness	61	50.8
Avoidance of self-medication during pregnancy	78	65.0

Knowledge scores were categorized into poor, moderate, and good levels. Moderate knowledge was the most frequent category, observed in 57 participants, followed by good knowledge in 39 participants. Poor knowledge was identified in one-fifth of the sample, indicating clinically relevant gaps in ANC-related awareness among pregnant women attending the tertiary care antenatal clinic. The overall knowledge categorization is shown in Table 3.

Table 3. Overall level of knowledge regarding antenatal care among pregnant women (n = 120)

Knowledge level	Score range	Frequency	Percentage
Poor knowledge	<10 out of 20	24	20.0
Moderate knowledge	10–14 out of 20	57	47.5
Good knowledge	≥15 out of 20	39	32.5
Mean knowledge score	13.4 ± 3.4	—	—

On bivariate analysis, higher educational status, urban residence, booked ANC status, and prior ANC counselling were significantly associated with higher mean knowledge scores. Participants with intermediate or graduate-level education had the highest mean knowledge score. Booked pregnant women also demonstrated significantly better knowledge than unbooked women. Prior ANC counselling showed a strong association with improved knowledge, suggesting the potential value of structured health education during routine antenatal visits. The association between selected demographic and obstetric factors and ANC knowledge score is presented in Table 4.

Table 4. Association of demographic and obstetric variables with mean ANC knowledge score

Variable	n	Mean knowledge score ± SD	p-value
Educational status			<0.001

No formal/Primary education	42	11.4 ± 3.1	
Secondary/Matric	38	13.3 ± 3.0	
Intermediate/Graduate	40	15.5 ± 2.7	
Residence			0.003
Urban	68	14.2 ± 3.2	
Rural	52	12.3 ± 3.4	
Gravidity			0.030
Primigravida	42	12.5 ± 3.5	
Multigravida	78	13.9 ± 3.3	
Trimester			0.053
First trimester	22	11.9 ± 3.2	
Second trimester	55	13.5 ± 3.2	
Third trimester	43	14.0 ± 3.5	
ANC booking status			<0.001
Booked	86	14.4 ± 3.1	
Unbooked	34	10.9 ± 3.0	
Prior ANC counselling			<0.001
Yes	72	15.0 ± 2.7	
No	48	11.0 ± 2.9	

In multivariable logistic regression, good ANC knowledge was independently associated with intermediate or higher education, booked ANC status, and prior ANC counselling. After adjustment for residence, income, and gravidity, women who had received prior ANC counselling had more than four times higher odds of having good knowledge compared with those who had not received counselling. The independent predictors of good ANC knowledge are shown in Table 5.

Table 5. Multivariable logistic regression analysis for predictors of good ANC knowledge

Predictor	Adjusted odds ratio	95% CI	p-value
Intermediate/graduate education	3.42	1.42–8.27	0.006
Booked ANC status	3.61	1.38–9.45	0.009
Prior ANC counselling	4.18	1.82–9.58	<0.001
Urban residence	2.17	0.96–4.91	0.064
Monthly income >100,000 PKR	2.33	0.83–6.57	0.109

Overall, the findings suggest that although general awareness regarding basic ANC components was acceptable, specific knowledge gaps remained regarding early booking, adequate ANC contact schedule, recognition of danger signs, and birth preparedness. Education and structured ANC counselling were the strongest modifiable determinants of good knowledge.

Discussion

In the present study, pregnant women demonstrated an overall moderate level of ANC knowledge, with a mean score of 13.4 ± 3.4 out of 20. Good knowledge was observed in 32.5% of participants, whereas 47.5% had moderate knowledge and 20.0% had poor knowledge. This pattern suggests that basic awareness of ANC was present in most women, but comprehensive understanding remained incomplete. Comparable findings were reported by Bashir et al., who observed that pregnant women attending a hospital-based ANC clinic had generally acceptable knowledge but lower translation of knowledge into practice, indicating that awareness alone may not ensure adequate ANC behavior (12). Similarly, Garg et al. found that knowledge and practice regarding ANC varied significantly according to educational and sociodemographic factors among pregnant women attending a tertiary care hospital (13).

The highest correct responses in the present study were related to iron and folic acid supplementation, tetanus vaccination, balanced diet, and blood pressure monitoring. These findings are consistent with previous studies showing that supplementation, immunization, and routine check-up messages are commonly reinforced during ANC visits and are therefore better understood by pregnant women (12,14). However, knowledge was comparatively lower regarding the recommended ANC contact schedule, first-trimester booking, decreased fetal movement, and birth preparedness. This gap is clinically meaningful because late booking and inadequate ANC contact reduce opportunities for early screening, prevention, counselling, and referral. Lee et al. reported that compliance with the WHO-recommended eight ANC contacts remains low in many low-resource settings and is shaped by education, access, and health-system factors (4). Mulatu et al. similarly showed that early ANC booking is influenced by education, counselling, and previous reproductive experience (5).

Knowledge of obstetric danger signs in the present study was mixed. Vaginal bleeding was well recognized, but decreased fetal movement and convulsions were less frequently identified. This finding is consistent with Tamang et al., who reported that pregnant women may recognize some obstetric emergencies but have poor recall of specific danger signs (15). Yunitasari et al. also concluded that awareness of obstetric danger signs in developing countries is generally low to moderate and is associated with educational status, ANC visits, and prior pregnancy experience (11). These findings indicate that danger-sign counselling should be delivered repeatedly, using simple language, visual aids, and culturally appropriate teaching methods.

Education was one of the strongest predictors of good ANC knowledge in this study. Women with intermediate or graduate-level education had significantly higher knowledge scores, and intermediate/graduate education remained independently associated with good knowledge. This aligns with evidence from South Asian and African settings showing that maternal education improves understanding of ANC, danger signs, nutrition, and care-seeking behavior (13–17). Booked ANC status was also independently associated with good knowledge, supporting the view that continuous ANC contact increases exposure to counselling and reinforces health messages. Massenga et al. reported that receipt of ANC components, including counselling and screening, is central to ANC quality and depends on consistent service contact (18).

Prior ANC counselling showed the strongest independent association with good knowledge in the present study, with more than fourfold higher odds of good knowledge. This finding is supported by intervention studies showing that structured antenatal education improves maternal knowledge, recognition of danger signs, and birth preparedness. Kukula et al. demonstrated that group ANC significantly improved danger-sign recognition and birth preparedness compared with individualized ANC (19). Similarly, nurse-led and facility-based education models have been shown to improve maternal self-efficacy, dietary knowledge, and pregnancy-related practices (20,21). These findings suggest that counselling should not be treated as an optional component of ANC but as a structured and measurable part of routine maternal healthcare.

Urban residence and higher income were associated with higher knowledge in bivariate analysis but did not remain statistically significant in multivariable regression. This suggests that the effect of socioeconomic status may be mediated through education, booked ANC status, and counselling exposure. Pakistani studies have similarly shown that quality ANC is shaped by empowerment, service access, provider communication, and family support rather than income alone (9,10,22,23). Birth preparedness remained one of the weaker knowledge domains in the present study, which is important because recent meta-analytic evidence shows that birth preparedness and complication readiness are strongly associated with maternal education, ANC follow-up, knowledge of danger signs, and healthcare access (24).

This study has some limitations. As it was conducted at a single tertiary care hospital, the findings may not be generalizable to all pregnant women in Pakistan, particularly those in rural communities or primary healthcare settings. The cross-sectional design also limits causal interpretation between counselling exposure and knowledge level. In addition, responses were based on a structured questionnaire and may be influenced by recall or social desirability bias. Despite these limitations, the study provides useful evidence regarding key knowledge gaps among pregnant women attending ANC services and identifies modifiable factors that can be targeted through structured counselling.

Overall, the findings highlight the need for standardized ANC counselling protocols, early booking promotion, visual education materials in local languages, and repeated counselling on eight ANC contacts, fetal movement monitoring, obstetric danger signs, and birth preparedness. In tertiary care settings in Pakistan, routine ANC visits should be used not only for clinical assessment but also as structured educational encounters to improve informed maternal decision-making and reduce avoidable delays in care-seeking.

Conclusion

Pregnant women had mainly moderate knowledge regarding antenatal care, with gaps in early booking, ANC contact schedule, danger signs, and birth preparedness. Regular structured counselling should be strengthened during ANC visits to improve maternal knowledge and timely care-seeking.

Declarations

Data Availability statement
All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate
Approved by the department concerned. (IRBEC-TCHJA-25)

Consent for publication
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Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

NS (Nursing Scholar)
Manuscript drafting, Study Design,
MH
Review of Literature, Data entry, Data analysis, and drafting articles.
SJ
Final Approval of the study, Critical Input, Study design

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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