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Original Article

Beyond The Numbers: Integrating Statistical Predictors With Lived Experiences Of Mothers Of Low Birth Weight Newborns Delivered In Tertiary Health Care Centre In Central India: A Mixed Method Study

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ABSTRACT

Background: Birth weight is single most important determinant of chances of survival, healthy growth and development of newborn. India accounts for 40% of LBW births in developing world. Thus, this study aimed to estimate the prevalence and to study lived experiencesperceptions of LBW among mothers. Objectives: To estimate prevalence and to study predictors of LBW among newborns delivered in tertiary health care centre in central India and to study lived experiences of mothers of LBW newborns. Methodology: A mixed method study was conducted during January 2025 to March 2026. Randomly 380 mothers were enrolled, structured proforma used for collection of data and association was analysed using Chi-square test. Qualitative data was gathered through 35 in-depth interviews and analysed via manual content analysis. Results: Mean age ± SD of mothers was 24.69 ±4.03 years, Majority 261 (68.69%) were from 20-30 years age group, 238 (62.63%) were homemakers, 191 (50.26%) Hindu, 118 (31.06%) from socioeconomic class III and 167 (43.95%) primigravida. Prevalence of LBW was 39.47%. Among 380 deliveries, 203 (53.42%) were male babies. Mean weight of baby 2.50 ± 0.61 kg. 274 (72.10%) were delivered at-term, 91 (23.95%) were preterm. Factors like working mothers (OR= 7.97), educated <high school (OR= 2.72), lower socioeconomic class (OR= 1.65), anaemic (OR= 2.49), done <4 ANC visits (OR= 4.79), having less birth spacing (OR= 2.22), low pre-pregnancy weight (OR= 1.84), consumed <100 IFA tablets (OR= 6.27) and gained <9 kg weight during pregnancy (OR= 3.06) were more prone for delivering LBW baby as compare to others (p <0.05). Themes emerged were "Eat Last, Eat Least" Paradigm, Double Burden of Labor, Barriers to Navigating Health Systems, Cultural Perceptions of "Small" Babies, Psychological Stress and Household Agency. Conclusion: Prevalence of LBW was high. Many factors were modifiable thus; incidence can be reduced by early detection and prompt treatment.

Keywords: Prevalence, LBW, Newborn, ANC, Predictors.

INTRODUCTION

Low birth weight (LBW) defined as birth weight less than 2500 grams regardless of gestational age, remains a major public health challenge worldwide, particularly in developing countries[1,10]. LBW is closely associated with increased neonatal morbidity, mortality, impaired growth and cognitive development and long-term health complications[2]. According to global estimates, South Asia carries the highest burden of LBW, with India contributing significantly to the overall prevalence[3].

Multiple maternal, socioeconomic, nutritional and healthcare-related factors contribute to LBW in India. Maternal anemia, inadequate antenatal care, poor maternal nutrition, low socioeconomic status, maternal age and pregnancy complications are commonly identified predictors[4,5]. Tertiary healthcare centres in Central India frequently manage high-risk pregnancies and referrals, making them important settings for studying determinants and outcomes related to LBW[6].

Although several quantitative studies have examined statistical predictors of LBW, limited attention has

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

been given to the lived experiences of mothers delivering LBW newborns[7]. Mothers often experience emotional distress, anxiety, financial burden, and challenges in caregiving, especially when newborns require prolonged hospitalization or intensive neonatal care[8]. Understanding these experiences is essential because maternal involvement plays a crucial role in newborn survival, breastfeeding, kangaroo mother care, and follow-up practices[9].

Therefore, this study aimed to estimate the prevalence of Low Birth Weight and predictors of low birth weight and lived experiences of mothers of LBW babies.

AIM AND OBJECTIVES:

1. To estimate the prevalence of Low Birth Weight among newborn babies delivered in tertiary health care center in central India.
2. To study predictors of Low Birth Weight in study participants.
3. To study lived experiences of mothers of LBW babies.

MATERIALS AND METHODS:

Study design & setting:

A mixed method study was conducted among pregnant women delivered in tertiary health care center in central India.

1. Inclusion criteria: Pregnant women delivered in tertiary health care center and who gave consent to participate in study.
2. Exclusion criteria: Those who were critically ill or not willing to participate

Study period was extended from January 2025 to March 2026

SAMPLE SIZE & SAMPLING TECHNIQUE:

Considering p = prevalence of Low birth weight, from study conducted by Shobha R, Raje S et al. (2017) i.e. p = 41.9 % and at 95% Level of significance (z = 1.96), Absolute error e= 5 % using the formula for Sample size, $n = z^2 \times pq / e^2 = 373.92$, Thus, the sample size was taken as 380.

Randomly two days in a week were selected for data collection. Ten participants were selected randomly during each visit from delivery list of Obstetrics and Gynecology wards & those who were willing to participate were included in the study.

ETHICAL CONSIDERATION:

Permission was taken from Head of Department of Obstetrics and Gynecology of tertiary health care center. Informed consent from study participants was taken after establishing rapport and explaining the purpose of study. This study was approved by Institutional Ethics Committee.

METHODOLOGY:

Pregnant women from Obstetrics and Gynecology wards delivered in tertiary health care center were enrolled in the study. A face-to-face interview was taken and structured proforma was used for collection of data regarding sociodemographic characteristics, menstrual history, antenatal, postnatal and neonatal history. General & Systemic examination were done. Socioeconomic status was assessed by using Modified B.G. Prasad Scale (March 2025)[4].

For the qualitative data, in-depth interview of mothers of LBW newborns who were willing to talk freely was conducted till the point of saturation achieved.

STATISTICAL ANALYSIS:

Data was entered in MS Excel window version 11 and analysed by using Open-Epi Software. Descriptive statistics, quantitative variables were measured as Mean, Standard Deviation, while qualitative variables were presented in Numbers & Percentage. Bar chart & pai charts were used to summarise baseline characteristics of the study participants. Association between two categorical variables were analysed by using Chi-square (X^{2}) test; p value < 0.05 was considered to be statistically significant, Odds Ratio was calculated. Manual content analysis was done.

Theme 1: The "Eat Last, Eat Least" Paradigm

Theme 2: The Double Burden of Labor

Theme 3: Barriers to Navigating Health Systems

Theme 4: Cultural Perceptions of "Small" Babies

Theme 5: Psychological Stress and Household Agency

RESULTS:

Table 1: Distribution of study participants according to Sociodemographic characteristics (n=380)

Variables		Number	Percentage
1. Age (in years)	<20	59	15.53
	20- 25	129	33.95
	25- 30	132	34.74
	≥30	60	15.78
2. Residence	Urban	197	51.84
	Rural	183	48.16
3. Religion	Hindu	191	50.26
	Muslim	102	26.84
	Bauddha	73	19.21
	Others	14	03.69
4. Type of family	Nuclear	173	45.53
	Joint	167	43.94
	Three Generation	40	10.53
5. Type of Diet	Vegetarian	214	56.32
	Mixed	166	43.68
6. Education	Illiterate	65	17.11
	Primary school	56	14.74
	Middle school	66	17.37
	High school	80	21.05
	Intermediate	79	20.79
	Diploma	16	04.21
	Graduate	11	02.89
	Postgraduate	7	01.84

7. Occupation	Homemakers	238	62.63
	Unskilled	34	08.95
	Semi-skilled	24	06.32
	Skilled	84	22.10
8. Socioeconomic Status (Modified BG Prasad scale, March 2025)	Class I	20	05.26
	Class II	112	29.47
	Class III	118	31.06
	Class IV	79	20.79
	Class V	51	13.42

Total 380 study participants were enrolled in the study. Majority were in the age group of 20-30 years 261(68.69%) followed by ≥30 years 60(15.78%). The Mean age was 24.69 years with SD ±4.03 Minimum age was 18 years & maximum was 32 years (Range 14). Majority 197(51.84%) were from urban area, 173(45.53%) from nuclear family. One hundred ninety-one (50.26%) were from Hindu religion. Regarding education, 65(17.10%) were illiterate, 80(21.05%) were educated upto high school. Majority 238(62.63%) were homemakers, rest were working mothers. As per the Modified BG Prasad scale (March 20252023), mostly belongs to Class III 118(31.06%) followed by class II, 112(29.47%).

Table 2: Obstetrics profile of study participants (n= 380)

1.Parity	Primiparity	304	80.00
	Parity 2	53	13.95
	Parity 3	17	04.47
	Grand multipara	6	01.58
2. Period of Gestation at delivery (in weeks)	<37 weeks	91	23.95
	37- 42 weeks	274	72.10
	≥42 weeks	15	03.95
3.Mode of delivery	Normal delivery	209	55.00
	Caesarean section	171	45.00
4. Anaemia in pregnancy	Present	179	47.11
	Absent	201	52.89
5. Grade of anaemia (n= 179)	Mild	110	61.45
	Moderate	33	18.44

	Severe	30	16.76
	Profound	6	03.35
6. Number of ANC visits	<4 visits	147	38.68
	≥4 visits	233	61.32
7. Number of IFA tablets consumed during pregnancy	Consumed < 100	149	39.21
	Consumed ≥ 100	231	60.79
8. Birth spacing in consecutive pregnancies (n= 213)	<18 months	59	27.70
	18-24 months	91	42.72
	≥ 24 months	63	29.58
9. Pre-pregnancy weight	<55 kg	207	54.47
	≥55 kg	173	45.53
12. Weight gain during pregnancy	<9 kg	177	46.58
	≥9 kg	203	53.42
13. Anaemia during pregnancy	Mild	235	61.84
	Moderate	69	18.16
	Severe	65	17.10
	Profound	11	02.90

Most of the mothers were primigravida primipara 304(80.00%). Most were term deliveries 274(72.10%), 91(23.95%) were delivered <37 weeks. Most of the deliveries 209(55.00%) were normal vaginal deliveries while 171(45.00%) were caesarean deliveries. One hundred seventy- nine (47.11%) mothers were anaemic, among them 110(61.45%), 33(18.44%), 30(16.76%) & 6(03.35%) were having mild, moderate, severe & profound anaemia respectively. Most of mothers 233(61.32%) done ≥4 ANC visits & 231(60.79%) taken≥ 100 tablets during pregnancy. Majority of mothers 91(42.72%) had 18-24 months of birth spacing in consecutive pregnancies, 207(54.47%) had pre-pregnancy weight less than 55kg & only 177(46.58%) of mothers had gain less than 9kg weight during pregnancy.

Table 3: Distribution of Newborn as per pregnancy outcome (n=380)

1. Sex of baby	Male	203	53.42
	Female	177	46.58
2. Weight of baby	Very LBW (1.001-1500 gm)	10	02.63
	Low birth weight (1.501-2499 gm)	140	36.84

	Normal weight (2500- 4000 gm)	219	57.63
	Macrocosmic (>4001 gm)	11	02.90
3. Gestational age at delivery	Preterm (<37 weeks)	91	23.95
	Term (37- 42 weeks)	274	72.10
	Post term (≥42 weeks)	15	03.95

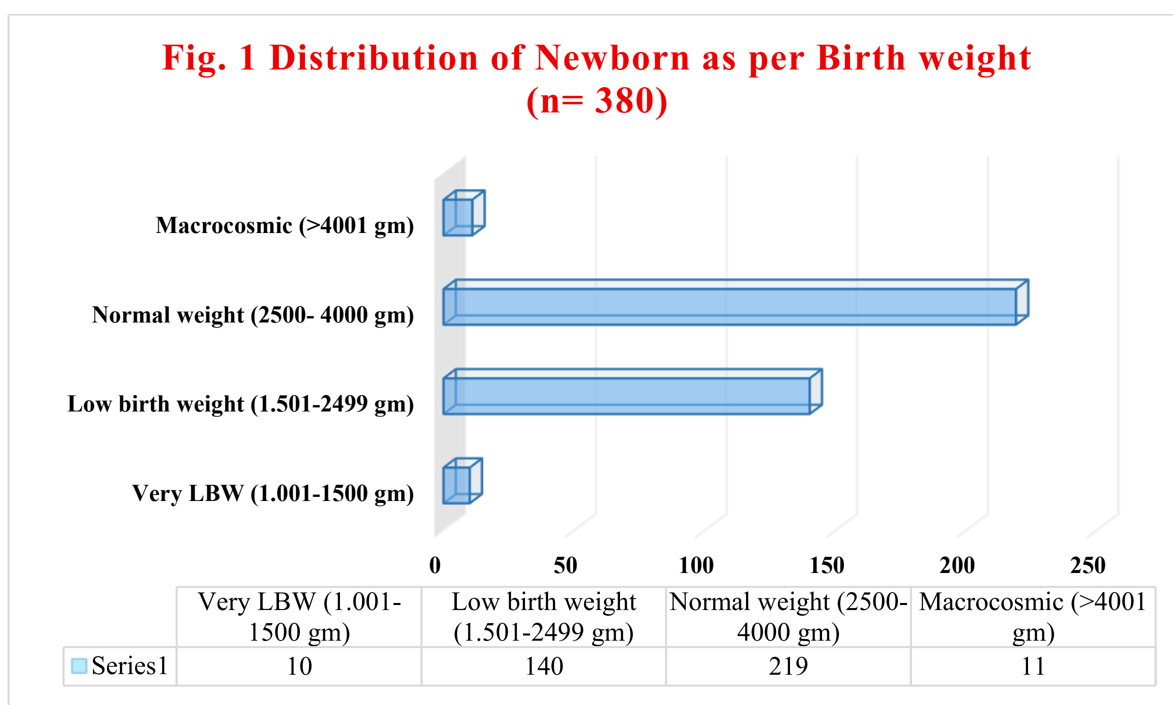

Fig. 1 & Table 3 shows, among 380 deliveries, 203(53.42%) were male babies. Prevalence of LBW was found to be 39.47%. Mean weight of baby was 2.50 kg with SD ± 0.61 maximum weight was 4.30 kg & minimum weight was 0.850 kg (Range= 3.45). Most of them 274(72.10%) were delivered at term, only 91(23.95%) were preterm babies.

Table 4 Association between Sociodemographic characteristics & LBW (n= 380)

Variable	Total	LBW		OR	95% CI	p-value
		Present	Absent			
1. Age of mother (in years)						
<20 years & ≥30 year	119	76	43	4.47	2.817, 7.081	**0.0000**
20- 29 years	261	74	187			
2. Place of Residence						
Rural	183	81	102	1.47	0.9745, 2.227	0.0826
Urban	197	69	128			

3. Religion						
Hindu	191	69	122	0.75	0.4992,1.139	0.2164
Others	189	81	108			
4. Type of family						
Nuclear	173	82	91	1.84	1.215, 2.793	**0.0053**
Others	207	68	139			
5. Education of mother						
<high school	187	96	91	2.72	1.775, 4.155	**0.0000**
≥ high school	193	54	139			
6. Occupation of mother						
Working mother	142	98	44	7.97	4.979, 12.75	**0.0000**
Others	238	52	186			
7. Socioeconomic status						
III, IV, V	248	108	140	1.65	1.06, 2.577	**0.0342**
I, II	132	42	90			

Table 4 shows, Association between sociodemographic characteristics & LBW. Mother of <20years & ≥30 years were found 4.47 times more prone for delivering of LBW babies as compare to those of 20-29 years & the association is statistically significant (OR= 4.47, 95% CI= 2.817- 7.081, p =0.00). Other factors such as mother from nuclear family (OR= 1.84), educated less than high school (OR= 2.72), working mothers (OR= 7.97) & those from lower socioeconomic (III, IV, V) class (OR= 1.65) were at risk of delivering LBW babies & this association is also statistically significant (p- value <0.05).

Table 5 Association between Maternal factors & LBW (n= 380)

Variables	**Total**	**LBW**		**OR**	**95% CI**	**p-value**
		Present	**Absent**			
1. Gravidity						
Primigravida & grand multigravida	194	91	103	1.90	1.252, 2.889	**0.0034**
Others	186	59	127			
2. Period of Gestation						
37- 42	274	67	207	0.09	0.0523, 0.153	**0.0000**

Other	106	83	23			
3. Anaemia during pregnancy						
Present	179	91	88	2.49	1.632, 3.795	**0.0000**
Absent	201	59	142			
4. Iron Folic acid tablets consumption						
<100	149	97	52	6.27	3.973, 9.88	**0.0000**
≥100	231	53	178			
5. ANC visits during pregnancy						
< 4 visits	147	91	56	4.79	3.071, 7.478	**0.0000**
≥4 visits	233	59	174			
6. Birth spacing in consecutive pregnancy (n= 213)						
<24 months	150	79	71	2.22	1.204, 4.112	**0.0100**
≥24 months	63	21	42			
7. Pre-pregnancy weight						
< 55 kg	173	82	91	1.84	1.215, 2.793	**0.0053**
≥ 55 kg	207	68	139			
8. Weight gain during pregnancy						
< 9 kg	147	82	65	3.06	1.989, 4.71	**0.0000**
≥ 9 kg	233	68	165			
9. Sex of baby						
Female	177	75	102	1.25	0.8308, 1.895	0.3298
Male	203	75	128			

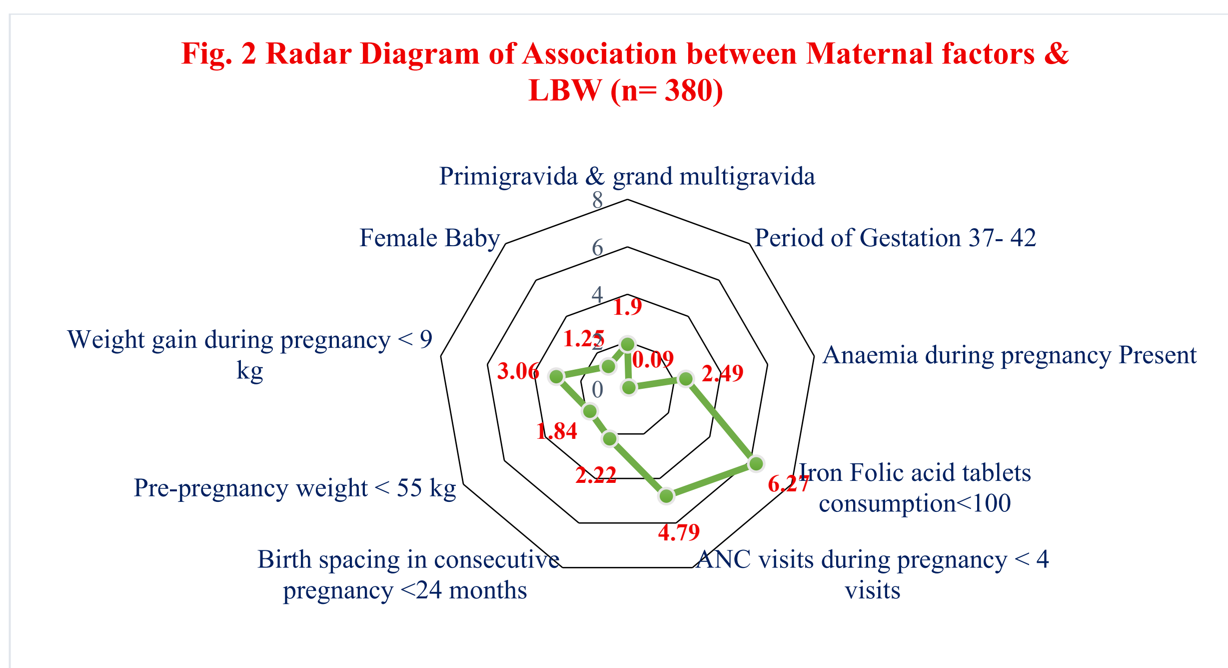

Fig. 2 & Table 5 shows, Association between Maternal factors, sex of baby & LBW. Mother of primigravida and grand multigravida were 1.9 time more at risk of LBW deliveries as compare to others (OR= 1.90) and the association was statistically significant (p<0.05). Anaemic mothers (OR= 2.49), those who consume <100 IFA tablets during pregnancy (OR= 6.27), those having <4 ANC visits (OR= 4.79) were at risk of delivering a LBW baby (p <0.05). Mother having less birth spacing (OR= 2.22), those having less pre- pregnancy weight (OR= 1.84) and weight gain less than 9 kg during pregnancy (OR= 3.06) were more prone for development of LBW baby as compare to others (p <0.05). Sex of the baby and LBW delivery did not show any statistically significant association (p value= 0.3298)

In-depth interviews of 35 mothers of LBW newborn were taken for qualitative analysis.

Themes	Sub-Themes/ Categories	Illustrative Quote (No. of Respondents)
Theme 1: **The "Eat Last, Eat Least" Paradigm**	1. Intrafamilial food distribution 2. Pregnancy food taboos (avoiding "hot" foods) 3. Lack of dietary diversity.	"I only eat what is left after my husband and father-in-law finish. Often, the vegetables are gone, and I just eat roti with salt/ pickle." **(16)** "My elders told me not to eat papaya or meat during the second trimester, fearing it would cause a miscarriage, even though the doctor said I needed the protein." **(11)** "We cannot afford milk every day; that is reserved for the growing children in the house, not for me." **(10)**
Theme 2: **The Double Burden of Labor**	1. Agricultural workload 2. Domestic drudgery (fetching water/firewood)	"The fields do not wait for my pregnancy. If I don't bend to transplant the rice, we lose our income for the season." **(15)** "I carry 20-liter pots of water from the community well/ Tap two times a day. My back aches, but who else will do it?" **(07)**

	3. Lack of "mandatory" rest periods.	
Theme 3: Barriers to Navigating Health Systems	1. Distance decay" (transport issues) 2. Lack of trust in institutional care 3. The cost of "free" healthcare (loss of wages)	The ASHA Tai tells me to go to the Rural hospital, but the bus frequency has reduced. A private auto asks for more than my husband's daily wage just for one trip." **(13)** "I went to the clinic, but the machine was broken, and they told me to go to the city. I am a labourer; I cannot afford to lose three days of work just for one sonography" **(19)** "The nurse was angry because I missed my last check-up, but I had no one to look after my other three children while I waited in the queue" **(08)**
Theme 4: Cultural Perceptions of "Small" Babies	1. Fear of obstructed labour (C-sections) 2. Normalized low birth weight 3. Fatalistic beliefs	"Neighbours tell me that if I eat too much 'Iron' (tablets), the baby's bones will become too hard and I will need an operation (C-section). I want a normal delivery, so I skip the tablets." **(11)** "My mother said it is better to have a small baby; it comes out easily. If the baby is too big, they will have to cut my stomach open." **(07)** "Everyone in our village has small babies. We are small people, so we expect the child to be small too. It is God's will." **(02)**
Theme 5: Psychological Stress and Household Agency	1. Preference for male children 2. Domestic disharmony 3. Lack of decision-making power	"This is my third girl. The tension in the house makes my stomach tight. I feel no hunger when there is constant shouting." **(13)** "I wanted to go for the scan, but my mother-in-law said it was a waste of money and that her generation never needed such things." **(21)**

DISCUSSION

Total 380 study participants were enrolled in the study. Majority were in the age group of 20-30 years 261(68.69%). Fifty-nine (15.53%) were < 20 years. The Mean age was 24.69 years. Majority 197(51.84%) were from urban area, 173(45.53%) from nuclear family followed by 167(43.94%) from Joint family. One hundred ninety-one (50.26%) were from Hindu religion. Similar findings were seen in the study conducted by Shastri A (2023)[14], Keshavrao CM (2023)[13], Girish Chavhan (2026)[30], Sulakhe R et al[21].

Regarding education, 65(17.10%) were illiterate, Majority 238(62.63%) were homemakers, rest were working mothers. As per the Modified BG Prasad scale (March 2025), mostly belongs to Class III 118(31.06%) followed by 112(29.47%), 79(20.79%), 51(13.42%) belong to Class II, Class IV, Class V respectively, Similar findings were seen in the study conducted by Shastri A (2023)[14], Keshavrao CM

(2023)[13], Girish Chavhan (2026)[30], Choudhary M et al[23], Sulakhe R et al[21].

Most of the mothers were Primipara 133(35.00%). Twenty-seven (07.11%) & 6(01.58%) were grand multigravida & grand multipara respectively. Most were term deliveries 274(72.10%). Ninety-one (23.95%) were delivered <37 weeks & 15(03.95%) were delivered at ≥42 weeks of pregnancy. 179(47.11%) mothers were anaemic among them 110(65%), 33(18.44%), 30(16.76%) & 6(03.35%) were having mild, moderate, severe & profound anaemia respectively. Most of mothers 233(61.32%) done ≥4 ANC visits, 231(60.79%) taken≥ 100 tablets during pregnancy. Majority of mothers 91(42.72%) had 18-24 months of birth spacing in consecutive pregnancies, 207(54.47%) had pre-pregnancy weight less than 55kg & only 177(46.58%) mothers had gained weight less than 9 kg during pregnancy, Similar findings were seen in the study conducted by Ghanghas K et al[16], Keshavrao CM (2023)[13], Rajashree Bhosale[33], Girish Chavhan (2026)[22], Bhagyashree et al (2026)[32].

Among 380 deliveries, 203(53.42%) were male babies & 177(46.58%) were female. Prevalence of LBW was found to be 39.47%. Most of them were delivered at term (37- 42 weeks) 274 (72.10%), only 91(23.95%) were preterm babies similar findings were seen in studies conducted by Thapa P et al[17].

Mother of <20years & ≥ 30 years were found 4.47 times more prone for development of LBW babies as compare to those of 20-29 years & the association is statistically significant Other factors such as mother from nuclear family (OR= 1.84), Educated less than high school (OR= 2.72), working mothers (OR= 7.97) & those from lower socioeconomic (III, IV, V) class (OR= 1.65) were at risk of delivering LBW babies & this association is statistically significant (p- value <0.05), Similar findings were seen in the study conducted by Ghanghas K et al[16], Rajashree Bhosale[33], Ghanghas K et al[17], Keshavrao CM (2023)[14].

Mother of primigravida and grand multigravida were 1.9 time more at risk of LBW deliveries as compare to others. Anaemic mothers, those who consume <100 IFA tablets, those having <4 ANC visits were at risk of delivering a LBW baby (p <0.05). Mother having less birth spacing, those having less pre- pregnancy weight, gained less than 9 kg weight during pregnancy were more prone for development of LBW baby as compare to others. Sex of the baby and LBW delivery didn't showed any statistically significant association (p value= 0.3298) similar findings were seen in studies conducted by Patel S[19], Choudhary M et al[24], Roy A et al[26], Sulekhe R et al[22].

CONCLUSION

In our study, we found prevalence of LBW among newborns delivered at tertiary health care centre in central India was 39.47%. Pregnancy at early age (<20 years) or delayed pregnancy ≥30 years) were found to be a risk factors for LBW. Others factors such as low education, women working during pregnancy, mothers of lower socioeconomic class, grand multigravida, anaemic and those who had not taking IFA tablets during pregnancy, having less than 4 ANC visits, less birth spacing between consecutive pregnancies, low weight/ BMI in pre-pregnant state were significantly associated with LBW deliveries.

RECOMMENDATIONS:

1. Provide direct financial incentives to offset lost daily wages, ensuring labour-intensive workers can prioritize mandatory rest and ANC visits.

2. Shift focus from individual mothers to educating husbands and elders to dismantle "eat last" traditions and debunk myths related to causes difficult deliveries

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