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RESEARCH ARTICLE
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TO ASSESS SOCIODEMOGRAPHIC PROFILE MORBIDITY AND MORTALITY PATTERN OF LOW BIRTH WEIGHT BABIES ADMITTED IN NICU OF TERTIARY CARE HOSPITAL OF SOUTHERN RAJASTHAN - A HOSPITAL BASED STUDY

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Abstract:
Background: Low birth weight (LBW) is a critical determinant of neonatal morbidity and mortality. Understanding its epidemiological, clinical, and demographic correlates is essential for improving outcomes.
Objective: To assess the sociodemographic characteristics, morbidity profile, and mortality outcomes of LBW babies admitted to the NICU of MBGH, Udaipur.
Methods: A hospital-based cross-sectional study was conducted over 12 months (September 2019–August 2020), including 350 LBW neonates admitted in NICU. Maternal and neonatal data were collected using structured proforma and analyzed using SPSS.
Results: Majority of mothers were from rural areas (66.9%) and Hindu religion (95.1%). Most mothers were in the 20–35 age group (58.9%). High illiteracy (29.7%), undernutrition (BMI <18.5 in 50%), and anemia (68.9% mild) were prevalent. Neonatal morbidities included sepsis, respiratory distress syndrome, and hypoglycemia. Mortality was significantly associated with very low birth weight, prematurity, and maternal risk factors like anemia and inadequate ANC visits.
Conclusion: The study identifies key sociodemographic and clinical factors contributing to poor outcomes in LBW babies in Udaipur. Strengthening antenatal care and targeting high-risk groups can reduce the LBW burden.

Keywords: Low birth weight, Neonatal morbidity, Neonatal mortality, Sociodemographic profile, NICU, Rajasthan

Introduction:

Low birth weight (LBW), defined by the World Health Organization as birth weight below 2500 grams, remains a major public health challenge worldwide**.(1)** It contributes significantly to neonatal morbidity and mortality, particularly in low- and middle-income countries**. (4)** According to the

National Family Health Survey-4 (NFHS-4), approximately 18.2% of newborns in India are of low birth weight, a figure that remains unacceptably high despite various maternal and child health interventions**. (5)** Rajasthan, with its unique mix of rural and tribal populations, poses additional challenges due to poor maternal nutrition, low education levels, and inadequate antenatal care services.

Multiple factors contribute to LBW, including maternal age, socioeconomic status, education level, nutritional status, parity, inter-pregnancy intervals, and access to health care services. These sociodemographic determinants interact with clinical factors such as preterm delivery, intrauterine growth restriction (IUGR), and maternal health conditions like anemia and infections. **(6,7,10)** LBW neonates are more susceptible to neonatal complications including hypoglycemia, sepsis, respiratory distress syndrome, hypothermia, and perinatal asphyxia, all of which can result in prolonged hospital stays, increased healthcare costs, and higher neonatal mortality rates**. (8,9)**

Despite national programs such as Janani Suraksha Yojana (JSY) and POSHAN Abhiyaan aiming to improve maternal and child health, regional disparities in neonatal outcomes persist. There is a critical need to evaluate local factors affecting LBW outcomes to develop targeted interventions. Udaipur district, served by Maharana Bhupal Government Hospital (MBGH), receives a large volume of neonatal admissions from both rural and urban catchments, offering an ideal setting for hospital-based research.

This study is undertaken to assess the sociodemographic profile of mothers, clinical characteristics of LBW neonates, and the pattern of morbidity and mortality among such admissions in the NICU of MBGH, Udaipur. By identifying the key risk factors, the study aims to contribute to the body of evidence required for planning effective neonatal care strategies in southern Rajasthan.

Methodology:

Study Design: Hospital-based cross-sectional observational study.

Study Setting: Neonatal Intensive Care Unit (NICU), Department of Pediatrics, Maharana Bhupal Government Hospital (MBGH), affiliated with RNT Medical College, Udaipur, Rajasthan.

Study Duration: September 2019 to August 2020.

Study Population: Inborn neonates admitted to NICU with birth weight less than 2500 grams within the first 72 hours of life.

Inclusion Criteria:

- Neonates with birth weight less than 2500 grams (LBW).
- Admitted to NICU within 72 hours of birth.
- Inborn deliveries conducted at MBGH.

Exclusion Criteria:

- Neonates with major congenital anomalies.
- Referred neonates with incomplete records.

Sample Size: 350 LBW neonates selected using universal sampling during the study period.

Data Collection Tools: A pre-tested structured proforma was used to collect maternal and neonatal data. Variables included maternal age, education, socioeconomic status, antenatal history, anemia, and nutritional status (BMI). Neonatal variables included birth weight category, gestational age, complications during NICU stay, duration of hospital stay, and final outcome (discharge/death).

Data Analysis: Data were entered in Microsoft Excel and analyzed using SPSS Version 17.0. Descriptive statistics (percentages, means) were used for summarizing data. Associations were tested using Chi-square tests for categorical variables and t-tests for continuous variables. Logistic regression analysis was used to identify predictors of neonatal mortality. A p-value of <0.05 was considered statistically significant.

Table 1. Residence of mother

Area	Numbers(n)
Rural	234(66.9%)
Urban	116(33.1%)
Total(N)	350

Out of total 350 total cases (LBW babies) included in this study, majority were from rural area 234 (66.9%) and nearly one third from urban area 116 (33.1%) only.

Table 2: Education of Mothers

Education level	Number(n)		Total(N=350)
	Urban	Rural	
Illiterate	5(4.2%)	99(42.9%)	104(29.7%)
Primary	22(18.5%)	48(20.8%)	70(20%)
Secondary	24(20.2%)	49(21.2%)	73(20.8%)
Higher secondary	18(15.1%)	23(9.9%)	41(11.8%)
Graduate& Above	50(42%)	12(5.2%)	62(17.7%)
Total	119	231	350
χ^2 = 101.6 , DOF = 4, p value - 0.001			

Out of 350 mothers of LBW babies were illiterate 104(29.7%) and most of mother have only primary level education 70(20%) & secondary level education 73(20.8%). Illiteracy rate is more in rural area 99 (42.9%) than urban area 5(4.2%).

Table 3. Socio Economic Status (Modified B.G. Prasad)

Socio Economic (SE) Class	Per Capita Monthly Income in rupees	Numbers(n)		Total(N=350)
		Urban	Rural	
I	**≥7008**	87(73.1%)	22(9.5 %)	109(31.1%)
II	**3504-7007**	20(16.9%)	21(9%)	41(11.7%)
III	**2102-3503**	11(9.2%)	111(48. 1%)	122(34.9%)
IV	**1051-2101**	1(0.8%)	72(31.2 %)	73(20.9%)
V	**≤1050**	0(0.00%)	5(2.2)	5(1.4%)
Total		119	231	350
χ^2=24.1; Dof =4;**p-value=0.003**				

Majority of study subjects were from middle class family. In urban area, most of belong to upper class 87(73.1%) whereas in rural area majority are from middle class 111(48.1%) and lower middle 72(31.2%).

Table 4. Anemia status of mother

Anemia	Numbers(n)		Total(N=350)
	Urban	Rural	
No anemia	9(7.6%)	4(1.7%)	13(3.7%)
Mild	95(79.8%)	146(63.2%)	241(68.9%)
Moderate	13(10.9%)	71(30.8%)	84(24%)
Severe	2(1.7%)	10(4.3%)	12(3.4%)
Total	119	231	350
χ^2=24.8;Dof=3;**p-value=0.002**			

In current study we observe that all mothers who delivers LBW babies having mild (68.9%) to moderate (24%) degree of anemia. Majority of rural area mothers having some grade of anemia; mild (63.2), moderate (30.8%), sever (4.3%) and there are only very few mothers those were not having anemia (1.7%).

Table 5. Morbidity Pattern Among LBW Neonates (n=350)

Morbidity	Frequency
Sepsis	149 (42.6%)
Respiratory Distress Syndrome	99 (28.3%)
Hypothermia	73 (20.9%)
Hypoglycemia	62 (17.7%)
Hyperbilirubinemia	54 (15.4%)
Apnea	24 (6.9%)
Intraventricular Hemorrhage (IVH)	15 (4.3%)

Sepsis was the most common morbidity (42.6%), followed by respiratory distress syndrome (28.3%), hypothermia (20.9%), hypoglycemia (17.7%), and hyperbilirubinemia (15.4%).6.9% developed apnea; 4.3% had intraventricular hemorrhage (IVH).

Table 6. Mortality Distribution by Birth Weight Category

Birth Weight Category	Total death (n)	Mortality Rate (%)
ELBW (<1500 g)	30 (19)	63.3%
VLW(1500–1999 g)	80 (19)	23.8%

Highest mortality was in ELBW group (63.3%), followed by VLBW (23.8%). Significant predictors of mortality included prematurity, sepsis, RDS, and maternal anemia.

Discussion:

This study reveals a high prevalence of maternal risk factors contributing to LBW and associated complications. Maternal undernutrition and anemia were consistent with findings from studies conducted in Maharashtra (Rao et al.) and Odisha (Bhue et al.). Antenatal care coverage remains suboptimal despite national programs. Educational status strongly influenced health-seeking behavior and pregnancy outcomes.

The clinical profile corroborates earlier research from Karnataka (Metgud et al.) and Haryana (Verma et al.), establishing neonatal sepsis and RDS as major contributors to NICU morbidity. High neonatal mortality in ELBW and preterm neonates underscores the vulnerability of this group and the need for specialized neonatal care.

Comparisons with NFHS data indicate the regional burden of LBW remains significant in Rajasthan. Innovative community-level strategies, including nutritional supplementation, behavior change communication, and mobile health tracking, are urgently required.

The strength of the study lies in its prospective design and focus on inborn admissions, eliminating referral bias. However, limitations include lack of long-term neonatal follow-up and absence of biochemical markers.

Conclusion:

LBW neonates admitted to the NICU of MBGH, Udaipur, exhibit high morbidity and mortality rates influenced by modifiable maternal factors such as anemia, poor nutrition, and inadequate antenatal care. Sepsis and respiratory complications remain leading causes of neonatal morbidity.

Targeted interventions focusing on maternal health improvement, early identification of high-risk pregnancies, and strengthening NICU protocols are essential to improve survival and long-term outcomes in LBW babies.

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