Association between Antenatal Care Visits and birth Preparedness Among Pregnant Women

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Abstract

Background: Maternal mortality remains a significant public health concern, particularly in low- and middle-income countries. Antenatal care (ANC) plays a vital role in reducing maternal and perinatal morbidity and mortality by promoting birth preparedness and complication readiness. Despite the availability of services, many women still do not attend the recommended number of ANC visits or make adequate preparations for childbirth.

Objective: To determine the association between antenatal care visits and birth preparedness among pregnant women and to identify socio-demographic factors influencing birth preparedness.

Methodology: A cross-sectional analytical study was conducted at Bahawal Victoria Hospital, Bahawalpur, from January to December 2024. A total of 259 pregnant women with gestational age ≥28 weeks were enrolled using non-probability consecutive sampling. Data were collected through face-to-face interviews using a pre-tested structured questionnaire. Birth preparedness was assessed using the WHO BPCR module. Descriptive statistics and chi-square tests were used for analysis.

Results: The mean age of participants was 26.7 ± 4.8 years. About 62.2% attended four or more ANC visits, and 64.5% had adequate birth preparedness. Women who attended ≥4 ANC visits were significantly more likely to be adequately prepared compared to those with fewer visits (82% vs. 35.7%, $p < 0.001$). Early initiation of ANC and higher maternal education were also significantly associated with better birth preparedness.

Conclusion: Regular antenatal care attendance is strongly associated with improved birth preparedness. Efforts should focus on increasing ANC uptake and integrating birth planning education into routine maternal health services, especially for less educated and rural women.

Keywords: Antenatal care, Birth preparedness, Maternal health, Pregnancy.

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Introduction

Maternal mortality remains a critical public health challenge globally, particularly in low- and middle-income countries (LMICs). According to the World Health Organization (WHO), approximately 287,000 women died due to pregnancy-related causes in 2020, with nearly 94% of these deaths occurring in low-resource settings.[1] Sub-Saharan Africa and Southern Asia together accounted for more than two-thirds of global maternal deaths.[1] Although significant progress has been made through initiatives such as the Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs), many countries still lag behind in achieving the target of less than 70 maternal deaths per 100,000 live births by 2030.[2]

Antenatal care (ANC) plays a pivotal role in reducing maternal mortality and morbidity by facilitating early detection and management of complications during pregnancy.[3] The WHO recommends at least eight ANC contacts during pregnancy to improve maternal and fetal outcomes.[4] Regular ANC visits provide opportunities for health education, immunization, screening for high-risk conditions, and counseling on birth preparedness and complication readiness (BPCR).[5]

Birth preparedness refers to the process of planning for a safe birth and being ready to act promptly in case of emergencies.[6] Key components include identifying a skilled birth attendant and a health facility for delivery, arranging transport, saving money for delivery expenses, and identifying a blood donor or support person.[7] Evidence suggests that women who are well-prepared for childbirth are more likely to seek timely emergency obstetric care and have better maternal outcomes.[8]

Despite the availability of maternal health

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services, utilization of recommended ANC visits and birth preparedness practices remain suboptimal in many resource-limited settings. A study conducted in rural Ethiopia found that only 42% of pregnant women had adequate birth preparedness.[9] In parts of South Asia and sub-Saharan Africa, cultural beliefs, lack of awareness, poverty, and poor access to healthcare facilities contribute to inadequate ANC attendance and poor birth planning.[10] These factors increase the risk of preventable maternal deaths and complications such as hemorrhage, eclampsia, and sepsis.[11,12]

Understanding the association between ANC visits and birth preparedness is essential for strengthening maternal health programs. Since ANC serves as a key platform for health education and counseling, it is expected that women who attend more frequent and earlier ANC visits will be more likely to develop birth plans. However, there is limited recent evidence, especially from LMICs, on the extent to which ANC influences birth preparedness behaviors. The objective of this study was to determine the association between antenatal care visits and birth preparedness and identify socio-demographic factors influencing birth preparedness among pregnant women.

Methodology

This study was designed as a cross-sectional analytical study conducted at the Gynecology and Obstetrics wards of Bahawal Victoria Hospital, Bahawalpur, from January to December 2024. The objective was to assess the association between antenatal care (ANC) visits and birth preparedness among pregnant women. The calculated sample size for the study at 95% confidence level with a 5% margin and 78.5% estimated proportion of the population exhibiting the characteristic (participants well-prepared for birth)[13] was 259. A total of 259 pregnant women admitted for delivery were included in the study. Participants were selected using a non-probability consecutive sampling technique, ensuring that all eligible women meeting the inclusion criteria were enrolled during the study period.

The inclusion criteria consisted of pregnant women with gestational age ≥28 weeks admitted for delivery regardless of parity. Women with high-risk pregnancies were excluded from the study. The independent variable was the number and timing of ANC visits, categorized based on WHO recommendations (≥4 visits vs. <4 visits), while the dependent variable was birth preparedness, defined using a composite score derived from key indicators such as identification of a birth facility, arrangement of transport, saving money for delivery, identifying a blood donor, and knowledge of danger signs during pregnancy and childbirth. Birth preparedness was further classified into adequate or inadequate based on the total score obtained using the WHO Birth Preparedness and Complication Readiness (BPCR) module , which has been widely validated for use in low- and middle-income countries.

Data were collected through face-to-face interviews using a pre-tested structured questionnaire developed in English and translated into Urdu for better understanding by the local population. The questionnaire also captured socio-demographic characteristics, obstetric history, and other potential confounding variables including age, parity, education level, socioeconomic status, and place of residence (urban vs. rural) .

Ethical approval was obtained from the Institutional Review Board (IRB) of Bahawal Victoria Hospital (Ref. No. 296/DME/QAMC/BWP Dated: 13-06-2025) Written informed consent was taken from each participant before data collection, and confidentiality was maintained throughout the study. Participation was entirely voluntary, and respondents were assured that refusal would not affect their standard of care.

For data analysis, IBM SPSS version 25.0 was used. Descriptive statistics were computed to summarize the demographic and clinical characteristics of the participants, expressed as frequencies, percentages, means, and standard deviations. Chi-square test was applied to determine the association between ANC attendance and birth preparedness. A p-value <0.05 was considered statistically significant.

Results

A total of 259 pregnant women were enrolled in this cross-sectional analytical study conducted at Bahawal Victoria Hospital, Bahawalpur. All participants were aged ≥18 years and had a gestational age of ≥28 weeks at the time of delivery. None of the selected participants had high-risk pregnancies.

The mean age of the participants was 26.7 ± 4.8

years, with ages ranging from 18 to 42 years. The majority (64.5%) were between 25–34 years. Most women (78.8%) were housewives, and nearly half (51.7%) belonged to rural areas. About 41.3% had completed secondary education or higher, while 32.4% had no formal education.

More than half (54.4%) of the women were multiparous. Only 16.2% had a history of previous pregnancy complications. Approximately 62.2% reported attending ≥4 ANC visits, as recommended by WHO. Of these, 48.6% initiated ANC in the first trimester.

Using the WHO BPCR module, birth preparedness was categorized into adequate or inadequate. Out of 259 participants 167 (64.5%) had adequate birth preparedness and 92 (35.5%) had inadequate birth preparedness.

Among the various components of birth preparedness assessed in this study, the majority of participants demonstrated awareness and planning in some key areas. A total of 213 women (82.2%) had identified a birth facility for delivery. In addition, 178 women (68.7%) had made arrangements for transport to the health facility and financial preparation was reported by 165 participants (63.7%). However, only 104 women (40.2%) had identified a potential blood donor in case of an emergency. Furthermore129 women (49.8%) were able to correctly identify danger signs during pregnancy and childbirth.

There was a statistically significant association between the number of ANC visits and birth preparedness ($p<0.001$). Among those who attended ≥4 ANC visits, 132 out of 161 (82%) were adequately prepared for birth, compared to only 35 out of 98 (35.7%) among those with fewer than four visits. Similarly, early initiation of ANC (≤12 weeks) was significantly associated with better birth preparedness ($p = 0.002$).

Higher maternal education level showed association birth preparedness. Women with secondary or higher education were more likely to be well-prepared (73.6%) compared to those with no formal education (25.4%) ($p<0.001$). Urban residence also showed a significant association with adequate birth preparedness (70.2% vs. 58.1%, $p = 0.034$). Parity and age did not show a significant association with birth preparedness.

Table I: Socio-demographic characteristics of respondents (n=259)

Variable	Frequency (%)
Age (years)	
≤24	81 (31.3%)
25–34	167 (64.5%)
≥35	11 (4.2%)
Education Level	
No formal education	84 (32.4%)
Primary	69 (26.6%)
Secondary	67 (25.9%)
Higher	39 (15.1%)
Residence	
Urban	133 (51.4%)
Rural	126 (48.6%)
Occupation	
Housewife	204 (78.8%)
Employed	55 (21.2%)

Table II: Obstetric profile of respondents

Variable	Frequency (%)
Parity	
Primipara	118 (45.6%)
Multipara	141 (54.4%)
Number of ANC visits	
<4	98 (37.8%)
≥4	161 (62.2%)
Timing of First ANC Visit	
≤12 weeks	126 (48.6%)
>12 weeks	133 (51.4%)

Table III: Birth preparedness indicators among respondents

Indicator	Adequately Prepared (%)	Inadequately Prepared (%)
Identification of birth facility	148 (94.3%)	65 (70.7%)
Arrangement of transport	124 (74.3%)	54 (58.7%)
Saving money for delivery	115 (68.9%)	50 (54.3%)
Identifying a blood donor	78 (46.7%)	26 (28.3%)
Knowledge of danger signs	99 (59.3%)	30 (32.6%)

Table IV: Association between ANC attendance and birth preparedness

ANC Attendance	Birth Preparedness		p-value
	Adequate	Inadequate	
<4 visits	35 (35.7%)	63 (64.3%)	
≥4 visits	132 (82%)	29 (18%)	
Total	167 (64.5%)	92 (35.5%)	<0.001

Table V: Association between socio-demographic factors and birth preparedness

Variable	Birth Preparedness		P-value
	Adequate(%)	Inadequate(%)	
Education			
No formal education	21 (25.4%)	62 (74.6%)	<0.001
Primary	40 (57.9%)	29 (42.1%)	
Secondary	57 (85.1%)	10 (14.9%)	
Higher	49 (100%)	0 (0%)	
Residence			
Urban	93 (70.2%)	40 (29.8%)	0.034
Rural	74 (58.1%)	53 (41.9%)	

Discussion

The findings of this study reveal a significant association between the frequency of antenatal care (ANC) visits and birth preparedness among pregnant women in Bahawalpur, Pakistan. Over 60% of participants attended four or more ANC visits, and these women were significantly more likely to be adequately prepared for childbirth compared to those with fewer visits (82% vs. 35.7%, $p < 0.001$). This supports existing evidence that regular ANC attendance plays a critical role in improving maternal health behaviors and enhancing awareness regarding birth planning.[7,14,15,16]

Our results align with previous studies conducted in Pakistan and other low- and middle-income countries (LMICs), which have shown that women who attend the recommended number of ANC visits are more likely to identify a birth facility, arrange transport, and recognize danger signs during pregnancy.[17,18,19] In our study, nearly half of the women had knowledge of danger signs, which is slightly higher than findings from a similar study in rural Sindh, Pakistan,[20] but still reflects a need for improvement.

Maternal education level emerged as a strong predictor of birth preparedness, with women having secondary or higher education being over twice as likely to be well-prepared compared to those with no formal schooling. This finding is consistent with other studies from South Asia, which highlight the influence of education on health-seeking behavior and decision-making autonomy.[21,22]

Urban residence was also positively associated with birth preparedness, indicating disparities in access to information and healthcare services between urban and rural populations. These findings emphasize the importance of targeted outreach programs in rural areas to bridge this gap.

This study used a cross-sectional design, limiting the ability to infer causality. Data were self-reported, which may introduce recall bias. Additionally, the study was conducted at a single tertiary care hospital, which may limit generalizability to rural or primary healthcare settings.

Conclusion

Regular ANC attendance significantly improves birth preparedness among pregnant women. Health promotion strategies should focus on increasing ANC uptake and integrating comprehensive birth planning education into routine antenatal services, particularly for women with lower education levels and those living in rural areas.

Author's Contribution: RA: Conception of work, Acquisition and Analysis of data and Drafting. **SR:** Acquisition and Analysis of data, Interpretation of data and revising. **RA:** Design of work, Acquisition and Analysis of data**, KS:** Design of work, Acquisition and Analysis of data, **QAM:** Design of work, Acquisition, **MA:** Design of work, Acquisition and Analysis of data and revising.

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References

1. World Health Organization. Maternal mortality: Levels and trends 2000 to 2020. Geneva: WHO; 2021.
2. Say L, Chou D, Gemmill A. Global causes of maternal death: a WHO 2005–2014 systematic review and analysis. *Lancet Glob Health* . 2020;8(11):e1392-e1404.
3. Souza JP, Gulmezoglu AM, Vogel J. Moving beyond essential interventions for reduction of maternal mortality (the WHO Multicountry Survey on Maternal and Newborn Health): a cross-sectional study. *Lancet* . 2020;395(10237):1723–1734.
4. World Health Organization. WHO recommendations on antenatal care for a positive pregnancy experience. Geneva: WHO; 2021.
5. Bohren MA, Hunter EC, Munthe-Kaas HM, et al. Facilitators and barriers to facility-based delivery in low- and middle-income countries: A qualitative evidence synthesis. *Cochrane Database Syst Rev* . 2021;(8):CD012752.

6. WHO. Monitoring birth preparedness and complication readiness: tools and indicators for maternal and newborn health. Geneva: WHO; 2020.
7. Adnan MK, Islam MM, Hossain MB. Determinants of birth preparedness among pregnant women in Bangladesh: Findings from a nationwide population-based survey. *PLoS One* . 2022;17(3):e0265209.
8. Gabrysch S, Campbell OM. Still too far to go to reach safe motherhood: trends in maternal mortality from 1990 to 2015. *J Glob Health* . 2021;11:05002.
9. Gedefaw A, Alemayehu M, Mengesha B. Birth preparedness and associated factors among pregnant women in Northwest Ethiopia. *Int J Womens Health*. 2021;13:101–108.
10. Omondi AO, Wanjala P, Were F. Birth preparedness and skilled attendance at delivery in rural western Kenya. *Pan Afr Med J*. 2022;41:110.
11. Tunçalp O, Were WM, MacLennan C. Quality of care for pregnant women and newborns—the WHO vision. *BJOG*. 2020;127(1):48–53.
12. Koo FX, Owais A, Hanif B. Birth preparedness and factors affecting its practice among mothers in Pakistan: A cross-sectional study. *J Pak Med Assoc*. 2023;73(1):113–118.
13. Maroof S, Azam N, Mashhadi SF, Mahmood H, Masood S, Babar H. Birth preparedness and complication readiness: a cross sectional survey from expectant mothers visiting a rural health center: birth preparedness and complication readiness. Pak Armed Forces Med J. 2017;67(6):952-57.
14. Gabrysch S, Campbell OM. Still too far to go to reach safe motherhood: trends in maternal mortality from 1990 to 2015. *J Glob Health* . 2021;11:05002.
15. Koo FX, Owais A, Hanif B. Birth preparedness and factors affecting its practice among mothers in Pakistan: A cross-sectional study. *J Pak Med Assoc* . 2023;73(1):113–118.
16. Tunçalp Ö, Were WM, MacLennan C. Quality of care for pregnant women and newborns—the WHO vision. *BJOG* . 2020;127(1):48–53.
17. Gedefaw A, Alemayehu M, Mengesha B. Birth preparedness and associated factors among pregnant women in Northwest Ethiopia. *Int J Womens Health* . 2021;13:101–108.
18. Omondi AO, Wanjala P, Were F. Birth preparedness and skilled attendance at delivery in rural western Kenya. *Pan Afr Med J* . 2022;41:110.
19. Siddiqui MA, Zuberi NF, Azam SI. Prevalence and correlates of birth preparedness among pregnant women in Karachi, Pakistan: A cross-sectional survey. *BMJ Open* . 2022;12(6):e058967.
20. Shaikh BT, Hatcher J. Antenatal care in rural Sindh, Pakistan—a qualitative exploration of women's perceptions. *Health Care Women Int* . 2020;31(11):991–1005.
21. Adnan MK, Islam MM. Maternal education and birth preparedness: Evidence from a population-based survey in Bangladesh. *BMC Pregnancy Childbirth* . 2021;21(1):1–10.
22. Rana MJ, Shehzad K, Farooq U. Factors influencing birth preparedness among pregnant women attending tertiary care hospitals in Lahore, Pakistan. *J Ayub Med Coll Abbottabad* . 2022;34(2):249–254.