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Original Research Article

Antenatal Care Services and its correlation with Outcomes of Pregnancy amongst Beneficiaries in Rural Health Training Center Jetalpur, Ahmedabad

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ABSTRACT

Background: Antenatal care is crucial for reducing maternal and neonatal mortality by ensuring the health of both the mother and fetus during pregnancy. Effective ANC services can significantly impact pregnancy outcomes, especially in rural settings where healthcare access is often limited. Our study aimed to evaluate the antenatal care services provided at a rural health center in Gujarat, India, focusing on early pregnancy registration rates, anemia prevalence, compliance with Iron-Folic Acid (IFA) supplementation, and delivery outcomes.

Material and Methods: A cross-sectional, record-based study was conducted at Jetalpur, PHC, a Rural Health Training Centre under Narendra Modi Medical College, Ahmedabad, using Technology for Community Health Operations (TeCHO+). Data from 387 pregnant women registered between April 2021 and March 2023 were analyzed using descriptive and comparative statistics.

Results: The study found a high early pregnancy registration rate of 89.66%, reflecting effective community outreach. However, anemia prevalence was significant at 78.87%, and only 3.79% of women completed the full course of IFA supplementation. Normal deliveries accounted for 71.21% of births, while Cesarean sections were 28.78%. Preterm births were recorded at 28.79%.

Conclusions: The study underscores the need for enhanced health strategies in rural areas to address anemia and improve compliance with ANC protocols. Continued efforts are essential to strengthen maternal health services and reduce disparities in rural healthcare.

Keywords: Anemia, Antenatal Care, Maternal Health, Pregnancy Outcomes, Rural Health

INTRODUCTION

Antenatal care (ANC) is pivotal for improving maternal and neonatal outcomes by preventing and managing pregnancy-related complications. Globally, ANC is recognized as a key strategy to reduce maternal mortality, with a target set by the United Nations to reduce the maternal mortality ratio (MMR) to less than 70 per 100,000 live births by 2030.[1] Despite significant progress, maternal mortality remains high in many low-and middle-income countries (LMICs), including India.[2]

India's MMR has decreased substantially, from 130 per 100,000 live births in 2014-2016 to 97 per 100,000 in 2018-2020.[3] However, this still exceeds the MMR in high-income countries, which stands at less than 12 per 100,000 live births.[4] The disparities between rural and urban areas remain significant, with rural women facing higher risks due to limited access to quality healthcare services.[5]

In Gujarat, maternal health indicators have improved, yet challenges persist, particularly in rural areas where ANC coverage is suboptimal.[6] According to the National Family Health Survey (NFHS-5), 76% of rural women in Gujarat registered their pregnancies in the first trimester, and 73% completed at least four ANC visits.[7] However, anemia

among pregnant women remains high, with 67% of pregnant women in rural Gujarat found to be anemic.[7]

This study aims to assess the antenatal care provided at a Rural Health Training Centre (RHTC) in Ahmedabad Gujarat. By comparing findings from this center with other relevant studies, we aim to identify gaps and opportunities for improving maternal health services. In view of all these facts, this study aimed to evaluate the quality of antenatal care services provided at Jetalpur Primary Health Center (PHC). The objectives were to assess the adequacy of antenatal care services offered, evaluate the outcome and compare the findings with existing literature to identify strengths and areas for improvement in the provision of maternal and child health services at the PHC.

MATERIALS AND METHODS

This cross-sectional, record-based study was conducted at Jetalpur PHC, a Rural Health Training Centre (RHTC) under Narendra Modi Medical College, Ahmedabad, Gujarat. The study aimed to evaluate the antenatal and intra-natal care services provided to pregnant women at the center. Data were extracted from the TeCHO+ app for the period between April 2021 and March 2023. The study population consisted of all pregnant women registered at the PHC during this time, with a total of 387 beneficiaries included in the analysis.

Data collection from the TeCHO+ app was carried out by faculty members of the Community Medicine Department. The extracted data were entered into an Excel sheet using Microsoft Office 365 for organization and management. The entire data was statistically analyzed using Statistical Package for the Social Sciences (SPSS) 26.0 for MS Windows. The data on categorical variable is presented as number and percentage. Chi-square test was used to test the significance between two categorical variables. The data on continuous variable is presented as Mean, Median, Range, Standard Deviation (SD) and Interquartile range (IQR). The Shapiro-Wilk test was used to check the normality of the continuous variable. Unpaired t-test was used to test significance between two means. Comparative analysis was performed to align the study findings with results from other similar studies to identify patterns, gaps, and opportunities for improvement in antenatal care. Ethical approval for the study was granted by the Institutional Review Board (Approval No. AMC MET/IRB/2022/33).

RESULTS

The study analyzed data from 387 pregnant women who were registered at the Jetalpur PHC between April 2021 and March 2023. Out of total beneficiaries 264 women had delivery hence data of outcome of Pregnancy has been analyzed for 264 beneficiaries. The majority of the women (45.99%) were aged between 21-25 years, with a mean age of 24.21 years. The average weight at registration was 51.36 kg, with most women (43.93%) falling within the 41-50 kg weight range (Table-1).

Table-1: Age and Weight Distribution of Beneficiaries

Variable	Number (n=387)	Percentage (%)
Age (Years)		
16-20	85	21.96
21-25	178	45.99
26-30	85	21.96
31-35	26	6.72
36-40	13	3.36
Weight (kg)		
31-40	43	11.11
41-50	170	43.93
51-60	123	31.78
61-70	34	8.78
71-80	12	3.10
81-90	3	0.77
91-100	2	0.52
Indicators	**Mean (SD)**	**Median (IQR)**
Age of Mothers	24.21 (4.74)	23 (6)
Weight of Mother	51.36 (9.54)	50 (10)

The antenatal care indicators, including timing of registration, anemia prevalence, Iron-Folic Acid (IFA) supplementation and Td vaccination are summarized which shows, a significant majority (89.66%) of the women registered for ANC in the first trimester. Despite early registration, 78.88% of the women were found to be anemic (Hb cut off in pregnancy is 11gm/dl). Only 3.79% of women completed the full course of IFA supplementation.62.88% women had consumed partial course IFA Tablets because of lack of awareness and side effects. 58.39% women had 1st dose and 27.39% had booster dose of Td vaccine (Table-2).

Out of the 264 deliveries recorded, 62.50% occurred in private hospitals, 17.80% at the PHC and 19.70% in other government hospitals. 71.21% of deliveries were normal vaginal deliveries and 28.79% were caesarean. 80.68% deliveries conducted by doctors and 19.31% by staff nurses. The average birth weight was 2.89 kg, with 93.18% of the neonates weighing between 2.5-4.0 kg. Preterm births accounted for 28.79% of deliveries. The male-to-female birth ratio was found to be 1:0.91. 94.32% new born cried immediately after birth. 95.45% mothers breast fed their newborns within 1 hour of birth indicates good postnatal care (Table-3).

Table-2: Antenatal Care Services

Variable	Number	Percentage (%)
Pregnancy Registration Week (n=387)		
4-12 weeks	347	89.66
13-24 weeks	35	9.04
25-36 weeks	5	1.29
Haemoglobin (gm/dL) (n=387)		
7-7.9	4	1.03
8-8.9	13	3.36
9-9.9	90	23.26
10-10.9	188	48.58
11-11.9	71	18.35
=>12	8	2.07
Data not available	13	3.36
IFA Tablets (n=264)		
Full Course	10	3.79
Partial Course	166	62.88
Data not available	88	33.33
Td Dose (n=387)		
Td-1	226	58.39
Td-2	141	36.43
Td-Booster	106	27.39
Data not available	35	9.05
Indicators	**Mean (SD)**	**Median (IQR)**
Hb (n=374)	10.10 (0.75)	10 (1)
Pregnancy Week (n=387)	9.67 (4.14)	9 (4)

Table-3: Maternal and Fetal outcome of pregnancy (n=264)

Variable	Number	Percentage (%)
Place of Delivery		
Private Hospital	165	62.50
PHC	47	17.80
Others	52	19.70
Weeks at Term		
< 28 weeks	2	0.76
28-32 weeks	6	2.27
33-36 weeks	68	25.76
≥ 37 weeks	188	71.21
Birth Weight (kg)		
2.5-4.0	247	93.56
1.5-2.49	16	6.06
< 1.5	1	0.38
Infant cried immediately after birth	249	94.32
Breastfeeding initiated after birth	252	95.45
Indicators	**Mean (SD)**	**Median (IQR)**
Birth Weight	2.89 (0.40)	2.80 (0.50)
Post partum hospital stay	1.72 (1.29)	2 (1)

Mean birth weight of babies whose mother's age ≥ 20 years was significantly heavier (p=0.008) denotes mother's elder age (≥ 20) is a promoting factor for baby's normal birth weight. Mothers with low weight (< 45 kg) significantly delivered low birth weight baby (p=0.003). Mother's weight is equally important for baby's good weight. Mean birth weight was significantly higher among those babies who registered before 12 weeks of gestation (p=0.001). So, we can give proper antenatal care for optimum duration if woman get registered before 12 weeks. Mother's hemoglobin has crucial role in fetus nourishment. As in our study mean birth weight is significantly higher in babies whose mother's hemoglobin was ≥ 11gm/dl (p=0.048) and same is applicable to consumption of IFA tablets during pregnancy had significantly (p=0.003) higher birth weight. The mean birth wight of babies who born on before 37 weeks was significantly low birth weight than who born after 37 weeks (p=0.000) (Table-4).

Table-4: Mother's parameter versus Baby's birth weight

Variable (n=264)		Mean (SD)	t value	p value
Mother's Age (years)	< 20 (n=32)	2.71 (0.47)	2.649	0.008
	≥ 20 (n=232)	2.91 (0.39)		
Mother's weight (kg)	< 45 (n=54)	2.75 (0.48)	3.005	0.003
	≥ 45 (n=209)	2.93 (0.37)		
Early registration (12 weeks)	Yes (n=229)	2.92 (0.38)	3.431	0.001
	No (n=35)	2.68 (0.42)		
Hemoglobin (gm/dl)	< 11 (n=218)	2.86 (0.41)	1.978	0.048
	≥ 11 (n=46)	2.99 (0.38)		
IFA tablets	Yes (n=176)	2.93 (0.37)	2.938	0.003
	No (n=88)	2.78 (0.43)		
Weeks at term (weeks)	< 37 (n=76)	2.71 (0.47)	4.413	0.000
	≥ 37 (n=188)	2.96 (0.35)		

Breastfeeding within the first hour of birth showed no significant association with infant gender (p=0.451). Among male infants, 96.38% were breastfed within the first hour, compared to 94.44% of female infants. As depicted in Figure-1, the rate of delayed breastfeeding initiation was low for both genders, with 5.56% in females and 3.62% in males.

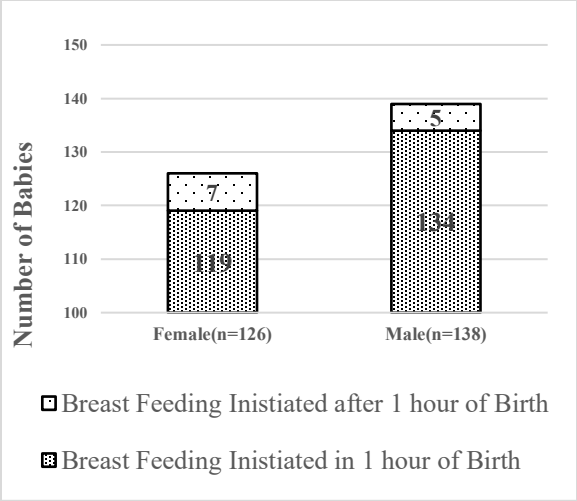

Figure-1: Breast feeding Initiation in 1 hour of birth

As shown in Figure-2, the study revealed a clear link between maternal age and birth outcomes. Mothers under 20 years of age experienced a higher proportion of preterm births (56.25% preterm, 43.75% full-term) compared to mothers over 20 years (25% preterm, 75% full-term), suggesting that younger mothers may have a higher risk of preterm birth (p=0.0002).

Figure-2: Impact of Maternal Age on Preterm and Full-term Birth Outcomes

As shown in Figure-3, delivery types were significantly associated with the place of delivery (p=0.0001). In private hospitals, the rate of Caesarean sections was notably higher (36.97%) than in government hospitals (15.15%). Conversely, normal deliveries were more common in government hospitals (84.85%) than in private hospitals (63.03%). This difference suggests variations in delivery practices between private and government healthcare facilities.

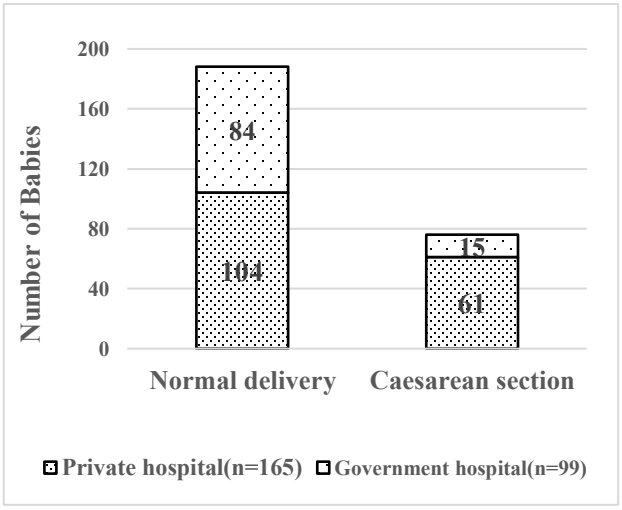

Figure-3: Comparison of Delivery Types in Private versus Government Hospitals

As far as vaccination at birth is concerned, the administration rates among newborns were high for Vitamin K (95.83%) and Hepatitis B (95.07%), indicating strong adherence to these protocols. Oral Polio Vaccine (OPV) was given to 84.09% of infants, slightly lower but still significant. However, BCG coverage was only 57.57%, suggesting challenges in ensuring timely administration of this vaccine. Overall, the results highlight good compliance for Vitamin K and Hepatitis B, with room for improvement in OPV and BCG vaccination rates.

Details of contraceptives practices showed that only 110 mothers had accepted any of the temporary or permanent contraceptive methods: 68 had barrier method, 33 had IUCD, 6 had pills and only 3 had accepted TL as a permanent sterilization.

DISCUSSION

The findings of this study highlight several important aspects of antenatal, intra-natal and postnatal care at the Jetalpur PHC, with both strengths and areas needing improvement.

Socio-demographic: The significant link between maternal age and breastfeeding initiation is supported by studies like Randhava et al in Patiala[8] and Prasad et al. (2020) in Pondicherry,[9] both indicating that younger mothers, particularly those under 20, are less likely to initiate breastfeeding early. This highlights the need for targeted educational efforts for younger mothers. The lack of a significant association between infant gender and breastfeeding initiation aligns with studies like Hassan et al.

(2018) in rural India[10] and Senanayake et al. (2019) in Bangladesh,[11] both of which found no gender-based differences in breastfeeding initiation. This suggests that other factors, such as maternal characteristics or hospital practices, may be more influential.

Antenatal Care: The early registration rate of 89.66% is a positive indicator of effective community outreach and awareness campaigns in the area, outperforming the national average (Sharmaet et al.).[12] However, the high prevalence of anemia among pregnant women (78.87%) mirrors the widespread issue seen across rural India, particularly in India (Sinhaet al).[13] This suggests a persistent challenge in addressing nutritional deficiencies despite efforts to improve ANC services. The low IFA compliance rate (3.79%) is particularly concerning and points to possible gaps in health education, follow-up, or accessibility to supplements. Compared to rural Maharashtra's reported 12% completion rate, Jetalpur PHC's performance highlights a critical area for targeted intervention (Raminiet et al).[14] Comparative analysis with other studies underscores the strengths in early registration and normal delivery rates at Jetalpur PHC but also highlights the consistent challenge of anemia and preterm births, which are common issues across rural India. For example, while anemia prevalence in rural Dev Bhumi Dwarka, Gujarat is comparable (Sahaet et al),[15] Jetalpur's higher preterm birth rate and lower IFA compliance suggest that more focused interventions are needed. Studies from rural Tamil Nadu have shown that community-based interventions can significantly improve early registration and reduce preterm births, suggesting potential strategies that could be adapted (Gaitondeet et al).[16]

Intra-natal Care: The study showed a high rate of normal deliveries (71.21%), which is encouraging compared to the 64% normal delivery rate in rural Rajasthan (Iyengar et al).[17] This may indicate a strong intra-natal care protocol at the PHC and a higher level of maternal health. However, the preterm birth rate of 28.78% is notably higher than in other regions, such as Bihar (Kumaret et al).[18] This raises concerns about the underlying maternal health conditions or external factors such as stress, nutrition, or access to healthcare that could be contributing to this elevated risk.

Postnatal Care: The strong association between the place of delivery and breastfeeding initiation is consistent with findings from Riahana et al. (2021) in LMIC[19] and Kurniawan et al. (2021) in Indonesia.[20] Both studies found that mothers in government hospitals were more likely to initiate breastfeeding early, likely due to better breastfeeding support and policies. Aligning private hospital practices with government standards is essential to ensure consistent breastfeeding support.

CONCLUSIONS

The findings from this study underscore the effectiveness of antenatal care services at Jetalpur PHC, particularly in achieving early registration and high normal delivery rates. However, the persistent challenges of anemia and low compliance with IFA supplementation highlight areas that need targeted interventions. The high rate of preterm births also suggests a need for more focused maternal health strategies in this rural setting.

Additionally, the study reveals important associations between maternal age, place of delivery, and early breastfeeding initiation. Younger mothers, particularly those under 20, were more likely to deliver preterm baby and less likely to initiate breastfeeding early, indicating the need for targeted educational efforts to increase awareness of breastfeeding benefits. The significant influence of the place of delivery on breastfeeding practices, with government hospitals showing better outcomes, emphasizes the necessity to align private hospital practices with those of government facilities to ensure consistent breastfeeding support.

Continued efforts to strengthen maternal health services, address deliveries at PHC, ensure compliance with ANC protocols, and promote early breastfeeding practices are essential to improving maternal and neonatal outcomes in rural areas of Gujarat.

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