ORIGINAL ARTICLE

Effectiveness of Adequate Antenatal Care in Reducing Adverse Perinatal Outcomes: A Cross-Sectional Study from an Urban Health Centre in Meerut, Uttar Pradesh

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ABSTRACT
Background: Antenatal care is a key preventive strategy to reduce maternal and neonatal morbidity and mortality. The World Health Organization recommends a minimum of eight visits during pregnancy to optimize outcomes. Adequate ANC facilitates early detection and management of obstetric complications and promotes safe delivery practices. **Objectives**: To assess the effectiveness of adequate ANC in reducing adverse perinatal outcomes and to determine its association with pregnancy outcomes among women attending an urban health center. **Methods:** A cross-sectional study was conducted among 252 antenatal women attending Urban Health and Training Centre, Multan Nagar, Meerut, Uttar Pradesh. Participants were selected using purposive sampling. Data were collected using a semi-structured questionnaire covering socio-demographic profile, obstetric history, ANC visits, Td vaccination, IFA and pregnancy outcomes. Data were analyzed using Microsoft Excel. **Results**: Most participants were aged between 15–25 years (59.52%). Nearly half (48.81%) had three ANC visits, while only 16.27% completed four visits. Td vaccination coverage was 83.33%, and 48.81% consumed IFA for three months. Institutional deliveries were 94.84%. Most newborns had normal birth weight, though 40.08% were low birth weight. **Conclusion:** ANC attendance was associated with favourable outcomes; however, adherence to recommended visits was suboptimal so early registration and follow-up is essential.

KEYWORDS
Antenatal Care, Perinatal Outcomes, Institutional Delivery, Low Birth Weight, Maternal Health.

INTRODUCTION
Antenatal care (ANC) plays a crucial role in detecting women with higher risk for unfavourable pregnancy outcomes(1). ANC refers to preventive healthcare provided by trained professionals to pregnant women, ensuring the best outcomes for both mother and baby by identifying and managing potential risks during pregnancy(2). The World Health Organization advises a minimum of four ANC visits, starting in the first trimester, to minimize the risk of illness and death among mothers and newborns (3). According to the WHO, ANC services include detecting and managing obstetric complications ,providing immunization and screening for conditions like anemia, haemorrhage, HIV, syphilis, and other STIs (4). ANC plays a vital role in meeting the SDGs, which target to reduce the maternal mortality to fewer than 70 per 100,000 live births by 2030. (1) Regular antenatal visits can significantly enhance the survival of mother and baby. Additionally, other beneficial interventions, including immunization, nutritional support, and family planning were also provided, all of which contribute to improve health outcomes. (5)

Aim and Objectives

- To assess the effectiveness of adequate Antenatal care in mitigating adverse perinatal outcomes
- To determine it's association with pregnancy outcomes.
- To evaluate the influence of socioeconomic factors on ANC utilization and pregnancy outcome.

MATERIAL & METHODS
Study Type and Study Design: Cross-sectional study
Study setting: Urban Health and Training Centre, Multan Nagar, Meerut, UP
Study population: ANC women visiting the centre
Study duration: 3 years
Sample size calculation: All ANC women visiting the centre for last 3 years
Inclusion Criteria: ANC women visiting the centre within 3 years available and willing at the time of study

Exclusion Criteria: ANC women who were not willing or very ill at the time of study
Ethical issues and Informed consent: Taken
Data analysis software: SYSTAT
Sampling technique: Purposive sampling
Research tool: Self designed semi -structured questionnaire
Dependent variables: Effectiveness of adequate Antenatal care in pregnancy outcome
Independent variables: age, sex, education
Methodology: The present cross-sectional study was conducted among ANC women visiting Urban health and training centre, Multan Nagar, Meerut for the last 3 years. The purpose and objective of the study was explained to the women prior to the data collection. Data was collected on predesigned semi structured questionnaire which included details of socio-demographic variables like age, religion, education, income, parity, type of delivery, place of delivery, TD vaccination, ANC visits, IFA, duration of pregnancy, live birth/ stillbirth, gender of the baby and birth weight of the baby. Before filling the questionnaire, questions were explained to the women so that they could understand the questionnaire completely and could answer properly. Completion of questionnaire was assured at the time of collection. The data was entered and analyzed on excel sheet.

RESULTS

Table 1 shows that the majority of mothers (59.52%) were aged 15–25 years, indicating predominantly young reproductive age participants. All participants were Hindu, and nearly two-thirds had at least secondary education or above. Almost half (49.60%) belonged to the lower income group (<₹10,000), reflecting a predominantly lower socioeconomic background.

Table-1: Demographic Profile

Variables	Frequency	Percentage
Age		
15-25	150	59.52%
26-35	98	38.89%
>36	4	1.59%
Religion		
Hindu	252	100%
Muslim	0	0%
Education		
Primary Education	24	9.52%
Secondary Education	92	36.51%
Intermediate Education	67	26.59%
Graduates	69	27.38%
Income		
<10000	125	49.60%
11000-20000	106	42.06%
>20000	21	8.34%
Total	252	100%

Table 2 shows that most deliveries were normal vaginal deliveries (58.33%), while 41.67% underwent cesarean section. Majority of the deliveries were conducted in private hospitals accounted for 49.6%, followed by government hospitals with 45.24%. All births were live and term, with the majority of newborns (58.33%) having a birth weight between 2.5–3.5 kg, suggesting generally favorable pregnancy outcomes.

Table-2: Delivery Outcome

Variables	Frequency	Percentage
Type of Delivery		
Normal Delivery	147	58.33%
Cesarean Section	105	41.67%
Place of Delivery		
Government Hospital	114	45.24%
Private Hospital	125	49.60%
Home Delivery	13	5.16%
Gender of Baby		
Male	150	59.52%
Female	102	40.48%
Birth Weight (kg)		
< 2.5	101	40.08%
2.5-3.5	147	58.33%
>3.5	4	1.59%
Type of Birth		
Still Birth	0	0%
Live Birth	252	100%
Gestational Age		
Pre-term	0	0%
Term	252	100%
Post-term	0	0%

Table 3 shows that nearly half of the mothers (48.81%) had three ANC visits, while only 16.27% completed four visits, indicating suboptimal adherence to recommended ANC schedules. A high proportion (83.33%) received two doses of Td vaccine. IFA consumption for three months was reported by 48.81%, reflecting moderate compliance with antenatal supplementation.

Table-3: Frequency and Indication of Antenatal Check-ups

Variables	Frequency	Percentage
ANC Visits		
1 Visit	4	1.59%
2 Visits	84	33.33%
3 Visits	123	48.81%
4 Visits	41	16.27%
Td Vaccine		
0	17	6.75%
1	25	9.92%
2	210	83.33%
IFA Tablets		
1 Month	3	1.19%
2 Month	80	31.75%
3 Month	123	48.81%
4 Month	46	18.25%

Most women were multigravida (57.15%), with 42.06% being primigravida. Nearly all participants (97.62%) had parity between 1–3. This distribution suggests a predominantly low-to-moderate risk obstetric population.

Table-4: Obstetric History

Parity		
Nulliparous	0	0%
1-3	246	97.62%

>4	6	2.38%
Gravida		
Primigravida	106	42.06%
Multigravida	144	57.15%
Grand Multipara	2	0.79%

DISCUSSION

The present study evaluated maternal demographic characteristics, antenatal care utilization, obstetric profile, and delivery outcomes among 252 mothers. The findings are discussed in light of existing national and international evidence.

The majority of participants (59.52%) were aged 15–25 years, which aligns with findings from the National Family Health Survey (NFHS-5, 2019–21) showing that early marriage and early childbearing remain prevalent in several parts of India. Similar age distributions have been reported by Singh et al. and Sharma et al., where most deliveries occurred among women below 30 years. The low proportion (1.59%) of mothers above 36 years in our study is comparable to other community-based Indian studies, indicating limited representation of advanced maternal age pregnancies.

Educational status in the present study showed that over 90% of women had education beyond primary level. NFHS-5 also reports a steady improvement in female literacy, which has been positively associated with better ANC utilization and institutional delivery rates. Studies by Titaley et al. and Bloom et al. have demonstrated that maternal education significantly improves healthcare-seeking behavior, a finding reflected in our relatively good ANC coverage.

Despite reasonable educational status, nearly half of the families (49.60%) had a monthly income below ₹10,000. Socioeconomic status has consistently been identified as a determinant of maternal health service utilization. Similar observations were reported by Goli et al., where lower income groups were less likely to complete recommended ANC visits and institutional deliveries.

Regarding obstetric profile, 57.15% of women were multigravida, consistent with findings from various Indian community studies that report a higher proportion of multiparous women in rural and semi-urban settings. However, the proportion of grand multipara (0.79%) in our study was lower compared to earlier national data, possibly reflecting improved family planning awareness.

Antenatal care utilization in this study was encouraging, with 65.08% of women completing at least three ANC visits. NFHS-5 reports that approximately 58.1% of women in India had four or more ANC visits, suggesting that while ANC attendance in our study is comparable, there remains scope for achieving full compliance with WHO's recommended minimum of four visits (recently updated to eight contacts).

Td immunization coverage was high (83.33% received two doses), consistent with NFHS-5 findings, which report over 85% tetanus toxoid coverage nationally. This indicates effective implementation of immunization services under the Universal Immunization Programme.

Iron and folic acid (IFA) supplementation compliance, however, was suboptimal in terms of duration. Although nearly half consumed IFA for three months, only 18.25% continued for four months. NFHS-5 reports that only about 44% of pregnant women consume IFA for 100 days or more, suggesting that poor compliance is a widespread issue. Similar findings have been reported in studies by Rai et al., citing side effects, forgetfulness, and lack of counseling as barriers.

With respect to delivery outcomes, 58.33% had normal vaginal delivery, while 41.67% underwent cesarean section. The cesarean rate in this study appears higher than the WHO recommended population-level rate of 10–15%. NFHS-5 reports a national cesarean rate of approximately 21.5%, though it is significantly higher in private facilities. The higher rate observed in our study may reflect referral bias or increased institutional access.

Institutional deliveries accounted for 55.16% (government and private combined), which is lower than the national average of 88.6% reported in NFHS-5. The relatively high home delivery rate (44.84%) indicates persistent barriers to institutional access in the study area, possibly linked to socioeconomic or cultural factors.

All births were live and term deliveries, which is a favorable finding. However, 40.08% of newborns weighed below 2.5 kg, indicating a considerable burden of low birth weight (LBW). NFHS-5 reports an LBW prevalence of approximately 18–22% in India, suggesting that the LBW proportion in our study is comparatively higher. Similar elevated LBW prevalence has been observed in lower socioeconomic populations, as reported by Metgud et al., where maternal nutrition and anemia were significant predictors.

Overall, while antenatal coverage and immunization indicators in this study are comparable to national averages, concerns remain regarding high cesarean rates, substantial home deliveries, and increased prevalence of low birth weight. These findings highlight the need for strengthened maternal nutrition programs, improved counseling on IFA adherence, and enhanced institutional delivery promotion.

CONCLUSION

The study demonstrates that antenatal care (ANC) contributes to favorable pregnancy outcomes, as reflected by high institutional deliveries (94.84%) and term live births (100%). A majority of newborns (58.33%) had normal birth weight, though a substantial proportion (40.08%) were low birth weight. Coverage of Td immunization was high (83.33%), while 48.81% of women consumed iron–folic acid for three months. However, adherence to recommended ANC visits was suboptimal, with only 16.27% completing four visits and 48.81% attending three visits. Despite this, outcomes remained generally positive. Strengthening early registration, improving awareness, and ensuring adequate ANC visits are essential to further enhance maternal and neonatal health outcomes.

RECOMMENDATION

The present study highlights the need of promoting early registration and ensuring completion of the recommended number of ANC visits through targeted awareness and follow-up strategies. Strengthening counseling on iron–folic acid supplementation and continuous monitoring of high-risk pregnancies is essential. Improving accessibility and quality of ANC

services, especially among lower socioeconomic groups, can further enhance maternal and neonatal health outcomes.

RELEVANCE OF THE STUDY

The study highlights that even suboptimal ANC attendance was associated with generally favorable outcomes, while identifying gaps in recommended visit adherence and IFA compliance. It emphasizes the need for strengthening ANC utilization and follow-up in urban low-resource settings to further improve maternal and neonatal health outcomes.

AUTHORS CONTRIBUTION

All authors have contributed equally.

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Nil

CONFLICT OF INTEREST

There are no conflicts of interest.

DECLARATION OF GENERATIVE AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

The authors haven't used any generative AI/AI assisted technologies in the writing process.

REFERENCES

1. Tabi SA, Dassah ET, Asubonteng GO, Ankobea F, Annan JJK, Senu E, Opoku S, Opoku E, Addo HSO. An assessment of the quality of antenatal care and pregnancy outcomes in a tertiary hospital in Ghana. *PLoS ONE* 2022; 17(10) 1-13.
2. Keya TA, Fernandez K, Kharkwal KC, Habib N. Impact of antenatal care on pregnancy outcomes: a cross sectional study in a rural community in Malaysia. *Medical Journal of Dr. D.Y. Patil Vidyapeeth* 2021; 14(2) 172-179.
3. Mina M, Nuruzzaman M, Habib M, Rahman M, Chowdhary FM, Ahsan SN, Ahmed FF, Azizi S, Mubin N, Kibria AHMG, Shuchi FA. The effectiveness of adequate antenatal care in reducing adverse perinatal outcomes: Evidence from a low or middle-income country. *Cureus* 2023; 15(12) 1-8.
4. Lim SWC, Foo SA, Chyan HG, Mathur M. Antenatal and fetal outcomes in the absence of antenatal care: a retrospective cohort study. *International Journal of reproduction, Contraception, Obstetrics and Gynecology* 2024; 13(6) 1376-1382.
5. K A, Kumar P, Bhavani K. A study on role of antenatal care in pregnanacy outcome in tertiary health care centre, Hydrabad. *Journal of Maternal and Child Health* 2022; 7(6) 653-661.
6. International Institute for Population Sciences (IIPS) and ICF. National Family Health Survey (NFHS-5), 2019–21: India. Mumbai: *IIPS*; 2021.
7. Singh PK, Rai RK, Alagarajan M, Singh L. Determinants of maternity care services utilization among married adolescents in rural India. *PLoS One*. 2012;7(2):e31666.
8. Sharma SK, Sawangdee Y, Sirirassamee B. Access to health: women's status and utilization of maternal health services in India. *J Biosoc Sci.* 2007;39(5):687-705.
9. Bloom SS, Wypij D, Gupta MD. Dimensions of women's autonomy and the influence on maternal health care utilization in a North Indian city. *Demography*. 2001;38(1):67-78.
10. Goli S, Doshi R. Correlates of maternal healthcare utilization in India: evidence from NFHS. *J Health Popul Nutr*. 2013;31(4):S1-S12.
11. World Health Organization. WHO recommendations on antenatal care for a positive pregnancy experience. Geneva: *WHO*; 2016.
12. Rai RK, Fawzi WW, Barik A, Chowdhury A. The burden of iron-deficiency anemia among women in India. *PLoS One.* 2018;13(6):e0198129.
13. World Health Organization. WHO Statement on Caesarean Section Rates. Geneva: *WHO*; 2015.
14. Metgud CS, Naik VA, Mallapur MD. Factors affecting birth weight of a newborn – a community-based study in rural Karnataka, India. *PLoS One.* 2012;7(7):e40040.
15. UNICEF. Low Birthweight: Country, regional and global estimates. New York: *UNICEF*; 2019.