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Original Research Article

A cross sectional study on demographic factors affecting low birth weight

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ABSTRACT

Background: Low birth weight (LBW) is one of the commonest cause for infant and childhood morbidity and mortality. The majority of low birth weight in developing countries is due to intrauterine growth retardation, while most low birth weight in industrialized countries is due to preterm birth. LBW is the single most important factor determining the survival chances of the child. The objectives of the study were to assess the proportion of low birth weight among babies delivered by mothers at a tertiary care hospital and to analyse the relationship between low birth weight and certain socio-demographic factors.
Methods: A cross-sectional study conducted in a tertiary care centre for a period of six months.
Results: The prevalence of LBW was 23.5%. The proportion of mothers having low birth weight was maximum in women aged less than 18 years (35%) and more than 30 years (26.5%). Muslim women had a higher proportion of LBW (28.8%). LBW was more in women belonging to joint family (30.0%), low per capita income group and illiterates.
Conclusions: The prevalence of LBW still continues to be high, almost one fourth of the babies are LBW. Different socio-demographic characteristics of the population are still the important factors determining the occurrence of LBW.

Keywords: Low birth weight, Demographic factors, Cross-sectional study

INTRODUCTION

Low birth weight (LBW) has been defined as a birth weight of less than 2.5 kg regardless of gestational age, the measurement being taken preferably within the first hour of life, before significant postnatal weight loss has occurred.[1] LBW is one of the commonest cause for infant and childhood morbidity and mortality. The majority of low birth weight in developing countries is due to intrauterine growth retardation, while most low birth weight in industrialized countries is due to preterm birth.[2] Preterm is defined as babies born alive before 37 weeks of pregnancy are completed. Their intrauterine growth may be normal. Given good neonatal care, these babies usually catch up growth and will be of normal size and performance by 2 to 3 years of age.[3] IUGR or Small-for-date (SFD) babies are those born at term or preterm, weigh less than the 10th percentile for the gestational age.[3]

Importance of LBW

LBW is one of the most serious challenges in maternal and child health. The public health importance is attributed to a number of factors such as, its high incidence, its association with mental retardation and a high risk of perinatal and infant mortality and morbidity;

human wastage and suffering; the very high cost of special care and intensive care units and its association with socio-economic underdevelopment.[4]

LBW infants are at an increased risk of neurological problems such as cerebral palsy and seizure disorders, severe mental retardation, lower respiratory tract conditions and general morbidity.[5] LBW increases the chances of infant and childhood morbidity, infections, malnutrition which ultimately leads to increased susceptibility to diseases which further degrades the condition. LBW is one of the leading factors causing post- natal mental retardation, physical disabilities, inhibited growth and chronic disorders.[6,7]

LBW is the single most important factor determining the survival chances of the child. Many of them die during their first year. The infant mortality rate is about 20 times greater for all LBW babies than for other babies. The lower the birth weight, the lower is the survival chance. Many of them become victims of protein - energy malnutrition and infection. LBW is thus an important guide to the level of care needed by individual babies. LBW also reflects inadequate nutrition and ill-health of the mother. There is a strong and significant positive correlation between maternal nutritional status and the length of pregnancy and birth weight. A high percentage of LBW therefore points to deficient health status of pregnant women, inadequate prenatal care and the need for improved care of the newborn.[8]

Current scenario of LBW

More than 20 million LBW infants are born each year in the developing world. Incidence of LBW ranged from 6% to 18% across the globe with sub-Saharan Africa accounting 13% to 15%.[9] According to the UNICEF and EDHS reports the prevalence of LBW in Ethiopia estimated to be 15% and 11% respectively.[9,10] Worldwide, different epidemiological studies have reported varied prevalence rates in Kenya (12.3%), Tanzania (13.6% & 14%), Central Africa (9%-23%) and Chennai (25.8%).[11-15] Higher prevalence of low birth weight was reported in a study conducted in Nigeria (45%).[16] Studies in India have also showed varied prevalence rates of LBW, 21.8% in Assam, 36.8% in Madhya Pradesh, and 27.76% in Odisha.[17-19]

Maternal age less than 20 years or more than 30 years, nuclear family, poor standard of living, tobacco use by father, female sex of the baby, and among environment and housing characteristics, the absence of sanitary latrine have all found to have significant association with LBW.[20] Maternal factors such as primiparity, short maternal stature, Maternal thinness, history of preterm birth, maternal age during delivery, maternal mid upper arm circumference (MUAC) and lack/infrequent of antenatal care follow-up have shown association with LBW.[21] The proportion of LBW babies has also been found to be high and significant in extremes of age i.e. teenage (44.19%) and 30 years and above age group (39.56%) and Muslim mothers (36.36%), illiterate mothers (53.52%), manual labourer (67.14%), socioeconomic class IV and V (32.98%), consanguinity history (60.58%), smoky fuel (30.02%), consumption of tobacco (49.11%).[19]

Although many studies have thrown light on various factors associated with LBW in India, such studies are very few in the state of Andhra Pradesh. Hence, the present study is an attempt to determine various socio-demographic factors associated with LBW.

Objectives

- To assess the proportion of low birth weight among babies delivered by mothers at a tertiary care hospital.
- To analyse the relationship between low birth weight and certain socio-demographic factors.

METHODS

It is a cross-sectional study conducted in the maternity wards of GSL General Hospital, Rajamahendravaram, Andhra Pradesh, during a period of six months from Jan 2019 to June 2019. All the women who delivered and postnatal women in the early postnatal period (first seven days) during the study period were considered for the study. Those mothers with multiple pregnancies, stillbirths and seriously sick newborns were excluded. A total of 376 women fulfilled the inclusion criteria, of which 362 women consented and were included for the study. All the study participants were explained about the purpose and confidentiality of the study in their vernacular language. After taking informed consent, data was collected using a predesigned, pretested proforma which contained socio-demographic details and child details. Ethical clearance was obtained from the Institutional Ethics Committee, GSL Medical College.

Statistical analysis

Data was entered into Microsoft excel sheet, double checked for errors and analyzed using epi-info. Results were expressed as frequencies and proportions for categorical variables and mean and standard deviations for continuous variables. Chi-squared test was applied to capture the differences in proportions across socio-demographic and obstetric outcome variables. Fischer's exact 'p' was considered if more than 20% of the cells had an expected count of less than 5.

RESULTS

Among a total of 323 babies, 85 babies had birth weight less than 2.5 kgs making a prevalence of 23.5% LBW. The present study showed that, the proportion of mothers having low birth weight was maximum in women aged less than 18 years (35%) and more than 30 years (26.5%).

Majority of the mothers in the study were Hindus, 255 (70.44%) followed by Muslims 66 (18.23%) and others were 41 (11.33%). LBW was significantly more in women belonging to joint family 67 (30.0%) compared to nuclear family 18 (12.9%). LBW is more 30 (35.7%) in low per capita income group as compared to higher income group 1 (8.3%). The percentage of LBW babies in the present study was highest 24 (43.63%) among those who were illiterate and the occurrence decreased as the level of education increased. This difference was statistically significant.

Table 1: Socio-demographic factors and their association with LBW.

Factor	LBW (n=85)	Normal weight (n=277)	Chi-square value	P value
	N (%)	N (%)		
Age (in years)				
<18	07 (35.0)	13 (65.0)	2.7785	0.4270
19-25	43 (20.8)	164 (79.2)		
26-30	26 (25.7)	75 (74.3)		
>30	09 (26.5)	25 (73.5)		
Religion				
Hindus	56 (22.0)	199 (78.0)	1.3814	0.5012
Muslims	19 (28.8)	47 (71.2)		
Others	10 (24.4)	31 (75.6)		
Type of family				
Nuclear	18 (12.9)	121 (87.1)	12.9924	0.00031
Joint	67 (30.0)	156 (70.0)		
Per capita income (Rs)				
<1000	00 (0.0)	01 (100.0)	17.87	0.0013
1000-1999	30 (35.7)	54 (64.3)		
2000-2999	43 (23.8)	138 (76.2)		
3000-3999	11 (20.8)	42 (79.2)		
4000-4999	00 (0.0)	31 (100.0)		
≥5000	01 (08.3)	11 (91.7)		
Education of woman				
Illiterate	24 (43.6)	31 (56.4)	6.90	0.0086
Primary	43 (21.3)	159 (78.7)		
Secondary	11 (13.3)	72 (86.7)		
Higher secondary	03 (18.8)	13 (81.3)		
Graduate / Degree	04 (66.7)	02 (33.3)		

DISCUSSION

In the present study, 85 out of 362 births were low birth weight, giving a prevalence of 23.5%. Some of the studies in India have shown similar prevalence rates of LBW, 21.8% in Assam, and 27.76% in Odisha.[17,19] However, higher prevalence of 36.8% was found in Madhya Pradesh.[18]

The present study showed that, the proportion of mothers having low birth weight was maximum in women aged less than 18 years (35%) and more than 30 years (26.5%), though no statistically significant difference could be found. Almost similar findings were observed from previous studies. Negi et al, in their study conducted at RHTC, Dehradun, found that the more number of LBW babies (36%) were born to mothers who were less than 20years of age. The risk of delivering LBW babies was almost twice among the mothers who were aged below 20 years and who were aged 30 years and above. In a study by Bhue et al, majority (82.33%) of the mothers belonged to 20-29 years age and the mean age of mother at time of admission was 24.32 years.[19] The proportion of LBW babies was higher in below 20 years mothers (44.19%) and ≥30 years (39.56%) as compared to 20-29 years (25.0%) and the association between maternal age and LBW was found significant ($p<0.05$).

Majority of the mothers in the study were Hindus, 70.44% followed by Muslims 18.23% and others were 11.33%. Though Muslim women had a higher proportion of LBW (28.8%) in the present study, the difference was not statistically significant. A study by Bhue et al, also found that majority of mothers were Hindu 96.02% but the proportion of LBW was found high in Muslims 36.36% compared to Hindu 27.90% and Christian 20.0% mothers and the association was found to be statistically not significant ($p>0.05$).[19] A study by Joshi et al also showed that there was no significant association between birth weight and religion.[23]

Present study found that LBW was significantly more in women belonging to joint family (30.0%) compared to nuclear family (12.9%). The reason may be due to more work in joint family due to more number of family members compared to nuclear family. However, other studies have showed higher occurrence of LBW babies in nuclear families compared to joint families. In a study by Bhue et al, out 1030 mothers, 528 (51.26%) were from joint family and LBW was more common in nuclear families (37.18%) compared to joint families (27.46%).[19] Similar results were revealed by Agarwal et al, in their Meerut based study.[24] The proportion of LBW was high in nuclear families (37.18%) and the association between type of family and LBW was found to be highly significant. Manna et al, and Padda et al, also reported similar findings.[25,26]

It is observed that in low per capita income group the LBW is more (35.7%) as compared to higher income group (8.3%). A study was carried out in Mexico city showed that low socioeconomic level was the most important risk factor for LBW.[27] Radhakrishnan et al, in their survey of all infants born in Kadakampally found that socioeconomic status of family was found to be significantly associated with LBW.[28] A low SES was associated with a 3.5 fold elevated risk of LBW in the baby compared to a high SES of the mother. study by Bhue et al, also reported that, majority of mothers 73.3% were from low SES (class IV and V) as compared to middle (II and III) and upper class (I) 26.70%.[19] The proportion of LBW baby increased with decrease in SES and was highest in lower class (32.98%) and the association was statistically significant ($p<0.05$).

The percentage of LBW babies in the present study was highest (43.63%) among those who were illiterate and the occurrence decreased as the level of education increased. This difference was statistically significant. Similar results have been found by Joshi et al, in their study reporting that maternal education was significantly associated with birth weight of the newborn and LBW babies were more commonly born to illiterate mothers, (45.45%).[17,23] Dhar et al, in their study found that 31.30% of illiterate women had LBW babies, compared to only 17.46% among literate women, which indicated significant association of maternal education with LBW.[18,29] A study by Bhue et al, reported that, among the study participants, 6.9% were illiterate, 14.56% with primary education, 16.7% with high school, 61.5% with intermediate and above.[19] The proportion of LBW was high in mothers who were illiterate (53.52%). The LBW proportion decreased as educational standard increased i.e. primary (40.0%), high school (35.42%), intermediate and above (19.22%) respectively. The association between mothers education and birth weight of babies was found statistically significant ($p<0.05$). Thus, the present study states that different socio-demographic characteristics of the population are still the important factors determining the occurrence of LBW among the newborn.

Limitations of the study

Since this is a hospital based study, the numbers may not be reflective of the population values.

CONCLUSION

The prevalence of LBW still continues to be high, almost one fourth of the babies are LBW. Different socio-demographic characteristics of the population are still the important factors determining the occurrence of LBW. Women need to bear children at the appropriate age. Therefore all measures including legal should be taken to stop early marriage and early conception. Similarly women should also be educated that late conception (more than 30 years) due to career pressure, education etc can also lead to low birth weight. Proper nutrition of the girl child, through adolescence to conception and during the reproductive period must be ensured so that the intergenerational cycle of malnutrition is broken. Families of pregnant women should be counseled regarding the importance of nutrition and care during antenatal period, beginning pre-conceptionally and ending post-natally. Women and families should be made aware about the various schemes provided by state and national governments to overcome LBW and to promote health of mother and child. LBW is a multi-factorial phenomenon. Hence, interventional programs should be encouraged not only in health sectors but in all those sectors of social development and social welfare programs.

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