

## A community based cross sectional study on the prevalence of low birth weight neonates and maternal factor responsible for the low birth weight

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### ABSTRACT

**Introduction:** Birth Weight is a major determinant of child health and nutrition and LBW [low birth weight] used as benchmark of mellowness. It has remained significant community health problem in India both because of high frequency and related mortalities and morbidities with it. This study was designed to find out the prevalence of LBW and possible maternal factors affecting it. **Method:** A cross-sectional hospital based community study was conducted at Dhiraj Hospital from Feb 2017 to April 2017; total 100 pregnant women were participated in this study, who delivered babies at obstetrics and gynecology ward. Information was collected from the mothers by pre-tested semi structured questionnaire. Percentage of incidences and statistical tests like Odds ratio [OR], chi-square test were used to evaluate the association between maternal factors and birth weight. **Result:** The incidence of LBW was found to be 38%. Gender wise evaluation of LBW babies shows about 53% of male child and 47% of female child, which indicates near about equal incidence of LBW in male and female babies. In the present study the risk of LBW associated with maternal factors like age of mother < 20 yrs [OR=2.1], <10.0 % Hemoglobin [OR=1.7] and education of mother [OR=1.4]. **Conclusion:** LBW was found to be 38% and it is considered as major public problem which needs attention. By proper counseling for marriageable age, conception age of mother and improving maternal nutrition will directly benefit the health of mothers and child.

**Keywords:** Community, low birth weight, maternal factor, problem

### Introduction

Low birth weight (LBW) is one of the main predictor of infant mortality. Worldwide, one out of seven infants is born with LBW. In Sub-Saharan Africa (SSA) and Asia the incidence of LBW has not declined in the last decade [1] and in Europe only very few countries have reduced its incidence [2].

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WHO estimated that globally about 25 million LBW babies are born each year, consist 17% of all live births, nearly 95% of them in developing countries.

The incidence of LBW varies widely between regions of the world, with levels of 32% in Southern Asia, 9% in Eastern Asia, 11-16% in Africa and 10-12% in Latin America and Caribbean's. In India, 27% babies are low birth weight and more than half of these are full term babies. [3]When scrutiny a foetus as small for its gestational age, it is important to make difference whether this is due to intra-uterine growth restriction (IUGR), prematurity or other constitutional factors. Although prematurity has historically been defined (American Academy of Pediatrics, 1935) as the birth of a live infant weighing 2500 g or less as "low birth weight" or less occurrence in clinical practice, reveal

that many of these infants were not actually premature, but rather full-term foetus from a pregnancy in which growth had been limited due to different factors. In 1967 the World Health Organization (WHO) recognized this fact, designating infants weighing 2500 g or less as “low birth weight”. [4]

A baby’s low weight at birth is either the result of pre-term birth [before 37 weeks of gestation] or due to restricted foetal (intrauterine) growth. LBW is closely associated with foetal and neonatal mortality and morbidity, inhibited growth and cognitive development and chronic diseases later in life. Many factors affect the duration of gestation and foetal growth and thus, the birth weight. They relate to the infant, the mother, or the physical environment and play an important role in determining the birth weight and the future health of the infant. [5] The death of every new born in India can be traced to either low birth weight a premature delivery, a reflection of poor maternal health and inadequate health care system. India reports highest number in the world as many as 700000 new born die in India each year. This accounts for 26% of neonate’s death in the world. [6] Taking in account of above incident of LBW in all over the world, it is found that Low birth weight is a major community health problem hence this study is designed with the objective to know the incidence of LBW in the population served by the Dhiraj hospital and possible maternal factors affecting birth weight.

## Methodology

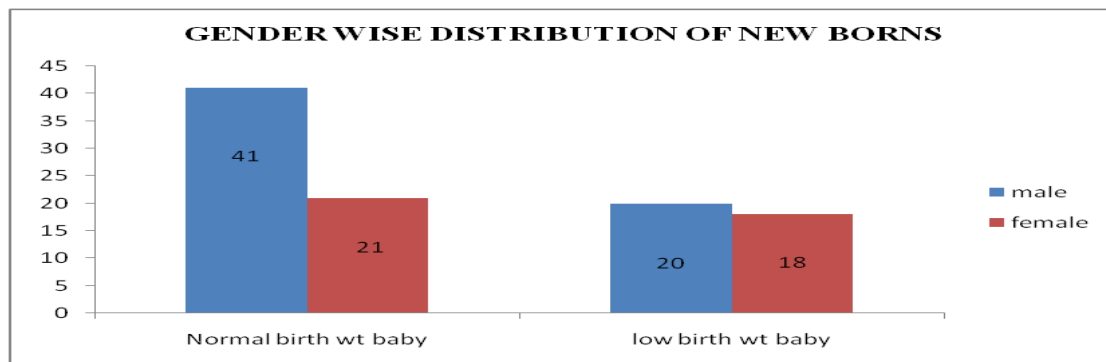
The study was conducted after getting approval from Institutional Ethics Committee, Sumandeep Vidyapeeth. Duration of the study was 3 month Feb 2017 to April 2017 and was conducted at

Dhiraj general hospital. Total 100 pregnant women participated in this study, who had delivered babies at obstetrics and gynecology wards. A predesigned and pretested questionnaire was prepared to collect information from the mothers. The baby birth weight was taken within an hour after birth. Informed consent was taken from the study population, who were willing to participate. Mothers who were not willing to participate, those has pre diagnosed complicated pregnancies and still birth deliveries were excluded from the study. Mothers were interviewed within 24 hours of delivery and also the available health records with the mother were reviewed. [3] The responsible maternal factors were survey during the study were namely age of mother, mother’s education, economic status, mother’s residence place, knowledge of nutrition, hemoglobin status of mother, hypertension, pregnancy interval, gravida, weight gain during pregnancy, antenatal checkup, iron supplement, mother’s occupation, gestational age, history of tobacco. To assess the nutritional status of the pregnant women, body mass index (BMI) was estimated using maternal weight at 36-40, gestational week. The weight gain from the twelfth week to term gestation represents the total weight gain during pregnancy was considered. Birth interval was analyzed in women (n=45) excluding primipara (n=55). Hemoglobin level was considered at 36-40 week of gestation. [7]

## Statistical analysis

Collected data was compiled in Microsoft office Excel 2007 format. The data was analyzed by preparing master table. The results were represented in the form of tables and graphs. Percentage of incidences and statistical tests like Odds ratio (OR), chi- square test were used to evaluate the association between maternal factors and birth weight. [3, 7]

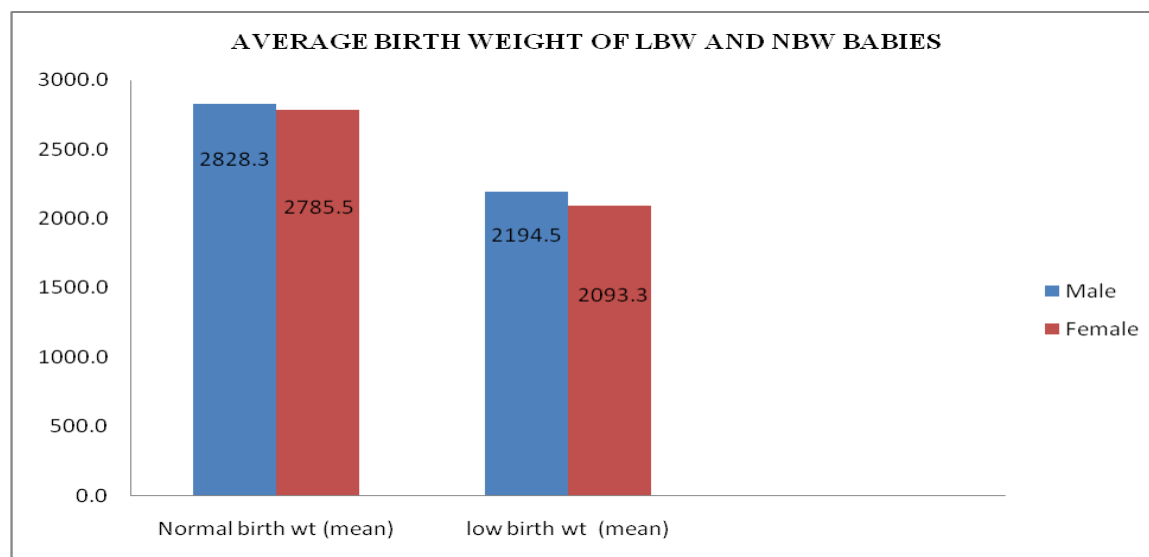
## Results



Graph 1: Distribution of male and female new born under low weight birth and normal weight birth

In this study it was found that out of 100 laboured women there are 38% LBW cases and 62% NBW cases. Gender wise evaluation of LBW babies shows about 53% of male child and 47% of female child, which indicates near about equal incidence LBW in male and female babies (Graph 1). Average birth

weight was calculated for the LBW and the NBW new born. It was observed that the mean weight of LBW babies were 2146.6 gram and NBW babies were 2810.8 grams, and there was not much difference in mean birth weight for both the sex under NBW and LBW group. (Graph 2)



**Graph 2: Average weight in grams for male and female new born under low weight birth [LBW] and normal weight birth [NWB]**

Distribution of case in LBW and NBW group was summarized the tabulated form (Table 1). In this study 88% mothers were residing in the rural area and about 99% were house wife. Mean age of participating mothers were 24 years and knowledge of nutrition was present in 99% of study population. The associated risk of LBW from various maternal factors was determined

by odds ratio (OR) and it was found in decreasing order with age of mother < 20 years [OR=2.1], < 10% Hb [OR=1.7] and education of mother [OR=1.4] (Table-2). OR indicated in this study are the raw data. In this study there was a significant association between height of mother and regular antenatal check up with birth weight of the baby.

**Table 1: Distribution of LBW and NBW cases for the risk factor surveyed during the survey**

Factors responsible	LBW	NBW	Total
<b>Age</b>			
< 20 years	9[52]	8[48]	17[100]
> 20 years	29[34]	54[66]	83[100]
<b>Mothers education</b>			
Illiterate	9[45]	11[55]	20[100]
Literate	29[36]	51[64]	80[100]
<b>Economic status</b>			
Below poverty line	37[39]	56[61]	93[100]
Above poverty line	1[14]	6[86]	7[100]
<b>Height of mother (centimeters)</b>			
<145cms	4[20]	17[80]	21[100]
>145cms	34[43]	45[57]	79[100]

<b>Nutritional status [BMI]</b>			
< 18.5	3[50]	3[50]	6[100]
18.5 - 24.9	25[39]	38[61]	63[100]
> 25	10[32]	21[68]	31[100]
<b>Knowledge on nutrition</b>			
Absent	1[100]	0	1[100]
Present	37[37]	62[63]	99[100]
<b>Hemoglobin (Hb) % status of mother (grams)</b>			
< 10 gm%	19[43]	23[57]	44[100]
> 10 gm %	19[33]	39[67]	56[100]
<b>Hypertension</b>			
No	35[38]	55[62]	90[100]
Yes	3[30]	7[70]	10[100]
<b>Spacing</b>			
<2year	5[71]	2[29]	7[100]
>2 year	14[36]	24[64]	38[100]
<b>Gravida[birth order]</b>			
1	19[37]	32[63]	51[100]
2	16[39]	25[61]	41[100]
> 2	3[37]	5[63]	8[100]
<b>Weight gain during pregnancy</b>			
<10kg	29[37]	48[63]	77[100]
> 10 kg	9[39]	14[61]	23[100]
<b>Antenatal checkup:</b>			
Irregular	5[83]	1[17]	6[100]
Regular[ three or above]	33[35]	61[65]	94[100]
<b>Iron supplement</b>			
Yes	37[37]	62[63]	99[100]
No	1[100]	0	1[100]
<b>Gestational age:</b>			
<37 weeks	2[20]	8[80]	10[100]
>37 weeks	36[40]	54[60]	90[100]
<b>Mother's occupation:</b>			
Working	0	1[100]	1[100]
house wife	38[38]	61[62]	99[100]
<b>History of tobacco chewing/smoking</b>			
Yes	2[100]	0	2[100]
No	36[36]	62[64]	98[100]
<b>Mother's Residence</b>			
Rural	32[36]	56[64]	88[100]
Urban	6[50]	6[50]	12[100]

Table 2: LBW associated risk with maternal factors

Factors responsible	Odd Ratio[95% CI]	Chi square value	p<0.05
Age	2.1	1.941	
Mothers education	1.4	0.520	
Economic status	#4	1.797	
Height of mother	#0.3	4.053	*0.0441
Hb % status of mother	1.7	1.61	
Hypertension	#1.5	0.302	
Weight gain during pregnancy	0.9	0.016	
Antenatal checkup	#9.2	5.568	*0.0183
Gestational age	#1.9	0.624	
Mother's Residence	0.6	0.834	

#value shall not be considered as observation is <5.\*p<0.05 when chi square test is done.

### Discussion

India reported to have LBW about 27 % [3] and in this study incidence of LBW was found to be 38 % which is similar to as reported earlier by Deshmukha *et al*[7]. Study was done to evaluate the maternal factor associated risk to LBW babies, it was found that mother age [OR=2.1] and maternal hemoglobin status [OR=1.7] (Table-2) shows associated risk with the prevalence of LBW neonates, which were observed in others study [7-10]. In this study it is found where mother with age > 20 year, 34 % case of LBW is there this could be due to unaware or inexperienced mother. It is observed that iron supplement was taken by about 99% of study population but when Hb level was observed 50-50% distribution of LBW in >10gm% and <10gm% of Hb category (Table 1), anemia results into low oxygen delivery to developing foetus, hence interferes with normal intrauterine growth.[10] In this study LBW risk is 1.4 folds more in uneducated mother, which could be due to unaware about intake of adequate nutrition or to avail health service for betterment of health, our outcome correlates to other study says LBW associated risk in illiterate mothers. [10, 11, 12] In this study there was a significant association between height of mother and regular antenatal checkup with birth weight of the baby which is similar study done by others [11, 12, 13, 14]. Maternal height and weight could affect intrauterine growth through either genetic or environmental mechanisms. Part of the mother's genetic potential could be passed on to the fetus and any deficit in her height and weight could impose limitations on the growth of the uterus, foetus and placenta. Antenatal care could have beneficial impact on intrauterine

growth either by diagnosis and timely treatment of pregnancy complications or by eliminating or reducing modifiable risk factor.[15] Various study show association of almost same maternal factor exception being mother residence, occupation, history of hypertension, tobacco chewing habit, weight gain during pregnancy, gestational week which were found to be insignificant in our study.

### Conclusion

In present study prevalence of LBW cases is about 38% and NBW is 62% of total study population. From this study it was found that, the mean birth weight of LBW infants is 2146.6 gm. The maternal factors associated with the risk of LBW neonates in this study was age of mother, hemoglobin & education of mother. Children born with low birth weight are likely to suffer developmental impairment and have risk of illness and premature death. Interventions like counseling for marriageable age, conception age of mother and improving maternal nutrition will directly benefit the health of mothers and child. On the other hand, proper health and nutritional management of LBW will reduce risk of morbidity and mortality in LBW neonates.

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