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ORIGINAL ARTICLE

Overcoming Barriers in Antenatal Care Visits: Challenges and Solutions for Improved Maternal Health

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ABSTRACT

Introduction: Antenatal care (ANC) is critical for ensuring maternal and fetal health, yet adherence remains suboptimal in many low-resource settings. This study aimed to identify barriers to ANC visits and propose strategies to improve adherence among pregnant women.

Methodology: A cross-sectional study was conducted among 422 pregnant women attending a tertiary care facility from August 2022 to August 2023 at Khyber Teaching Hospital Peshawar. Participants were selected through consecutive sampling and data were collected using structured questionnaires. Barriers to ANC were categorized into logistical, financial, cultural, and healthcare system-related factors. Statistical analyses included chi-square tests and logistic regression to identify predictors of ANC adherence.

Results: 38.6% of the population attended all eight of their recommended ANC visits. Big concerns were issues with logistics (76.2%), money challenges (63.4%), and cultural variances (48.9%). Living in a remote region, having few education, and having a lower socioeconomic level were associated with poor adherence ($p<0.05p<0.05$). Strong predictors of adherence, according a multivariate study, were living in a city and education (OR=2.45 and OR=2.71 respectively).

Conclusion: Though there are several reasons why people find it difficult to follow ANC, the primary ones are cultural, financial, and practical ones. To raise ANC attendance and mothers' health, focused interventions including free or low-cost transportation, educational initiatives, and programs involving men participation are required.

Keywords: Antenatal care, maternal health, barriers, adherence, rural healthcare, socioeconomic factors

INTRODUCTION

Antenatal care (ANC) visits are essential to ensure favorable outcomes for both mothers and newborns, and maternal health continues to be a crucial component of public health worldwide[1]. ANC visits give doctors the chance to check on expectant mothers, spot and treat any problems, and provide vital health education. In order to maximize the health of both the mother and the newborn, the World Health Organization (WHO) advises at least eight ANC visits during pregnancy[2,3]. Nevertheless, in many low- and middle-income countries (LMICs), including those with concerningly high rates of maternal death and morbidity, adherence to advised ANC visits is still below ideal levels[4].

Barriers to ANC utilization are multifaceted and context-specific, influenced by socioeconomic, cultural, logistical, and healthcare system-related factors. Socioeconomic challenges such as poverty, illiteracy, and unemployment often hinder access to healthcare services[5]. Cultural norms and gender inequalities can discourage women from seeking ANC services, while logistical challenges, including transportation issues and long distances to healthcare facilities, exacerbate the problem[6]. Additionally, healthcare system-related barriers such as understaffed clinics, unavailability of trained personnel, and poor-quality services further deter women from accessing care[7].

Studies have demonstrated that poor utilization of ANC services is associated with adverse maternal and neonatal outcomes, including preterm births, low birth weight, and increased risk of maternal mortality[8]. Despite various interventions, the uptake of ANC visits remains inconsistent, particularly in LMICs. Existing research has largely focused on the prevalence and types of barriers without adequately addressing how these challenges can be mitigated through context-specific and scalable solutions[9].

Although the importance of ANC visits is well-established, there is a lack of comprehensive research exploring integrated strategies to overcome these barriers. Limited studies have delved into the practical application of solutions such as community-based interventions, digital health technologies, and policy-level reforms that address the unique challenges faced by pregnant women in diverse settings. This gap in understanding the effectiveness of tailored solutions hinders the development of sustainable interventions aimed at improving maternal health outcomes.

Objective The primary objective of this study is to identify and address the barriers to antenatal care visits by exploring practical, scalable solutions to improve maternal health outcomes, with a particular focus on integrating community engagement, healthcare system strengthening, and innovative technologies.

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METHODOLOGY

Study Design and Setting: This study was a cross-sectional, mixed-methods research conducted from August 2022 to August 2024 in Khyber Teaching Hospital Peshawar. The study was carried out at primary healthcare centers, maternal health clinics, and community settings to ensure diverse representation of the population.

Study Population: The study population included pregnant women in their second or third trimester, aged between 18 and 45 years, who had accessed antenatal care services at least once during their current pregnancy. Healthcare providers, including midwives, nurses, and obstetricians, were also included to gain a multifaceted understanding of the barriers and solutions to antenatal care.

Sample Size and Sampling Technique: The sample size was calculated using Cochran's formula for cross-sectional studies:

$n=Z^2 \cdot p \cdot (1-p)/e^2$

Where:

- Z is the standard normal variate at a 95% confidence level (Z=1.96),
- p is the expected prevalence of ANC utilization barriers, assumed to be 50% to ensure the maximum sample size (p=0.5),
- e is the margin of error, set at 5% (e=0.05).

The calculated sample size was 384. To account for non-response and incomplete data, a 10% contingency was added, resulting in a final sample size of 422 participants. Participants were selected

using stratified random sampling to ensure representation from urban, peri-urban, and rural areas.

Data Collection: Data collection was conducted using a structured questionnaire and semi-structured interviews. The questionnaire was designed based on previous literature and validated through a pilot study involving 30 participants. It included sections on demographic characteristics, socioeconomic status, and barriers to ANC visits, such as logistical, cultural, and healthcare system-related challenges. Semi-structured interviews were conducted with healthcare providers and a subset of pregnant women to gain qualitative insights into potential solutions for identified barriers.

Data Analysis: SPSS version 26 was used to examine quantitative data. Data on demographics and barriers were summarized using descriptive statistics, including means, medians, frequencies, and percentages. While independent t-tests and one-way ANOVA were utilized to compare continuous variables across groups, chi-square tests were utilized to evaluate relationships between categorical variables. To find determinants of ANC visit adherence, multivariate logistic regression analysis was used. NVivo software was used to transcribe verbatim interview qualitative data and conduct a theme analysis. Inductive coding was used to identify themes, with an emphasis on obstacles to ANC visits and potential remedies. The findings' robustness was guaranteed by the triangulation of qualitative and quantitative data.

Ethical Considerations: The institution's institutional review board granted ethical approval. All participants were given written informed consent after being fully informed about the study's goals, methods, possible risks, and advantages. Participant data was anonymized to preserve confidentiality, and involvement was completely voluntary..

RESULTS

A total of 422 pregnant women participated in the study, yielding a response rate of 96.7%. The mean age of participants was 29.4 ± 5.7 years, with the majority (60.2%, n=254) aged between 25 and 35 years. Of the participants, 71.3% (n=301n = 301n=301) resided in rural areas, and 28.7% (n=121) were from urban or peri-urban areas. In terms of education, 68.9% (n=291) had no formal or primary education, while 12.3% (n=52) had attained secondary or higher education. The socioeconomic data revealed that 55.4% (n=234) of participants were below the poverty line, while 44.6% (n=188) had incomes above it (Table 1).

Table 1: Demographic and Socioeconomic Characteristics of Participants

Variable	Frequency (n)	Percentage (%)
Age (years)		
18–24	93	22.1
25–35	254	60.2
>35	75	17.7
Residence		
Urban/Peri-urban	121	28.7
Rural	301	71.3
Education Level		
No formal/Primary	291	68.9
Secondary/Higher	52	12.3
Socioeconomic Status		
Below poverty line	234	55.4
Above poverty line	188	44.6

Barriers to ANC visits were extensively reported by the participants. The most frequently cited challenge was logistical barriers (76.2%, n=322), including lack of transportation and long distances to healthcare facilities. Financial barriers were identified by 63.4% (n=267), while cultural barriers, such as male-dominated decision-making, were highlighted by 48.9% (n=206). Healthcare system-related issues, such as unavailability of skilled staff and poor service quality, were noted by 40.7% (n=172) (Table 2).

A chi-square analysis revealed significant associations between rural residence and logistical barriers ($\chi2=18.32, p<0.001$) and between low socioeconomic status and financial barriers ($\chi2=22.45, p<0.001$). Additionally, cultural barriers were more prevalent among women with no formal education ($\chi2=13.89, p=0.001$).

Table 2: Barriers to Antenatal Care Visits

Barrier Type	Frequency (n)	Percentage (%)	Associated Factor	Test Statistic (χ2)	p-value
Logistical Barriers	322	76.2	Rural Residence	18.32	<0.001
Financial Barriers	267	63.4	Low Socioeconomic Status	22.45	<0.001
Cultural Barriers	206	48.9	No Formal Education	13.89	0.001
Healthcare System Barriers	172	40.7	Poor Staffing and Services	10.18	0.007

Table 3: Adherence to ANC Visits by Demographic and Socioeconomic Factors

Variable	Adherence (n, %)	Non-Adherence (n, %)	Test Statistic (χ2)	p-value
Residence				<0.001
Urban	63 (52.6)	58 (47.4)	19.78	
Rural	85 (28.3)	216 (71.7)		
Education Level				0.004
Secondary/Higher	26 (49.8)	26 (50.2)	11.56	
No formal/Primary	68 (23.4)	223 (76.6)		
Income Level				0.002
Above Poverty Line	89 (47.3)	99 (52.7)	9.67	
Below Poverty Line	74 (31.2)	160 (68.8)		

Only 38.6% (n=163) of participants reported completing the recommended minimum of eight ANC visits. Rural women had significantly lower adherence rates (28.3%, n=85) compared to urban women (52.6%, n=63, $\chi2=19.78, p<0.001$). Women with secondary or higher education showed better adherence (49.8%, n=26) compared to those with no formal education (23.4%, n=68, p=0.004). Women from households with incomes above the poverty line were more likely to adhere (47.3%, n=89) compared to those below the poverty line (31.2%, n=74 $\chi2=9.67, p=0.002$) (Table 3).

Multivariate logistic regression analysis indicated that education level, household income, and urban residence were significant predictors of ANC adherence. Women with secondary or higher education were 2.71 times more likely to adhere (OR=2.71,95), and those with household incomes above the poverty line had 1.89 times higher odds of adherence (OR=1.89,95).

Table 4: Logistic Regression Analysis of Predictors of ANC Adherence

Predictor	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Education Level	2.71	1.74–4.22	<0.001
Income Above Poverty Line	1.89	1.12–3.19	0.017
Urban Residence	2.45	1.59–3.78	<0.001

Thematic analysis of interviews supported the quantitative findings, emphasizing logistical and financial barriers as key challenges. Participants suggested potential solutions such as subsidized transportation services, male engagement programs, and financial incentives for regular ANC visits. Healthcare

providers highlighted the need for improved healthcare worker training and better allocation of resources to rural facilities (Table 5).

Table 5: Qualitative Themes and Suggested Solutions

Theme	Description	Suggested Solutions
Logistical Barriers	Transportation and distance challenges	Community-based transport programs
Financial Constraints	High cost of care	Subsidized care and financial incentives
Cultural Barriers	Male decision-making dominance	Male involvement education programs
Healthcare System Issues	Staffing shortages, lack of resources	Enhanced training, resource allocation

DISCUSSION

This study revealed significant barriers to ANC adherence among pregnant women, particularly in rural settings. Logistical challenges, financial constraints, and cultural factors were the most commonly reported barriers. Additionally, adherence to the recommended minimum of eight ANC visits was notably low, with only 38.6% of participants meeting the guideline. Predictors of higher adherence included higher education levels, urban residence, and socioeconomic stability.

The findings align with existing evidence indicating that logistical barriers, such as lack of transportation and distance from healthcare facilities, significantly hinder ANC access[10]. Studies in other low-resource settings have similarly identified rural residence as a key factor limiting access to care. Financial constraints were found to be a critical determinant, mirroring research demonstrating that low-income households often prioritize immediate survival needs over preventive health measures[11]. Cultural norms, particularly male-dominated decision-making, were also significant barriers. This is consistent with literature highlighting the role of patriarchal structures in limiting women's autonomy in health-related decisions[12]. Additionally, the association between higher education levels and better adherence aligns with studies emphasizing education as a key enabler of health-seeking behaviors. Education likely improves awareness of ANC benefits and empowers women to overcome sociocultural and logistical challenges[13].

Healthcare system-related barriers, such as insufficient staffing and poor service quality, were consistent with findings from other settings that report inadequacies in healthcare delivery as a critical issue[14]. The observed low adherence rates to ANC guidelines are comparable to findings in other developing regions, where adherence ranges between 20–50%.[15] The significant influence of urban residence on better adherence reflects the disparities in healthcare infrastructure and accessibility between rural and urban areas globally[16].

Limitations and Future Suggestions: There are various restrictions on this study. Initially, it depended on self-reported information, which could be skewed by social desirability or memory. Second, it is not possible to draw conclusions about the causal relationship between identified barriers and ANC adherence due to the cross-sectional methodology. Third, the study was only carried out at one location, which would have limited how broadly the results can be applied. In order to evaluate the causal links between obstacles and ANC adherence, future studies should use longitudinal approaches. The findings may be more broadly applicable if the study is extended to several locations in various areas. The efficacy of interventions including education campaigns, male involvement initiatives, and subsidized transportation in enhancing ANC adherence should be assessed. Furthermore, in order to provide context-specific solutions for enhancing maternal health outcomes, a targeted research into issues pertaining to the healthcare system, such as staff training and resource allocation, is advised.

CONCLUSION

This study highlights significant barriers to antenatal care adherence, including logistical, financial, cultural, and healthcare system-related challenges. Low adherence rates were linked to rural residence, low education levels, and poor socioeconomic status. Addressing these barriers through targeted interventions can improve maternal health outcomes, particularly in underserved populations.

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