

Maternal Health, Antenatal Care Utilization and Neonatal Outcomes in Rural Waghodia, Vadodara, Gujarat: A Community-Based Observational Study

Dr. Kunadoddi Archana¹, Dr. Anil Kumar², Dr. Sriramula Priyanka³, Dr. Raj Kumar Modepu⁴, Dr. Niraj Pandit⁵

¹ Associate Professor, Department of Community Medicine, CMR Institute of Medical Sciences, Medchal, Telangana, India.

Email: k.archanadavid123@gmail.com

² Associate Professor, Department of Community Medicine, CMR Institute of Medical Sciences, Medchal, Telangana, India.

Email: rxanil411@gmail.com

³ Associate Professor, Department of Community Medicine, CMR Institute of Medical Sciences, Medchal, Telangana, India.

Email: priyankasriramula28@gmail.com

⁴ Senior Resident, Government Medical College, Jayashankar Bhupalpally, Telangana, India.

Email: rajkumar.modepu16@gmail.com

⁵ Professor and Head, Department of Community Medicine, Sumandeep Vidyapeeth, Piparia, Vadodara, Gujarat, India.

Email: dmiraj74@gmail.com

Corresponding Author

Dr. Umer Farooq

Associate Professor, Department of Community Medicine, Muzaffarnagar Medical College.

Email: umerbanday1983@gmail.com

Abstract

Introduction: Antenatal, intranatal and postnatal services are central to preventing avoidable maternal and neonatal morbidity. Their value is particularly important in rural communities, where education, household resources, distance and perceived need may influence service use.

Aim and objectives: This study assessed maternal characteristics, use of maternal health services and neonatal outcomes among pregnant women registered at Anganwadi centres in rural Waghodia, Vadodara, and examined relationships between maternal factors and newborn outcomes.

Materials and methods: A community-based observational study with retrospective and prospective components was conducted from March to December 2017. All 122 eligible pregnant women registered at seven Anganwadi centres were enrolled after ethical approval and informed consent. Participants were followed through pregnancy, delivery and the first 28 days of neonatal life. Data were summarized using descriptive statistics and associations were examined with the chi-square test.

Results: Most women received at least four antenatal visits, while anaemia and excess weight were common. Of 121 recorded birth outcomes, 83 newborns had normal birth weight and 38 had low birth weight. Breastfeeding within one hour was reported for approximately half of the newborns. Low birth weight was more frequent among preterm and post-term newborns, and low birth weight was associated with greater reported neonatal infection and diarrhoea.

Conclusion: The study demonstrates strong contact with antenatal services but continuing gaps in nutritional health, timely breastfeeding and newborn risk prevention. Preconception counselling, focused anaemia and weight management, early breastfeeding support and closer follow-up of small or preterm newborns should be strengthened in rural programmes..

Keywords: antenatal care; maternal health; neonatal health; low birth weight; breastfeeding; rural India..

INTRODUCTION

Antenatal care begins after conception and continues throughout pregnancy. It provides an opportunity to monitor maternal and fetal health, identify complications, administer immunization and supplements, promote birth preparedness, and connect women with skilled care at delivery (1,2,3). The broader purpose is not simply to count visits, but to ensure that each contact delivers effective assessment, counselling, prevention and referral..

Evidence from low- and middle-income settings shows that utilization is shaped by social and economic circumstances, education, perceived risk, distance to facilities and the organization of services(4,5,6,7). In India, routine maternal care generally includes clinical examinations, blood-pressure and weight monitoring, haemoglobin assessment, iron-folic acid supplementation, tetanus protection, counselling and postnatal guidance.(8)

Maternal health and newborn health are closely linked. Anaemia, undernutrition, obesity, short stature, advanced maternal age, prematurity and inadequate care can influence delivery and neonatal outcomes. Low birth weight is particularly important because it increases vulnerability to infection, diarrhoeal disease and other complications during early life (9,10,11,12). Although national programmes have improved access, local data are needed to identify gaps within specific rural populations. This study therefore examined maternal characteristics, service utilization and neonatal outcomes among women registered at Anganwadi centres in Waghodia town, Vadodara district, Gujarat.

Aim

To determine the relationship between maternal characteristics, utilization of antenatal, intranatal and postnatal services, and health outcomes among mothers and newborns in rural Waghodia, Vadodara.

Objectives

To describe maternal sociodemographic, anthropometric and clinical characteristics.

To assess access to and utilization of antenatal, delivery and postnatal care.

To describe newborn health at birth and during the neonatal period.

To examine associations between maternal factors, health-service use and newborn outcomes.

To identify practical strategies for addressing observed gaps in maternal and newborn care.

Materials and Methods

Study design and setting: This community-based observational study combined retrospective review with prospective follow-up. It was conducted in Waghodia town, Vadodara district, Gujarat, between March and December 2017. Seven Anganwadi centres were included. The town is served by a primary health centre, a community health centre and nearby teaching hospitals that provide maternal and child health services.

Participants and sampling: The study population comprised women aged 15–44 years who had registered their pregnancy at the selected Anganwadi centres during the defined nine-month period, together with their newborns. All 122 eligible women were included. Women outside the reproductive-age range, those not registered at the selected centres and those who declined participation were excluded.

Data collection and follow-up: Information was collected using a piloted, pretested questionnaire covering demographic characteristics, occupation, education, anthropometric measurements, clinical findings, antenatal visits, delivery, breastfeeding and neonatal health. Women were assessed during pregnancy and followed through pregnancy outcome. Newborns were assessed immediately after birth and during at least two home visits within the first 28 days. Written informed consent was obtained from participants and permission was obtained from the relevant authorities and ethics committee.

Analysis: Data were entered into Microsoft Excel and analyzed using SPSS version 20. Means and standard deviations were calculated for continuous variables, and frequencies and percentages for categorical variables. The chi-square test was used for bivariate associations. Maternal analyses used n=122; neonatal and delivery analyses used n=121 unless otherwise stated because one pregnancy ended before a live birth outcome was available.

Results

All 122 eligible women participated. The mean maternal age was 24.96 years (SD 4.46); 51.6% were aged 18–24 years. Most participants were Hindu, and 64.0% were literate. Most women were homemakers, while almost all spouses were employed in the private sector.

Table: 1. Sociodemographic characteristics of participants (n=122).

Characteristic	n	%
Age 18–24 years	63	51.6
Age 25–29 years	36	29.5
Age 30–35 years	23	18.9
Hindu religion	86	70.5
Muslim religion	36	29.5
Literate participant	78	64.0
Illiterate participant	44	36.0
Housewife	104	85.2

The participants were predominantly young adults, with more than half aged 18–24 years.

Nearly two-thirds were literate, although a substantial minority had no formal literacy.

The socioeconomic profile indicates that household and community-based services were important sources of care.

A total of 117 women (96.0%) reported four or more antenatal visits. Tetanus immunization was documented for 95.9%, and 95.9% were Rh positive. Anaemia was present in 45.1%. Nutritional and drug supplementation was obtained from an Anganwadi centre, a nearby private hospital or both for nearly all participants.

Table: 2. Maternal care utilization and selected health indicators (n=122).

Indicator	n	%
Four or more antenatal visits	117	96.0
Fewer than four antenatal visits	5	4.0
Complete tetanus immunization	117	95.9
Anaemia present	55	45.1
Previous contraceptive use	26	21.3
Received supplementation from Anganwadi and/or hospital	121	99.2
Elderly primigravida	10	8.2
Short stature (≤ 140 cm)	13	10.7
Overweight	45	36.9
Obesity	28	23.0

A high proportion of women had the minimum number of antenatal contacts recorded in the study.

Anaemia and elevated BMI were common and represent modifiable maternal risk factors.

The small group with fewer antenatal visits requires targeted counselling and follow-up.

Among 121 delivery outcomes, 80 (65.8%) were vaginal births and 41 (34.2%) were caesarean deliveries. There were 11 preterm, 101 full-term and 9 post-term births. The detailed outcome tables recorded 83 newborns with normal birth weight and 38 with low birth weight. Four newborns were classified as very low birth weight within the maturity-by-weight analysis.

Table: 3. Delivery and birth-weight outcomes (n=121).

Outcome	n	%
Vaginal delivery	80	65.8
Caesarean delivery	41	34.2
Preterm birth	11	9.1
Full-term birth	101	83.5
Post-term birth	9	7.4
Normal birth weight	83	68.6
Low birth weight	38	31.4

Approximately one-third of newborns had low birth weight, and preterm or post-term births were less common than full-term births.

Low birth weight was concentrated among preterm and post-term newborns in the cross-tabulated results.

The findings support continued risk-based monitoring beyond simply documenting antenatal attendance.

Breastfeeding within one hour was reported for 61 newborns (50.8%), while 27 (22.5%) began after one hour and 33 (26.7%) after two hours. Prelacteal feeding was reported for 35 newborns (29.2%). Low birth weight was associated with higher reported neonatal infection and diarrhoea than normal birth weight in the source analysis.

Table: 4. Early feeding and neonatal morbidity indicators (n=121).

Indicator	n	%
Breastfeeding initiated within 1 hour	61	50.8
Breastfeeding initiated after 1 hour	27	22.5
Breastfeeding initiated after 2 hours	33	26.7
Prelacteal feeding given	35	29.2
Exclusive breastfeeding/no prelacteal feed	85	70.8
Low-birth-weight newborns with reported infection	27	79.4
Normal-birth-weight newborns with reported infection	9	11.0
Low-birth-weight newborns with reported diarrhoea	24	70.6
Normal-birth-weight newborns with reported diarrhoea	18	20.7

Only about half of the newborns were breastfed within the first hour, and nearly one-third received a prelacteal feed.

Reported infection and diarrhoea were substantially more frequent among low-birth-weight newborns.

Early breastfeeding support and structured neonatal surveillance should be integrated into routine follow-up.

Discussion

This study presents a combined picture of maternal service utilization and newborn health in a rural population. The proportion of women reporting at least four antenatal visits was high. This may reflect the

availability of Anganwadi services, a primary health centre and nearby teaching hospitals. However, high attendance does not necessarily guarantee complete or high-quality care; each contact must include appropriate examination, counselling, supplementation and referral.(8)

Anaemia affected 45.1% of participants. Although the estimate was lower than that reported in some rural Indian studies, it remains clinically important because maternal nutritional status can influence fetal growth, birth weight and postpartum recovery. Strengthening haemoglobin screening, iron-folic acid adherence, dietary counselling and treatment follow-up is therefore warranted.(13)

More than half of the women were overweight or obese. Excess maternal weight is associated with hypertensive disorders, operative delivery and adverse perinatal outcomes, while inadequate weight can also compromise fetal growth. Preconception counselling and individualized weight management should be incorporated into reproductive and antenatal services.(14,15)

The study recorded low birth weight in nearly one-third of newborns. The pattern of higher low birth weight among preterm and post-term newborns is biologically plausible and emphasizes the importance of gestational-age assessment and timely referral. Small newborns also had more reported infection and diarrhoea, consistent with evidence that low birth weight increases vulnerability to early-life morbidity.(16)

Breastfeeding within the first hour was reported for only about half of the newborns, and prelacteal feeding remained common. This indicates a practical gap in intranatal and immediate postnatal care. Birth attendants, nurses and families should receive consistent counselling, and facilities should support skin-to-skin contact and breastfeeding initiation as soon as clinically feasible.(17,18)

The findings should be interpreted in light of several limitations. The study was conducted in one rural town and included a relatively small sample, so generalizability is limited. Several outcomes were based on participant reports and routine records. The source dissertation also contains small discrepancies in denominators and selected percentages; the manuscript presents the detailed cross-tabulated counts where available and clearly distinguishes the maternal denominator from the 121 birth outcomes. Larger multicentre studies using standardized definitions would improve precision.

Conclusion

Women in this rural population had high reported antenatal-care contact, but important maternal and newborn risks remained. Anaemia, overweight and obesity, delayed breastfeeding, prelacteal feeding and low birth weight require continued attention. Low-birth-weight newborns had a greater burden of reported infection and diarrhoea, underscoring the need for early identification and follow-up.

Rural maternal and newborn programmes should combine accessible antenatal services with stronger preconception counselling, nutrition and anaemia management, birth preparedness, immediate breastfeeding support and home-based neonatal monitoring. Community education through Anganwadi workers, health facilities and local media may help women and families recognize danger signs and seek skilled care promptly...

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