

Determinants Associated with Frequency of Antenatal Care Visits in Uttar Pradesh: Results from Demographic Health Survey

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ABSTRACT

Introduction: Despite advancements in maternal healthcare in recent years, antenatal care (ANC) visits in India remain relatively low and unequal, particularly across states. For instance, in 2015–2016, only 26.4% of women in Uttar Pradesh (U.P.) received at least four antenatal visits. Using data from the fifth round of the Demographic Health Survey, this study seeks to investigate the factors influencing antenatal visit in U.P.

Methodology: This analysis includes women aged 15–49 years who had their most recent live birth within the past five years ($n = 25,774$). The outcome variable, "adequate antenatal care visits," is defined as having four or more ANC visits. Logistic regression was applied to examine the association between explanatory variables and ANC visits, with associations considered statistically significant at $p < 0.05$.

Results: In U.P., only 41.6% of women had taken adequate ANC visits. Regression analysis indicated that women with higher education, belonging to higher wealth quantiles, residing in urban areas, having two or fewer children, aged 25–29, and whose husbands were more educated had higher odds of adequate ANC visits.

Conclusion: Nearly 58% of pregnant women in U.P. had not receive the adequate ANC visits. Given the factors associated with at least four ANC visits, it is essential to develop targeted strategies to meet government recommendations as soon as possible, ensuring that every pregnant woman in Uttar Pradesh receives adequate antenatal visits during pregnancy.

Keywords: Antenatal care visits, demographic health survey, Uttar Pradesh.

INTRODUCTION

India has achieved a 70% reduction in the overall maternal mortality ratio (MMR) over the past two decades [1]. India is progressing well toward achieving the maternal mortality targets outlined in the United Nations Sustainable Development Goals (SDGs), which aim to reduce global maternal mortality to below 70 per 100,000 live births by 2030, with no country exceeding an MMR of 140 per 100,000 [2]. However, despite this progress, India still accounts for 12% of all global maternal deaths [3]. Providing high-quality maternal healthcare before, during,

and after childbirth is recognized as a highly effective approach to reducing preventable maternal deaths [3, 4, 5]. Antenatal care (ANC) offers a vital opportunity for skilled healthcare professionals to address potential health risks during pregnancy by focusing on disease prevention, early identification, and effective management [6, 7]. ANC also enables healthcare providers to engage pregnant women in health promotion and education, focusing on both immediate and long-term health benefits [4, 8]. The primary goal of ANC is to deliver care that ensures optimal health conditions for both the mother

and the baby throughout the pregnancy [6]. Acknowledging the life-saving potential of adequate antenatal care, the World Health Organization (WHO) has released guidelines for providing sufficient care during pregnancy. These guidelines emphasize established interventions that are proven to enhance maternal and neonatal health outcomes [6, 9]. Launched in 2002, the WHO's Focused Antenatal Care model advises that pregnant women should have a minimum of four comprehensive antenatal care visits with a qualified healthcare provider during their pregnancy [9]. The significance of antenatal care (ANC) in reducing stillbirth rates, preventing pregnancy-related complications, and ensuring a positive pregnancy experience is widely recognized. Additionally, women who utilize ANC are more likely to access other essential services, such as breastfeeding support, nutrition counseling, postpartum family planning, and child immunization.[10]. The antenatal period offers opportunities to provide pregnant women with essential interventions that are crucial for their health and the well-being of their infants. Attending antenatal care at least four times enhances the likelihood of receiving effective maternal health interventions during this critical period [11]. This is one of the indicators in the Global Strategy for Women's, Children's, and Adolescents' Health (2016-2030) Monitoring Framework and serves as a tracer indicator for health services aimed at achieving universal health coverage [11,12]. This study aims to assess the relationship between ANC visits and socio-economic variables among women of reproductive age in Uttar Pradesh. Specifically, we seek to identify the factors that contribute to adequate ANC visits in U.P. and provide insights for policy interventions that can enhance maternal healthcare access and reduce maternal mortality.

METHODOLOGY

Data Source:

This analysis utilizes individual-level data from the Indian National Family Health Survey 5 (NFHS-5) collected between 2019 and 2021 [5]. In India, Ministry of Health and Family Welfare designated the International Institute for Population Sciences in Mumbai as the nodal organization for the Fifth National Family Health Survey [5]. The primary objective of each cycle of the NFHS has been to provide high-quality data on family welfare, health, and emerging challenges in these areas. The NFHS series comprises nationally representative cross-sectional surveys that collect data on various demographic, socioeconomic, maternal and child health outcomes, reproductive health, and family planning. This analysis includes data from the most recent live births within the last five years among women aged 15–49 years in Uttar Pradesh, with a total sample size of 25,774.

Dependent variable:

Women were asked, "How many times did you receive antenatal treatment during this pregnancy?" regarding their most recent pregnancy within the past five years. This continuous variable was transformed into a binary variable, dividing it into two groups: those who had four or more ANC visits and those who did not. The outcome variable, "adequate antenatal care visits," is defined as having four or more ANC visits in accordance with WHO standards. For our analysis, ANC visits were categorized to create a dichotomous dependent variable with the following outcomes: adequate ANC (≥ 4 visits) and inadequate ANC (< 4 visits).

Independent variables:

All relevant socioeconomic variables were included in the study as independent variables. Participants' ages were categorized in 5-year increments, ranging from 15 to 49 years. Additional variables included birth order (fewer than three vs. three or more), place of residence (urban vs. rural), religion (Hindu, Muslim, and other), women's

education level (no education, primary, secondary, and higher), wealth index (poorest, poor, middle, rich, and richest), and husband's education level (no education, primary, secondary, and higher).

STATISTICAL ANALYSIS

Key outcomes and covariates were analyzed using frequency distributions to describe the

study sample. Chi-squared tests assessed associations between independent variables and adequate antenatal visits. Logistic regression analyzed the relationship between explanatory variables and ANC visits, with significance set at $p < 0.05$. Statistical analysis was performed in SPSS version 28.

RESULTS

Variables	N	≥4 ANC N (%)	<4 ANC N (%)	p-value
Age Group (in year)				
15-19	363	133(36.6)	230(63.4)	0.00
20-24	6610	2786(42.1)	3824(57.9)	
25-29	10139	4304(42.4)	5835(57.6)	
30-34	5325	2204(41.4)	3121(58.6)	
35-39	2257	887(39.3)	1370(60.7)	
40-44	620	243(39.2)	377(60.8)	
45-49	160	109(68.1)	51(31.9)	
Place of Residence				
Rural	21228	8471(39.9)	12757(60.1)	0.00
Urban	4246	2137(50.3)	2109(49.7)	
Highest Education Level of Women				
No Education	7386	2599(35.2)	4787(64.8)	0.00
Primary	3318	1305(39.3)	2013(60.7)	
Secondary	10385	4491(43.2)	5894(56.8)	
Higher	4385	2213(50.5)	2172(49.5)	
Wealth Quintile of women				
Poorest	6768	2319(34.3)	4449(65.7)	0.00
Poorer	6591	2556(38.8)	4035(61.2)	
Middle	4711	2031(43.1)	2680(56.9)	
Richer	3865	1757(45.5)	2108(54.5)	
Richest	3539	1945(55)	1594(45)	
Religion				
Hindu	21039	8728(41.5)	12311(58.5)	0.31
Muslim	4356	1842(42.3)	2514(57.7)	
Others	79	38(48.1)	41(51.9)	
Total number of living children				
≤ 2	14832	6633(44.7)	8199(55.3)	0.00
≥ 3	10642	3975(37.4)	6667(62.6)	
Husband's Education				
No Education	648	227(35)	421(65)	0.00
Primary	489	178(36.4)	311(63.6)	
Secondary	1941	856(44.1)	1085(55.9)	
Higher	742	352(47.4)	390(52.5)	

Variables	cOR	p-value	95% CI
Age Group (in year)			
15-19 (Reference)			
20-24	1.26	0.003	1.01-1.56
25-29	1.27	0.028	1.02-1.58
30-34	1.22	0.075	0.98-1.52

35-39	1.12	0.335	0.89-1.40
40-44	1.11	0.427	0.85-1.45
45-49	0.80	0.293	0.54-1.20
Place of Residence			
Rural (Reference)			
Urban	1.52	0.000	1.42-1.63
Highest Education Level of Women			
No Education (Reference)			
Primary	1.19	0.000	1.09-1.29
Secondary	1.40	0.000	1.32-1.49
Higher	1.87	0.000	1.73-2.02
Wealth Quintile of women			
Poorest (Reference)			
Poorer	1.215	0.00	1.13-1.30
Middle	1.45	0.00	1.34-1.56
Richer	1.59	0.00	1.47-1.73
Richest	2.34	0.00	2.15-2.54
Total number of living children			
≤ 2	1.35	0.00	1.29-1.42
≥3 (Reference)			
Husband's Education			
No Education (Reference)			
Primary	1.06	0.63	0.83-1.35
Secondary	1.46	0.00	1.21-1.76
Higher	1.67	0.00	1.34-2.07

In this study, we included 25,474 reproductive age group women who had given birth in last five year. Only 41.6% of pregnant women obtained adequate ANC visits in U.P. Factors that had statistically significant association with antenatal visits are age, wealth quintile, birth order, education level, place of residence and partner's education level. 63.4% women in the age group of 15-19 had taken maximum inadequate ANC visits. Women who had higher education level, richest wealth quintile, had more than two children, partner's highest education level and belong to urban area had obtained maximum adequate ANC visits (50.5%, 55%, 37.4%, 47.4% and 50% respectively). Compare to poorer women odds of taking adequate ANC visits is 2.34 times higher in richest women. Odds of taking adequate ANC visits is 1.27 in women (25-29) in compared to women (15-19). Women living in urban U.P. had higher odds (1.52) of adequate ANC visits compared to their rural counterparts. Women giving birth to more than 2 child had 1.35 times odds of adequate ANC visits compared to women having less than or equal to 2

children. Women with higher education level had 1.87 times odds of ANC visits compared to women with no education.

DISCUSSION

The findings of this study, particularly those related to the factors influencing antenatal care (ANC) utilization, are largely consistent with the existing body of research on maternal health. In this study, only 41.6% of women received adequate ANC visits in Uttar Pradesh, which is lower than the national average reported in other studies. For instance, it was reported that in Madhya Pradesh, 57% of women received at least four ANC visits [13]. This discrepancy reflects regional differences in healthcare access across India, with states like Uttar Pradesh having weaker maternal healthcare systems compared to more developed regions like Kerala, where ANC utilization is much higher, 93.1% of women receiving adequate ANC [14]. The strong influence of socio-economic status on ANC utilization in this study is consistent with numerous studies across India. A study of antenatal care utilization in Nigeria, found that wealthier

women were significantly more likely to receive adequate ANC, a finding echoed in our study where the richest women had 2.34 times higher odds of receiving adequate ANC compared to the poorest women [15]. Similarly, it was reported that wealthier women in high-focus Indian states were more likely to receive adequate ANC, emphasizing that financial constraints remain a major barrier to accessing maternal healthcare in India's poorer regions [14]. The study's finding that higher education levels significantly improve the odds of adequate ANC visits, 1.87 times higher in women with higher education compared to those with no education. Bhandari et al. found that women's education in Nepal was a significant predictor of ANC utilization, with more educated women being more likely to access maternal healthcare services [16]. This trend is common in low economic countries, where education improves health literacy and decision-making autonomy, which, in turn, leads to better healthcare-seeking behavior. Similarly, A study found that education not only enhances a woman's ability to access care but also her understanding of the importance of regular ANC visits [17]. The urban-rural disparity highlighted in this study, where urban women had 1.52 times higher odds of receiving adequate ANC compared to their rural counterparts, also aligns with previous findings. Urban-rural divide in maternal healthcare utilization in India, found that urban women are significantly more likely to receive ANC due to better healthcare infrastructure and higher literacy levels in urban areas [18]. Similar disparities have been documented in Indonesia, where rural women faced more barriers to accessing healthcare services, from longer travel distances to fewer available facilities [19]. The study revealed that younger women, particularly those aged 15-19, were less likely to receive adequate ANC, with 63.4% reporting inadequate visits. This finding is consistent with Singh et al., who noted that adolescent mothers in India are less likely to access maternal healthcare services

compared to older women [14]. Adolescents often face additional barriers, including lack of financial independence, limited autonomy in healthcare decision-making, and greater stigma associated with pregnancy at a young age. Moreover, the increased likelihood of adequate ANC visits among women with more than two children in our study is supported by other study, who found that women with higher parity are more familiar with the healthcare system and are more likely to seek maternal care [13].

CONCLUSION

In summary, the study shows that socioeconomic status, education, and urban residence are significant predictors of adequate ANC utilization, with wealthier, more educated women, particularly those in urban areas, being more likely to receive adequate ANC services. Women in the youngest age group and those from poorer households are at a higher risk of inadequate ANC visits, highlighting disparities in access to maternal healthcare in U.P. The consistent challenges reported, suggest that addressing these social determinants of health through policy interventions such as improving education, reducing economic barriers, and expanding rural healthcare infrastructure remains crucial for improving maternal health outcomes.

Strengths:

One of the key strengths of this analysis is the use of data from the most recent iteration of a nationally representative survey (NFHS-5). This ensures that the findings are generalizable to the population of reproductive-age women in India, specifically Uttar Pradesh.

Comprehensive Analysis: The study explored the interaction between adequate antenatal care (ANC) visits and various socio-economic factors, such as age, education, wealth quintile, residence, and partner's education. This allows for a more nuanced understanding of the factors influencing ANC utilization.

LIMITATIONS

Self-Reported Data: The reliance on self-reported responses from the NFHS-5 survey may introduce recall bias, as women may not accurately remember the number of ANC visits or other related behaviors.

Limited Focus: While the study focuses on ANC visits as a key indicator of maternal healthcare, it does not take into account other essential health behaviors during pregnancy, such as iron supplementation and tetanus toxoid vaccination, which are also important for maternal and child health.

Declaration by Author

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REFERENCES

1. Meh C, Sharma A, Ram U, Fadel S, Correa N, Snelgrove JW, et al. Trends in maternal mortality in India over two decades in nationally representative surveys. *Bjog*. 2022; 129(4):550–61. Epub 20210915. <https://doi.org/10.1111/1471-0528.16888> PMID: 34455679; PubMed Central PMCID: PMC9292773.
2. United Nations. Transforming our world: the 2030 Agenda for Sustainable Development. 2015. 3. World Health Organization.
3. Trends in maternal mortality: 2000 to 2017: estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. Geneva: World Health Organization, 2019.
4. Lee HY, Oh J, Kim R, Subramanian SV. Long-term trend in socioeconomic inequalities and geographic variation in the utilization of antenatal care service in India between 1998 and 2015. *Health Serv Res*. 2020; 55(3):419–31. Epub 20200304. <https://doi.org/10.1111/1475-6773.13277> PMID: 32133652; PubMed Central PMCID: PMC7240766. 10.
5. Ogbo FA, Dhama MV, Ude EM, Senanayake P, Osuagwu UL, Awosemo AO, et al. Enablers and barriers to the utilization of antenatal care services in India. 2019.
6. World Health Organization. WHO recommendation on antenatal care for positive pregnancy experience. Geneva: WHO, 2016
7. Rustagi R, Basu S, Garg S, Singh MM, Mala YM. Utilization of antenatal care services and its sociodemographic correlates in urban and rural areas in Delhi, India. *Eur J Midwifery*. 2021; 5:40. Epub 20210910. <https://doi.org/10.18332/ejm/140459> PMID: 34585106; PubMed Central PMCID: PMC8431095
8. Turan JM. Community-based antenatal education in Istanbul, Turkey: effects on health behaviours. *Health Policy and Planning*. 2003; 18(4):391–8. <https://doi.org/10.1093/heapol/czg047> PMID: 14654515
9. World Health Organization. WHO antenatal care randomized trial: manual for the implementation of the new model. Geneva: World Health Organization, 2002 2002. Report No.: 9241546298 Contract No.: WHO/RHR/01.30
10. Dixit P., Dwivedi L.K., Ram F. Strategies to improve child immunization via antenatal care visits in India: a propensity score matching analysis. *PLoS One* 2013;8:e66175
11. World Health Organization. Make every mother and child count. The world health report. Geneva: World Health Organization; 2005. p. 229. <https://www.who.int/data/gho/indicator-metadata-registry/imr-details/80>
12. International Institute for Population Sciences—IIPS/India, ICF. India national family health survey NFHS-5 2019–21. Mumbai, India: IIPS and ICF, 2022.
13. Jat TR, et al. "Factors affecting the use of maternal health services in Madhya Pradesh state of India: a multilevel analysis." *International Journal for Equity in Health*, 2011.
14. Singh PK, et al. "Factors associated with maternal healthcare service utilization in nine high-focus states in India: a multilevel analysis based on the DLHS-3." *BMC Pregnancy and Childbirth*, 2012.
15. Fagbamigbe AF, Idemudia ES. "Barriers to antenatal care use in Nigeria: evidences from non-users and implications for maternal health programming." *BMC Pregnancy and Childbirth*, 2015.
16. Bhandari R, et al. "Antenatal care utilization in Nepal: a multilevel analysis." *BMC Pregnancy and Childbirth*, 2016.

17. Desai S, Johnson K. "Women's education and reproductive behavior: recent evidence from the Demographic and Health Surveys." *Studies in Family Planning*, 2005.
18. Kumar A, Singh A. "Explaining the gap in antenatal care service utilization between urban and rural India." *PLoS ONE*, 2015.
19. Titaley CR, et al. "Determinants of the use of antenatal care services in developing countries: a systematic review." *PLoS ONE*, 2010.

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