ORIGINAL ARTICLE ASIAN JOURNAL OF MEDICAL SCIENCES

Prevalence of low birth weight and maternal risk factors at a tertiary care hospital: A cross-sectional study

Arvind Sharma[1], Sunita Patel[2], Aprajita[3], Prince Kumar Lodhi[4]

[1]Professor, [2]Assistant Professor, [3,4]Postgraduate Resident, Department of Community Medicine, Netaji Subhash Chandra Bose Medical College, Jabalpur, Madhya Pradesh, India

Submission: 04-02-2025 Revision: 04-03-2025 Publication: 01-04-2025

ABSTRACT

Background: Birth weight is a key public health indicator reflecting infant survival, maternal health, and healthcare quality. Low birth weight (LBW) is associated with significant risks, including cognitive and motor delays, neurodevelopmental disorders, congenital anomalies, sepsis, respiratory distress, insulin resistance, dyslipidemia, and hypertension. **Aims and Objectives:** This study aims to assess the prevalence of LBW and identify factors contributing to LBW. **Materials and Methods:** This hospital-based cross-sectional study was conducted at a tertiary care hospital in Jabalpur, Madhya Pradesh, over 6 months. Data were collected postnatally from mothers of live newborns using a pre-tested questionnaire covering demographics, antenatal care (ANC), obstetric history, and neonatal characteristics. **Result:** A total of 5133 newborns were included in the study and prevalence of LBW at 41.3% was reported. Prevalence of LBW was significantly higher among mothers under 24 years (43.4%), with lower education (44.7%), underweight (50.4%), tobacco use (54.3%), alcohol use (64.4%), <4 ANC (46.0%), anemia (48.3%), shorter birth intervals (50.7%), and preterm births (51.0%). **Conclusion:** Despite various maternal and neonatal health programs, LBW remains a significant public health challenge, influenced by multiple maternal factors such as young age, low educational attainment, poor nutritional status, inadequate ANC, tobacco and alcohol use, anemia, and preterm delivery.

Key words: Antenatal care; Low birth weight; Preterm birth; Anemia; Risk factors

Access this article online

Website: https://ajmsjournal.info/index.php/AJMS/index

DOI: 10.71152/ajms.v16i4.4445

E-ISSN: 2091-0576

P-ISSN: 2467-9100

INTRODUCTION

Birth weight is a key public health indicator, reflecting infant survival, growth, maternal health, nutrition, healthcare delivery, and poverty.[1] Low birth weight (LBW) is defined as a birth weight of <2,500 g at the time of birth, regardless of gestational age.[2] Despite significant efforts to improve maternal and child health, LBW continues to be a major public health issue. According to the World Health Organization (WHO), 15–20% of global births – over 20 million annually – are classified as LBW.[3] In India, the incidence of LBW is 18.2%, with a higher prevalence of 20.5% in Madhya Pradesh, as reported by NFHS-5.[4]

LBW can result from preterm birth or intrauterine growth restriction. Infants born with LBW are at significant risk of cognitive deficits, motor delays, cerebral palsy, neurodevelopmental disorders, and psychological issues. They have a four-fold higher risk of neonatal death compared to their normal birth weight (NBW). Long-term consequences include chronic conditions such as insulin resistance, dyslipidemia, and hypertension, increasing the likelihood of cardiovascular, metabolic, and renal diseases in adulthood. Advancements in medical technology have improved survival rates for LBW infants but have also led to increased healthcare costs. Prolonged hospital stays, especially in neonatal intensive care unit, create financial burdens for families.[5]

Address for Correspondence:
Aprajita, Postgraduate Resident, Department of Community Medicine, Netaji Subhash Chandra Bose Medical College, Jabalpur, Madhya Pradesh, India. **Mobile:** +91-8076114169. **E-mail:** draprajita9@gmail.com

LBW has a complex etiology, influenced by maternal, sociodemographic, and other factors. Identifying predictors of LBW can guide the implementation of preventive measures to reduce its prevalence and associated neonatal morbidity and mortality.[1] Despite numerous maternal and neonatal health programs, LBW remains a significant public health challenge, highlighting the need for regional research to understand contributing factors and develop targeted interventions.

Aims and objectives

This study aimed to determine the prevalence of LBW and identify maternal and sociodemographic factors associated with LBW among deliveries at a tertiary care hospital in Jabalpur, Madhya Pradesh, India.

MATERIALS AND METHODS

Study design and setting

This hospital-based cross-sectional study was conducted at a tertiary care hospital in Jabalpur, Madhya Pradesh, India for the period of 6 months from September 2023 to February 2024.

Study population

All live newborns delivered at the hospital during the study period were included in the study. Mothers who provided consent for participation were enrolled, while cases of stillbirths and intrauterine deaths were excluded.

Data collection tools and procedures

Data were collected using a structured questionnaire administered to mothers post-delivery, covering demographic details, antenatal care (ANC), obstetric history, and neonatal characteristics. Birth weights were recorded from hospital records.

Ethical considerations

Ethical approval was obtained from the Institutional Ethics Committee of the tertiary care hospital (IEC/2023/6478 Date: July 27, 2023). Written informed consent was obtained from all participating mothers.

Statistical analysis

Data were analyzed using SPSS version 25. Continuous data were presented with mean and standard deviation while categorical data were presented with frequency and percentage. Chi-square tests were employed to assess the association between categorical variables. Odds ratios (OR) with 95% confidence intervals were calculated for significant factors and $P<0.05$ was considered statistically significant.

RESULTS

Prevalence of LBW (Table 1, Figure 1)

A total of 5,096 mothers were included in the study, with 5133 live births (35 twins and 1 triplet). A total of 2981 (58.1%) newborns had NBW (2.5–4.0 kg), and 32 (0.6%) newborns were overweight (>4.0 kg). The prevalence of LBW was 41.3% (n=2120). Out of 2120, 1622 (76.5%) newborns had a birth weight between 1.5 and 2.5 kg, 400 (18.9%) were classified as very LBW (1.0–1.5 kg), and 98 (4.6%) were extremely LBW (<1.0 kg).

Demographic, antenatal, and obstetric characteristics (Table 2)

Among 5096 mothers, 55.0% were aged 25–34 years, 36.0% were aged 15–24 years, and 9.0% were aged 35 years or older. Most mothers resided in rural areas (72.0%), and 43.0% had secondary education, while 45.0% of fathers attained higher education. Hinduism was predominant (78.6%), with 40.0% belonging to other backward classes, 25.0% to the general category, 21.1% to scheduled tribes, and 13.9% to scheduled castes. The majority of mothers were housewives (80.0%), while 50.0% of fathers were semiskilled workers. Most mothers belonged to lower socioeconomic class V (53.0%) and joint families (66.0%), with 21.0% being underweight. Tobacco use was reported in 3.0% of mothers, while alcohol consumption was observed in 1.0%.

Table 1: Distribution of newborns according to birth weight

Birth weight of live newborn	Frequency (n=5133)	Percentage
Overweight (>4.0 kg)	32	0.6
NBW (2.5–4.0 kg)	2981	58.1
LBW (<2.5 kg)	2120	41.3

NBW: Normal birth weight, LBW: Low birth weight

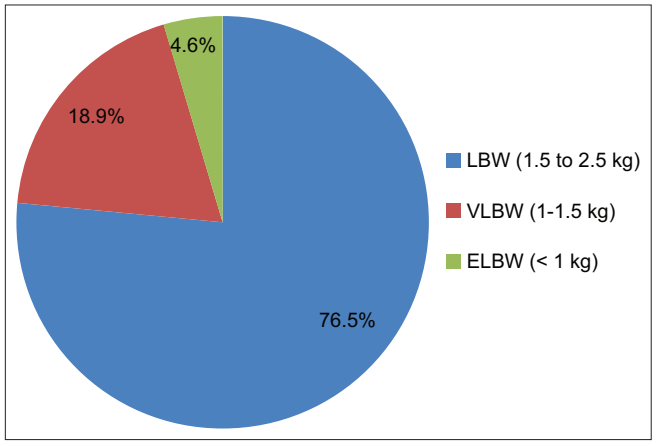

Figure 1: Distribution of low birth weight newborn according to birth weight

Table 2: Characteristics of study participants (n=5096)

Demographic characteristics	Frequency	Percentage
Age (in years)		
15–24	1835	36.0
25–34	2803	55.0
≥35	458	9.0
Residence		
Urban	1427	28.0
Rural	3669	72.0
Education of mother		
Illiterate	968	19.0
Primary	713	14.0
Secondary	2191	43.0
Higher	968	19.0
Graduate and above	256	5.0
Education of father		
Illiterate	561	11.0
Primary	866	17.0
Secondary	2293	45.0
Higher Secondary	713	14.0
Graduate and above	663	13.0
Religion		
Hindu	4005	78.6
Muslim	1054	20.7
Christian	37	0.7
Caste		
Schedule tribe	1074	21.1
Schedule caste	710	13.9
Other backward classes	2038	40.0
General	1274	25.0
Occupation of mother		
Housewife	4077	80.0
Unskilled	357	7.0
Semiskilled	510	10.0
Skilled	102	2.0
Semi-professional	50	1.0
Professional	0	0.0
Occupation of father		
Unemployed	153	3.0
Unskilled	713	14.0
Semiskilled	2548	50.0
Skilled	1070	21.0
Semi-professional	459	9.0
Professional	153	3.0
Socioeconomic status		
Class I	102	2.0
Class II	113	2.2
Class III	1161	22.8
Class IV	1017	20.0
Class V	2703	53.0
Type of family		
Nuclear	1733	34.0
Joint	3363	66.0
Nutritional status		
Body mass index		
Underweight	1068	21.0
Normal	3558	69.8
Overweight	415	8.1
Obese	55	1.1
Tobacco use		
No	4943	97.0
Yes	153	3.0
Alcohol use		
No	5045	99.0
Yes	51	1.0
Frequency of alcohol consumption		
Once a week	16	0.3
Less than once a week	35	0.7
Antenatal and delivery characteristics		
ANC visits		
<4 visits	2036	40.0
≥4 visits	3060	60.0
Iron supplementation		
No	1376	27.0
Yes	3720	73.0
Calcium supplementation		
No	2075	40.7
Yes	3021	59.3
Tetanus injection		
No	204	4.0
Yes	4892	96.0
Anemia		
Mild	307	6.0
Moderate	274	5.4
Severe	171	3.4
Not Anemic	4344	85.2
Type of delivery		
Normal vaginal delivery (NVD)	3201	62.8
Cesarean section (CS)	1895	37.2
Birth order		
First	2548	50.0
Second	1427	28.0
Third	662	13.0
Four	408	8.0
Fifth	51	1.0
Birth interval		
<24 months	1427	28.0
≥24 months	3669	72.0
Sex of child		
Male	2646	51.9
Female	2450	48.1
Gestational age		
Preterm	1863	36.6
Full term	3233	63.4
Multiple pregnancies	36	0.7

ANC: Antenatal care

ANC showed that 60.0% of mothers attended more than four visits, and 73.0% received iron supplementation. Anemia was present in 14.8% of cases (mild: 6.0%, moderate: 5.4%, severe: 3.4%). Most deliveries were normal vaginal deliveries (62.8%), with cesarean sections accounting for 37.2%. Preterm births occurred in 36.6% of cases.

Sociodemographic factors associated with LBW (Table 3)

Prevalence of LBW was significantly higher in mothers aged <24 years (43.4%, OR: 1.14, P=0.02), with lower education (44.7%, OR: 1.23, P=0.005), underweight (50.4%, OR: 1.62, P<0.001), and those using tobacco (54.3%, OR: 1.72, P<0.001) or alcohol (64.4%, OR: 2.06, P=0.01). Factors such as paternal education, religion, caste, residence, employment, and socioeconomic status may indirectly influence newborn birth weight; however, no direct significant association with LBW was observed.

Table 3: Association of sociodemographic factors with LBW

Risk factors	BW <2.5 kg (n=2120) (%)	BW ≥2.5 kg (n=3013) (%)	Total (n=5133) (%)	Odds ratio (95% CI)	χ^2	P-value
Age (in years)						
≤24	806 (43.4)	1051 (56.6)	1857 (100)	1.14 (1.02–1.28)	5.16	0.02
>24	1314 (40.1)	1962 (59.9)	3276 (100)			
Residence						
Urban	579 (40.0)	870 (60.0)	1449 (100)	0.92 (0.82–1.05)	1.42	0.23
Rural	1541 (41.8)	2143 (58.2)	3684 (100)			
Education of mother						
Illiterate and primary	762 (44.7)	941 (55.3)	1703 (100)	1.23 (1.10–1.39)	12.25	0.005
Secondary and above	1358 (39.6)	2072 (60.4)	3430 (100)			
Education of father						
Illiterate and primary	624 (43.1)	825 (56.9)	1449 (100)	1.10 (0.97–1.25)	2.49	0.11
Secondary and above	1496 (40.6)	2188 (59.4%)	3684 (100)			
Religion						
Hindu	1635 (40.6)	2392 (59.4)	4027 (100)	0.87 (0.77–1.00)	3.64	0.06
Other	485 (43.9)	621 (56.1)	1106 (100)			
Caste						
SC and ST	772 (42.7)	1034 (57.3)	1806 (100)	1.09 (0.97–1.23)	2.12	0.14
OBC and general	1351 (40.6)	1976 (59.4)	3327 (100)			
Occupation of mother						
Not working	1689 (41.2)	2410 (58.8)	4099 (100)	0.98 (0.85–1.13)	0.05	0.80
Currently working	431 (41.7)	603 (58.3)	1034 (100)			
Occupation of father						
Not working	1729 (41.2)	2472 (58.8)	4201 (100)	0.97 (0.84–1.12)	0.68	0.16
Currently working	391 (42)	541 (58)	932 (100)			
Socioeconomic status						
Class I and III	554 (39.6)	844 (60.4)	1398 (100)	0.90 (0.80–1.03)	2.12	0.15
Class IV and V	1566 (41.9)	2169 (58.1)	3735 (100)			
Type of family						
Nuclear	746 (42.5)	1009 (57.5)	1755 (100)	1.07 (0.96–1.21)	1.52	0.21
Joint and 3rd generation	1374 (40.7)	2004 (59.3)	3378 (100)			
Body mass index						
Underweight	600 (50.4)	590 (49.6)	1190 (100)	1.62 (1.42–1.84)	52.65	<0.001
Normal, overweight, obese	1520 (38.5)	2423 (61.5)	3943 (100)			
Tobacco use						
Yes	95 (54.3)	80 (45.7)	175 (100)	1.72 (1.27–2.32)	12.05	<0.001
No	2025 (40.8)	2933 (59.2)	4958 (100)			
Alcohol use						
Yes	27 (64.4)	4 6 (35.6)	73 (100)	2.06 (1.18–3.61)	5.98	0.01
No	2093 (41)	2967 (59)	5060 (100)			

SC: Scheduled castes, ST: Scheduled tribes, OBC: Other backward class

Antenatal and obstetric factors associated with LBW (Table 4)

LBW was significantly associated with <4 antenatal visits (46.0%, OR: 1.38, P<0.001), lack of iron supplementation (47.5%, OR: 1.41, P<0.001;), maternal anemia (48.3%, OR: 1.39, P<0.001), higher birth order (47.2%, OR: 1.37, P<0.001), shorter birth intervals (<24 months, 50.7%, OR: 1.70, P<0.001), and preterm births (51.0%, OR: 1.54, P<0.001). No significant associations were found with calcium supplementation, tetanus injections, the sex of the child, or multiple pregnancies.

DISCUSSION

Prevalence of LBW

The prevalence of LBW varies across regions in India, influenced by socioeconomic and healthcare disparities. This study in Madhya Pradesh reported LBW prevalence of 41.3%, notably higher than other studies, such as 17.9% in Odisha (Panda et al.,[6]) and 21.49% in West Bengal (Pal et al.[7]). Nationally, NFHS-5 reported an LBW prevalence of 18.2%, with Madhya Pradesh at 20.5%.[8] The higher prevalence in this study likely reflects its tertiary care hospital setting, which manages high-risk pregnancies and referrals.

Determinants of LBW

In this study, significant determinants of LBW included younger maternal age (<24 years), lower education, underweight status (Body mass index [BMI] <18.5), anemia, tobacco or alcohol use, inadequate ANC (<4 visits), and lack of iron supplementation. Obstetric factors such as preterm births, shorter birth intervals (<24 months), and higher birth order (≥3) were also strongly associated with LBW. These findings align with previous studies. Singh

Table 4: Association of antenatal and obstetric factors with LBW

Risk factors	BW <2.5 kg (n=2120) (%)	BW ≥ 2.5 kg (n=3013) (%)	Total (n=5133) (%)	Odds ratio (95% CI)	χ^2	P-value
ANC visits						
<4 visits	947 (46.0)	1111 (54)	2058 (100)	1.38 (1.23–1.55)	31.17	<0.001
≥4 visits	1173 (38.1)	1902 (61.9)	3075 (100)			
Iron supplementation						
No	664 (47.5)	734 (52.5)	1398 (100)	1.41 (1.25–1.60)	30.07	<0.001
Yes	1456 (39)	2279 (61)	3735 (100)			
Calcium supplementation						
No	889 (42.4)	1208 (57.6)	2097 (100)	1.07 (0.96–1.21)	1.67	0.19
Yes	1231 (40.5)	1805 (59.5)	3036 (100)			
Tetanus injection						
No	102 (45.1)	124 (54.9)	226 (100)	1.17 (0.90–1.54)	1.27	0.25
Yes	2018 (41.1)	2889 (58.9)	4907 (100)			
Anemia						
Yes	374 (48.3)	400 (51.7)	774 (100)	1.39 (1.20–1.63)	18.18	<0.001
No	1746 (40.1)	2613 (59.9)	4359 (100)			
Type of delivery						
Cesarean section	792 (42.9)	1055 (57.1)	1847 (100)	1.10 (0.98–1.24)	2.86	0.09
Normal vaginal delivery	1328 (40.4)	1958 (59.6)	3286 (100)			
Birth order						
≥3	540 (47.2)	603 (52.8)	1143 (100)	1.37 (1.20–1.56)	21.11	<0.001
<3	1580 (39.6)	2410 (60.4)	3990 (100)			
Birth interval						
<24 months	735 (50.7)	714 (49.3)	1449 (100)	1.70 (1.51–1.93)	73.4	<0.001
>24 months	1385 (37.6)	2299 (62.4)	3684 (100)			
Sex of child						
Male	1089 (40.8)	1579 (59.2)	2668 (100)	0.95 (0.86–1.07)	0.5	0.48
Female	1031 (41.8)	1434 (58.2)	2465 (100)			
Gestational age						
Preterm	962 (51)	923 (49)	1885 (100)	1.88 (1.68–2.11)	115.8	<0.001
Full term	1158 (35.7)	2090 (64.3)	3248 (100)			
Multiple pregnancies						
Yes	36 (49.3)	37 (50.6)	73 (100)	1.19 (0.96–1.51)	1.64	0.20
No	2084 (41.2)	2976 (58.8)	5060 (100)			

ANC: Antenatal care, BW: Birth weight

et al.,[5] reported higher LBW prevalence among women aged 15–24 years, underweight mothers, and those with no ANC or iron supplementation. Ismail et al.,[9] emphasized the protective role of iron/folic acid intake and antenatal visits, with anemia, gestational hypertension, and preterm delivery as risk factors. Similarly, Panda et al.,[6] identified maternal education, inadequate ANC, and preterm births as significant contributors. Sharma et al.,[10] highlighted younger maternal age, preterm delivery, and inadequate nutrition as key predictors of LBW.

Sociodemographic factors

The present study observed a higher prevalence of LBW (43.0%) among mothers under 24 years, consistent with previous studies demonstrating a significant association between younger maternal age and LBW.[10,11] In the present study, women with lower education levels also had higher odds of delivering LBW infants. Similar findings have been reported in study from Northern India.[12]

In the study, tobacco use was significantly associated with LBW. Kramer's meta-analysis also highlighted the significant role of indoor smoke, cigarette smoking, and tobacco chewing in LBW.[13]

Maternal health and obstetric history

In this study, regular antenatal checkups were associated with a reduced risk of LBW, with mothers having four or more visits showing lower LBW rates, consistent with studies from Odisha[6] and Kerala.[9]

Low micronutrient intake and maternal BMI are key factors in fetal development. Underweight mothers have higher LBW prevalence, with birth weight positively linked to maternal BMI and weight gain during pregnancy. WHO and UNICEF attribute 96% of LBW cases to low socioeconomic status, poor diet, infections, and physical labor during pregnancy.[14]

The prevalence of anemia in our study was relatively low (14.8%), possibly due to data collected during the postpartum period, some cases may have improved with interventions during pregnancy. The present study found that mothers who did not take sufficient iron and folic

acid supplements were more likely to have LBW babies, aligning with studies from Kerala[9], Tripura[15], and Odisha.[6] In India, 30–70% of non-pregnant women are anemic.[16] Studies show that mothers with hemoglobin levels below 11 g/dL are more likely to have LBW babies.[17]

The present study found a prevalence of 50.4% LBW in preterm babies. A Taiwan Birth Cohort Study reported that 57.3% of LBW babies were preterm, and 44% were small for gestational age.[18] Sharma et al.,[10] and Singh et al.,[19] also highlighted a significant association between a history of premature delivery and LBW.

The present study reinforces the multifactorial nature of LBW, emphasizing the importance of maternal health, ANC, and modifiable risk factors. Addressing these determinants through targeted interventions could reduce LBW prevalence and improve neonatal outcomes.

Limitations of the study

This study had several limitations, including potential bias due to its hospital-based design and the single-institution setting, which limits the generalizability of the findings. In a country where a significant number of deliveries occur at home, a community-based study would offer a more holistic understanding of the factors contributing to LBW.

CONCLUSION

This study found a high prevalence of LBW (41.3%) among 5133 newborns. Key risk factors included young maternal age, lower education, poor nutrition, inadequate ANC, substance use, preterm birth, anemia, higher birth order, and short birth interval. Strengthening ANC, early screening, nutritional support, and family planning can help mitigate these risks. Educating mothers on nutrition, ANC, and healthy lifestyle choices is crucial to reducing LBW and improving neonatal outcomes in tertiary care settings.

ACKNOWLEDGMENT

We express our sincere gratitude to the medical superintendent for their support in facilitating this study. We extend our heartfelt appreciation to the Head of the department and the staff of the Obstetrics & Gynaecology department for their valuable assistance and cooperation throughout the research process. We are especially grateful to all the participants for their willingness to contribute to this study. Their participation was instrumental in making this research possible.

REFERENCES

1. Gupta S, Jatav P, Saroshe S, Shukla H and Bansal SB. A cross-sectional study to assess factors affecting low birth weight at tertiary care center, Indore. Indian J Public Heal Res Dev. 2024;15(3):83-90.
   https://doi.org/10.37506/p525q625
2. UNICEF. Low Birth Weight. New York: UNICEF. Available from: https://data.unicef.org/topic/nutrition/low-birth-weight [Last accessed on 2024 Dec 23].
3. World Health Organization. Global Nutrition Targets 2025: Low Birth Weight Policy Brief. Geneva: World Health Organization; 2014. Available from: https://iris.who.int/bitstream/handle/10665/149020/WHO_NMH_NHD_14.5_eng.pdf [Last accessed on 2025 Jan 02].
4. Ministry of Health and Family Welfare, Government of India. National Family Health Survey (NFHS-5), 2019-2021. New Delhi: Ministry of Health and Family Welfare; 2021. Available from: https://www.mohfw.gov.in [Last accessed on 2025 Jan 02].
5. Singh D, Manna S, Barik M, Rehman T, Kanungo S and Pati S. Prevalence and correlates of low birth weight in India: Findings from national family health survey 5. BMC Pregnancy Childbirth. 2023;23(1):456.
   https://doi.org/10.1186/s12884-023-05726-y
6. Panda R, Jena P, Chanania K and Kar D. Determinants of low birth weight in a tertiary care hospital in Eastern India. Natl J Community Med. 2022;13(01):37-42.
   https://doi.org/10.5455/njcm.20211207094736
7. Pal A, Manna S, Das B and Dhara PC. The risk of low birth weight and associated factors in West Bengal, India: A community-based cross-sectional study. Egypt Pediatr Assoc Gaz. 2020;68(1):27.
   https://doi.org/10.1186/s43054-020-00040-0
8. International Institute for Population Sciences (IIPS), ICF. National Family Health Survey (NFHS-5), India, 2019-21. Mumbai: International Institute for Population Sciences; 2021. Available from: https://www.dhsprogram.com/pubs/pdf/FR375/FR375.pdf [Last accessed on 2024 Dec 10].
9. Ismail IM and Venugopalan PP. Case-control study on risk factors of low birth weight in a tertiary care hospital, Kerala. Ann Community Health. 2016;4(3):5-12.
10. Sharma SR, Giri S, Timalsina U, Bhandari SS, Basyal B, Wagle K, et al. Low birth weight at term and its determinants in a tertiary hospital of Nepal: A case-control study. PLoS One. 2015;10(4):e0123962.
    https://doi.org/10.1371/journal.pone.0123962
11. Agarwal K, Agarwal A, Agrawal VK, Agrawal P and Chaudhary V. Prevalence and determinants of “low birth weight” among institutional deliveries. Ann Niger Med. 2011;5(2):48-52.
    https://doi.org/10.4103/0331-3131.92950
12. Demelash H, Motbainor A, Nigatu D, Gashaw K and Melese A. Risk factors for low birth weight in Bale zone hospitals, South-East Ethiopia: A case-control study. BMC Pregnancy Childbirth. 2015;15(1):264.
    https://doi.org/10.1186/s12884-015-0677-y
13. Kramer MS. Determinants of low birth weight: Methodological assessment and meta-analysis. Bull World Health Organ. 1987;65(5):663-737.
14. Sen J, Roy A and Mondal N. Association of maternal nutritional status, body composition and socio-economic variables with low birth weight in India. J Trop Pediatr. 2010;56(4):254-259.

https://doi.org/10.1093/tropej/fmp102

15. Bhattacharjya H, Das S and Ghosh D. Proportion of low birth weight and related factors in a tertiary care institute of Tripura. Int J Med Public Health. 2015;3(2):1-5.

    https://doi.org/10.4103/2230-8598.151236

16. Pratima V, Shraddha S, Archana G, Ashutosh K and Ahilesh K. Prevalence of anaemia in adults with respect to socio-demographic status, blood groups and religion in north Indian population. Int J Biol Med Res. 2012;3(4):2422-2428.

17. Ahmad MO, Kalsoom U, Sughra U, Hadi U and Imran M. Effect of maternal anaemia on birth weight. J Ayub Med Coll Abbottabad. 2011;23(1):77-79.

18. Mantzoros CS, Varvarigou A, Kaklamani VG, Beratis NG and Flier JS. Effect of birth weight and maternal smoking on cord blood leptin concentrations of full-term and preterm newborns. J Clin Endocrinol Metab. 1997;82(9):2856-2861.

    https://doi.org/10.1210/jcem.82.9.4248

19. Singh S, Shrestha S and Marahatta S. Incidence and risk factors of low birth weight babies born in Dhulikhel hospital. J Inst Med Nepal. 2011;32(3):39-42.

Authors' Contributions:
AS- Definition of intellectual content, literature survey, prepared first draft of manuscript; **SP**- Concept, design, clinical protocol, design of study, manuscript preparation, editing, and manuscript revision; **A**- Implementation of study protocol, data collection, data analysis, manuscript preparation and submission of article, coordination and manuscript revision; **PKL**- Review manuscript; literature survey and preparation of figures, statistical analysis, and interpretation.

Work attributed to:
Department of Community Medicine, Netaji Subhash Chandra Bose Medical College, Jabalpur, Madhya Pradesh, India.

Orcid ID:
Arvind Sharma - https://orcid.org/0000-0003-4567-6920
Sunita Patel - https://orcid.org/0000-0001-9179-2768
Aprajita - https://orcid.org/0009-0002-9635-1907
Prince Kumar Lodhi- https://orcid.org/0009-0003-5928-5688

Source of Support: Nil, **Conflicts of Interest:** None declared.