



### RESEARCH ARTICLE

## A STUDY OF PREVALENCE AND SOCIODEMOGRAPHIC DETERMINANTS FOR LOW BIRTH WEIGHT, HOSPITAL BASED CROSS-SECTIONAL STUDY IN, MAHARASHTRA INDIA

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Birth weight, place of residence, mothers occupation education, fathers occupation and education, birth order, working, non working.

### Abstract

**Background :** The birth weight one of the most important determinant of its chances of survival, healthy growth and development. LBW significantly contributes to various health disorders in both children and adults, linking it to severe malnutrition in children under five, poor psychomotor development, and lower educational performance.

**Objectives:** To determine the prevalence of low birth weight and various determinants associated with low birth weight in tertiary care hospital.

**Results:** In present study over all prevalence of low-birth-weight was 70 (37.23%) 54% male and 46% female, no sex wise significant difference was found. 55(79%) LBW new born from rural area and 15(21%) from urban area it shows significant difference ( $p < 0.001$ ). Most of the LBW baby 39 (56%) from joint family followed by 31(44%) nuclear family no statistically difference was found, 33(47%) was in 1st birth order followed by 10(14) % 3rd birth order and the difference was statically significant ( $p < 0.001$ ). The present study has identified a significant association between place of residence, religion, mother's education, non-working mothers, father's education, and non-working fathers

**Discussion:-** The socio-demographic factors considered in other studies are totally different than the mentioned studies so our study cannot be compared.

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During this study, we couldn't find any other study with similar factors. present study has identified a significant association between place of residence, religion, mother's education, non-working mothers, father's education, and non-working fathers. Conclusion: education plays an important role in improving health seeking behaviour, social

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status, living standard and health services utilization. Literacy status should be improved by enhancing the school enrollment and decreasing school drop-out rate. Future research is needed to identify the factors responsible for low birth weight.

### **Introduction:-**

Birth weight serves as both a crucial measure of maternal well-being and a strong predictor of neonatal and childhood health outcomes. The newborn's birth weight is ideally documented within the first hours of delivery and captured before significant postnatal weight loss takes place. A newborn with low birth weight (LBW) is characterized as a live baby weighing less than 2,500 grams at birth. According to WHO estimates, approximately 25 million babies with LBW are born annually, and 5 million of them experience global mortality<sup>1</sup>. Birth weight is the first weight of new born obtained after birth. For the live birth, birthweight should preferably measure within first hour of life, before significant post-natal weight loss has been occurred<sup>2</sup>. Birth weight is one of the most important criteria for determining the neonatal and infant survival. Low birth weight (LBW) has been defined by the World Health Organization (WHO) as weight at birth of less than 2500 g<sup>3</sup>.

This practical cut off for international comparison is based on epidemiological observations that infants weighing less than 2500 g are approximately 20 times more likely to die than heavier babies<sup>4</sup>. Birth weight is a useful parameter in predicting the future growth and development of child. It can be used in identifying "at-risk" families and help in decision making during the implementation of intervention programs, especially in countries and regions with limited resources<sup>5</sup>.

The prevention of LBW is a public health priority, particularly in developing countries with high prevalence. Majority of the studies focused on the maternal factors; there are very few studies that analysed the socio demographic variables. Studies done in India suggest that, factors associated with LBW differ from one area to another, again in the state Odisha it differs from district to districts and majority of neonatal mortality in this setup in recent past were LBW and belongs to low socioeconomic status. Hence, the present study was done to measure the proportion of LBW babies and its association with maternal socio-demographic factors<sup>6</sup>.

LBW significantly contributes to various health disorders in both children and adults, linking it to severe malnutrition in children under five, poor psychomotor development, and lower educational performance. Various maternal factors, including intrauterine growth failure, short gestational periods, education levels, income, place of residence, maternal age, and the number of antenatal care visits, also influence this pathophysiology<sup>7</sup>.

It estimated that the risk of neonatal mortality for low-birth-weight infant 20 time more than for the infant with birth weight exceeding 2500grams, and increases sharply as birth weight decreases<sup>8</sup>.

More than half of the infant's death occurs in first 28 days of life. Most of these take place in first week of life. The major causes of these deaths are due to birth asphyxia, hypothermia and infection but the baby born with low birth weight are higher risk of dying. In developing countries infant mortality rate is very high as compare to developed countries. Socio demographic characteristic such as parents' education, maternal education, religion, type of family, place of residence, birth order, such factor are also associated with low birth weight. With this background this research was conducted to find out the prevalence and sociodemographic determinates for low birth weight.

### **Aims and objectives:-**

To determine the prevalence of low birth weight and various determinants associated with low birth weight in tertiary care hospital.

### **Material and Method:-**

The present study was conducted obstetric ward, labour room and of Government Medical College Akola Maharashtra. Ethical was taken. The study was conducted from January 2024 to December 2025 for the period of one year. The study subject was all the mother who undergone delivery, at government medical college Akola. Purposive sampling method was used to select study population. Informed written consent was taken after explaining the purpose of study. The mother those who not in the position to provide the required information were excluded from the study.

The data was collected with the predesigned and pre tested questionnaire the information regarding age, sex, place of residence, place of residence, type of family, birth order, religion mothers' education occupation and father education and occupation was collected. All the babies were weighed on calibrated baby weighing scale machine (max weight 10kg) 10-gram accuracy. Low birth was defined as birth weight of <2500 g.

#### Some operational definition:-

Newborn weight is first weight of obtained after birth as a significant postnatal weight seen in few hour birth weight should preferably measure within first hour of life

Low birth weight is defined as weight less than 2,500g.

Very low birth weight less than 1.500g

Extremely low birth weight less than 1.000g.

Statistical analysis: frequency and percentage were used for categorical variables to summarised data. Difference was assessed by employing Chi-square test categorical variables. In order to investigate the association of predictor variables with outcome variable (LBW) all analysis were performed using EPI-6 Software version 2.3.

#### Results:-

**Table no 1. Sociodemographic characteristics of study population**

<b>Sex wise distribution</b>		
Male	98	52%
Female	90	48%
Total	188	100%
<b>Place of Residence</b>		
Urban	57	30%
Rural	131	70%
Total	188	100%
<b>Type of Family</b>		
Nuclear	79	42%
Joint	109	58%
Total	188	100%
<b>Birth Order</b>		
1	88	47%
2	67	36%
3	26	14%
4	5	2.6
>4	1	0.4
Total	188	100%
<b>Religion</b>		
Hindu	139	74%
Muslim	42	22%
Bouddha	6	4%
Sikh and Others	0	0%
Total	188	100%
<b>Mother's Education</b>		
Illiterate	12	6%
Primary	20	10%
Secondary	72	41%
11 <sup>th</sup> and 12 <sup>th</sup>	57	30%
Graduate and above	27	13%
Total	188	100%
<b>Mother's Occupation</b>		
Non-working	168	89%
Working	20	11%
Total	188	100%

<b>Father's Education</b>		
Illiterate	8	4%
Primary	16	8%
Secondary	64	34%
11 <sup>th</sup> and 12 <sup>th</sup>	55	29%
Graduate and above	45	25%
Total	188	100%
<b>Father's Occupation</b>		
Non worker	0	0%
Service	20	11%
Farmer	68	36%
Skilled work	32	17%
Business	28	15%
Daily labor	40	21%
Total	188	100%

Table no 1 Shows a total 188 newborn out of which 98(52%) male and female 90(48%) newborn so, there is no significant sex wise variation in this study most of them were from rural area 131(70%) with joint family 109(58%). In the present study majority of newborn were having birth order1. 88(47%) followed by birth order 2. 36(67%) only 1 (0.4%) new born were in birth order 4 majority among them were Hindu 139(74%) followed by Muslim 42(22%). In this study most of study populations mother were educated up to secondary schooling 72(41%) followed by 11 & 12 standard 57(30%) 168 (89%) were nonworking category. In our study most of the father were educated up to secondary schooling 64(34%) followed by 11 and 12 standard 55(29%) and 68(36%) farmers followed by 40(21%) daily laborers and Skilled work 32(17%).

**Table no. 2 Distribution of low birth weight according to sociodemographic variable of study participants**

Characteristic	Birth Weight Low birth Weight	Normal	Total	Chi-Square	p-value
Male	38 (54%)	60	98 (100)	0.51	0.47
Female	32 (46%)	58	90 (100)		
<b>Place of residence</b>					
Rural	55(79%)	2	57	22.86	< 0.001
Urban	15(21%)	116	131		
<b>Type of Family</b>					
Nuclear	31(44%)	48	79	0.91	0.33
Joint	39(56%)	70	109		
<b>Birth Order</b>					
1	33(47%)	55	88	56.71	< 0.001
2	24(34%)	43	67		
3	10 (14%)	16	26		
4	3(5%)	2	5		
>4	0 %		1		
<b>Religion</b>					
Hindu	50 (72%)	89	139	86.57	< 0.001
Muslim	15(22%)	27	42		
Bouddha	3(4%)	3	6		
Sikh and others	2 (2%)	00	0		
<b>Mother's Education</b>					
Primary education	7 (10%)	5	12	25.66	< 0.001
Secondary education	30 (43%)	10	20		
Higher Secondary	26 (37%)	46	72		
Graduate and above	7 (10%)	50	57		

<b>Mother's occupation</b>					
Non-working	57 ( 81 %)	111	168	27.66	< 0.001
Working	13 (19%)	7	20		
<b>Father's Education</b>					
Illiterate	2 (3%)	6	8	37.01	< 0.001
Primary education	5 ( 7%)	11	16		
Secondary education	22 (31%)	42	64		
Higher secondary	29 (41%)	26	55		
Graduation and above	12 (18%)	33	45		
<b>Father's Occupation</b>					
Non working	0	0	0	40.90	< 0.001).
Service 10 ( 11%)		10	20		
Farmer	29 (36%)	39	68		
Skilled worker	09(17%)	23	32		
Business07 15(%)	21		28		
Daily laborer	15 (21%)	25	40		

Table 2. Among the 188 newborns, In present study over all prevalence of low-birth-weight was 70 (37.23%) 54% male and 46% female, no sex wise significant difference was found. 55(79%) LBW newborn from rural area and 15(21%) from urban area it shows significant difference ( $p < 0.001$ ). Most of the LBW baby 39 (56%) from joint family followed by 31(44%) nuclear family no statistically difference was found, 33(47%) was in 1<sup>st</sup> birth order followed by 10(14) % 3<sup>rd</sup> birth order and the difference was statically significant ( $p < 0.001$ ). 50(72%) newborn belonging to Hindu family followed by 15(22%) Muslim family this religion was difference was also statically significant ( $p < 0.001$ ). mothers' education was found important role for low birth new born, maximum mother was educated up to higher secondary 30(43%) followed by higher secondary 27(37%) here also the difference was statically significant ( $p < 0.001$ ). such difference was also observed in Nonworking 57(81%) and working mothers 13(19%) statically significant ( $p < 0.001$ ). most of the father were educated up to Higer Secondary 29(41%) followed by graduation 12(18%) and occupation wise 29(36%) farmer followed daily laborer 15(21%) so above education and occupation also statically significant ( $p < 0.001$ ).

### Discussion:-

Low birth weight is major problem in developing countries. Asian countries for the example, highest prevalence of total low birth by African and Latin America Asian countries South Asia highest incidence (27%) of LBW. it is the high time to think LBW as a public health problem<sup>9</sup>.

Children who survive LBW have a higher incidence of diseases, retardation in cognitive development and undernourishment. There is also evidence that LBW or its determinant factors are associated with a predisposition to higher rates of diabetes, cardiac diseases and other future chronic health problems<sup>10</sup>.

In the present study prevalence of low birth weight was 37.23% which was significantly associated with place of residence, birth order, religion, mothers' education, mother occupation, fathers' education and fathers' occupation. The study conducted by Mohd Maroof Lal Diwakar Singh, Seema barman, Navin Kumar Santosh Kumar Burman in Banda district utter Pradesh in 2021-22 reported low birth prevalence 27.9 %<sup>11</sup>. Across-sectional study was conducted by Anjani Kumar Srivastawa, Basavaraj Mannapur, Asok Dorle and Anjali Singh in 2021 in North Karnataka and reported prevalence of low birth weight was 21%<sup>12</sup>. The prevalence of low birth weight was noted 36.33% in Nizamabad Telangana (A Hospital based cross sectional study) by Amar Devguru, Sandeep Gada, Dnyaneshwar Potphale, Mummareddi, Dinesh Ishwar, Dipti Purwar. So this study is similar to present study<sup>13</sup>.

The study conducted by Harsh Patel, Jitesh Mehata, Bela Patel, Rohitkumar Ram and Dipesh Parmar in 2021 at Sourashtra region of Gujrat and reported 77% newborn from housewife which was followed by 16.8% from labourer and 5.4% from service, prevalence of low birth weight was statistically higher in mother who were illiterate. Mothers education was statistically significant in the present study<sup>8</sup>.

Study carried out by Gururaj MS, Anitha N, Kulkarni AK, Rekha, in rural south India, a hospital-based study Sulli in 2010 and observed maternal educational status have most risk factors for low-birth weight babies along with maternal occupation was statistically significant for low-birth weight.<sup>14</sup>

Damini Singh, Sayantani mamma, Manish Barik, Tanveer Rehman, Shreekantha Kanugo, Sanghmitra Patil conducted the study from NFHS-5 has taken information from 7 districts and 28 states and 8 union territory. They included the study population 639,699 households in the year 2023 and observed that several sociodemographic factors were potentially associated with maternal age, sex of child, maternal education, place of residence.<sup>15</sup>

Ratna Panda, Pratibha Jena, Kavita Chanin, Dattatraya Kar conducted the study from January to June 2019 (Case-control study) in IMS and SVM hospital Bhubaneswar and observed that primary and secondary education have lower possibility of low birth weight however the disease condition like hypothyroidism and pre-term delivery was associated with low birth weight.<sup>16</sup>

Ananya Roy, M. Zobaida Akter, Dhiraj Candra Biswas observed socioeconomic condition of respondent mothers plays an important role in low birth weight.<sup>9</sup>

Ramesh Kumar Sangwan, Ramesh Kumar Huda, Mukti Khetan, Paul Gazta, Bonitha V Babu carried out cross sectional the study Jalore district of Rajasthan in February 2021 to August 2022 and observed that low birth weight was prevalent in nuclear families.<sup>17</sup>

The present study has identified a significant association between place of residence, religion, mother's education, non-working mothers, father's education, and non-working fathers. Maternal education and maternal occupation is associated with low birth weight, reported by Gururaj M S, Anita N. Kulkarni and Rekha, so this study is comparable with our study. Ratna Panda, Prathibha Jain conducted a case control study in Bhubaneswar, the educational status and disease condition like hypothyroidism and preterm delivery was associated with low birth weight. However, Damini Singh et. reported sex of the child and maternal education along with place of residence are the risk factors for low birth weight. The socio-demographic factors considered in this study are totally different than the above mentioned studies so our study cannot be compared. During this study, we couldn't find any other study with similar factors.

### **Conclusion:-**

The prevalence of low birth weight in our study was 37.23 % in the study population. The study demographic determinants place of residence, religion, mother's education, non-working mothers, father's education, and non-working fathers. So education plays an important role in improving health seeking behaviour, social status, living standard and health services utilization. Literacy status should be improved by enhancing the school enrollment and decreasing school drop-out rate. Future research is needed to identify the factors responsible for low birth weight.

### **Limitation of study:-**

It is a hospital based study so result cannot be generalized. The study did not include other obstetrical factor like nutritional factors of mother, infection during pregnancy, complication during pregnancy which may have directly effect on low birth weight.

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Nil

### **Conflict of interest:-**

There is no conflict of interest

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