pISSN 2394-6032 | eISSN 2394-6040

Research Article

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20160484

Low birth weight and its determinants in a teaching hospital of Karnataka, India

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Received: 29 January 2016 Accepted: 10 February 2016

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ABSTRACT

Background: Low birth weight is prospective marker of future growth and development of children and retrospective marker of mother's nutritional and health status. The low birth weight is considered as sensitive index of nation's health and development. The low birth weight babies are at 20 time's greater risk of dying than normal birth weight babies. Lower the birth weight, lower the chances of survival. Objectives of the study was to find out the proportion of low birth weight babies delivered in Sri Chamarajendra district hospital, Hassan, India and to describe the influence of some maternal and socio demographic factors on the birth weight of baby.

Methods: A cross sectional, hospital based study was designed in post natal care wards of Sri Chamarajendra district hospital, Hassan, India from February 2012 to June 2012. 630 post natal mothers were selected for the study based on sample size estimation. Post natal mothers who delivered single, live babies were included and babies with congenital malformations and twins were excluded from the study.

Results: A number of factors like teenage pregnancy and mothers age above 30 years, illiteracy of the mothers, lower socioeconomic status, short birth spacing, lack of antenatal care, inadequate consumption of IFA tablets, anemia during pregnancy, improper dietary intake, tobacco consumption, bad obstetric history, obstetric complications during the present pregnancy were found to be significantly associated with low birth weight.

Conclusions: Most of the determinants of low birth weight can be managed easily by providing adequate antenatal care.

Keywords: Low birth weight, Post natal mothers, Antenatal care

INTRODUCTION

Today's children are tomorrow's citizens of a country. Thus the normal health and growth of children plays an important role in the prosperity of a country. Number of factors like maternal, socio environmental and genetic is responsible for the normal health, development and survival of children. The children are at an increased risk of mortality and morbidity than the general population. This is more so in the first year of life. More than half the infant deaths occur in the first 28 days of life. Babies born with low birth weight are at higher risk of dying. Birth weight is one of the important factors for the survival,

normal growth and development of a child.² Low birth weight is prospective marker of future growth and development of children and retrospective marker of mothers nutritional and health status.¹ The low birth weight is considered as sensitive index of nations health and development.³

The low birth weight babies are at 20 time's greater risk of dying than normal birth weight babies. Lower the birth weight, lower the chances of survival. Many of them become victims of protein-energy malnutrition, infections and neuro-developmental handicap.⁴

The goal of reducing the low birth weight incidence by at least one third between 2000 and 2010 is one of the major goals in "a world fit for children", the declaration and plan of action adopted by United nations general assembly by special session on children in 2002.⁵

The reduction of low birth weight also forms an important component to the millennium development goals (MDG) for reducing child mortality. Activities towards the achievement of MDGs will need to ensure a healthy start in life for children, by making certain that women commence pregnancy healthy and well nourished, and go through the pregnancy and child birth safely. Low birth weight is therefore an important indicator for monitoring progress towards these internationally agreed upon goals.⁵

Globally more than 20 million low birth weight babies are born each year. 72% of the low birth weight babies in the developing countries are born in Asia and 22% in Africa. India alone accounts for 40% of low birth weight babies in developing world and more than half of those in the Asia. In India, disparity has ranged from a prevalence of 10% for the privileged high socioeconomic class to 56% for the poor slum community. Rural and urban slum population has consistently recorded highest prevalence of low birth weight. According to NFHS III, national incidence of low birth weight is 22%.

Kramer has identified 43 potential factors for low birth weight.⁶ The factors vary from one area to another, depending upon geographic, socioeconomic and cultural factors. Thus it is necessary to identify factors prevailing in a particular area responsible for low birth weight, so as to plan the strategy to tackle this important problem.

In view of this, present study is designed with the objective to find the proportion of the low birth weight babies delivered in Sri Chamarajendra district hospital, Hassan, India. Objectives for the study was to find out the proportion of low birth weight babies delivered in Sri Chamarajendra district hospital, Hassan, India and to describe the influence of some maternal and socio demographic factors on the birth weight of baby.

METHODS

Study design

A cross sectional, hospital based study.

Study setting

Post natal care wards of Sri Chamarajendra district hospital, Hassan, India.

Study period

Study period was from February 2012 to June 2012.

Sample size

Based on NFHS III, a prevalence of low birth weight 22% is taken into consideration.⁴

A sample size at 95% confidence limits, with 15% allowable error is calculated applying the formula $4PQ/L^2$. Thus, 630 post natal mothers were calculated for study.

Inclusion criteria

Post natal mothers who delivered single, live babies.

Exclusion criteria

Babies with congenital malformations and twins were excluded.

All the mothers who are delivered were interviewed next day of delivery. The information regarding the study variables was recorded on predesigned, pretested questionnaire. Physical examination was undertaken after the interview was over. The available health records were also reviewed. Birth weight of the baby was studied with the variables such as maternal age, education and occupations, fathers education, socioeconomic status, type of family, type of residence, mothers age at first conception, parity, interpregnancy interval, antenatal care, iron and folic acid tablets consumed, physical activity during pregnancy, diet intake, consumption of tobacco, bad obstetric history, obstetric complications during pregnancy, anaemia, and mothers height.

Operational definition

Birth weight less than 2.5 kg was considered as low birth weight. A birth weight equal to or more than 2.5 kg was considered as normal birth weight.

Data analysis

Data analysis is done by using SPSS software. Chi-square test is applied and p value is calculated to establish the level of significance.

RESULTS

Out of total 630 live new borns, 101 were low birth weight babies. Thus the proportion of low birth weight found was 16% (Figure 1). The proportion of low birth weight babies was higher in teenage mothers (34.2%) and in above 30 years age group (36.8%) (Figure 2). A highly significant association was found between maternal age and birth weight of baby (p<0.001). More low birth weight babies are found in illiterate mothers. A highly significant association was found between mothers education and birth weight of babies (p<0.001) (Figure 3). Mothers having height less than 140 cm (28%) and in 140-145 cms (28.5%) shows highly significant

association between maternal height and birth weight of baby (P<0.001) (Table 1). Percentage of low birth weight babies was higher in second para and above (18%) compared with primiparous mothers (14%). However, no significant association was revealed between parity and birth weight of baby (p>0.05) (Table 2). Inter pregnancy interval less than 18 months (51.3%) shows highly significant association (p<0.001) (Table 3). 22% of the mothers with severe anemia and 37.2% of the mothers with moderate anemia delivered low birth weight babies, which was statically highly significant (p<0.001) (Table 4). 26.2% mothers delivered low birth weight babies in whom bad obstetric history was present. A significant association was found between bad obstetric history and birth weight of baby (p<0.05) (Table 5). Percentage of low birth weight babies was higher (38.2%) in mothers with obstetric complications during present pregnancy. A highly significant association was found between obstetric complications and birth weight of baby (p<0.001) (Table 6).

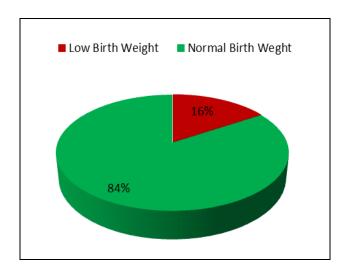


Figure 1: Pie diagram showing proportion of low birth weight.

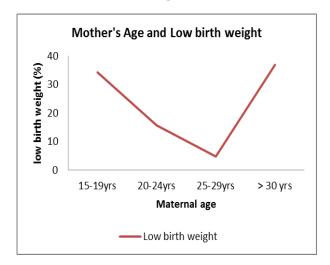


Figure 2: Line diagram showing distribution of low birth weight by age of the mother.

Table 1: Mothers height and birth weight of the baby.

Mothers height	Low birth weight	Normal birth weight	Total
<140 cm	17 (27.9%)	44 (72.1%)	61 (100%)
140-140 cms	26 (28.6%)	65 (71.4%)	91 (100%)
145-149 cms	23 (11%)	187 (89%)	210 (100%)
150-154 cms	29 (12.4%)	21 (87.6%)	242 (100%)
>155 cms	6 (19.2%)	21 (80.8%)	26 (100%)
Total	101 (16%)	529 (84%)	630 (100%)
140-140 cms 145-149 cms 150-154 cms >155 cms	26 (28.6%) 23 (11%) 29 (12.4%) 6 (19.2%)	65 (71.4%) 187 (89%) 21 (87.6%) 21 (80.8%)	91 (100%) 210 (100%) 242 (100%) 26 (100%)

 $\chi^2 = 23.57$; Df = 4; p < 0.001.

Table 2: Parity and birth weight of the baby.

Birth weight			Total
Parity	Low birth weight	Normal birth weight	
1 st	43 (14%)	264 (86%)	307 (100%)
2 nd and above	58 (18%)	265 (82%)	323 (100%)
Total	101 (16%)	529 (84%)	630 (100%)

 χ^2 = 8.01; Df=2; p>0.05.

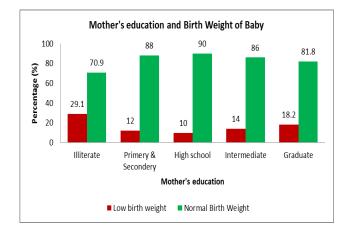


Figure 3: Bar diagram showing distribution of low birth weight by mother's education.

Table 3: Inter pregnancy interval and birth weight of the baby.

Inter	Birth weight		
pregnancy interval	Low birth weight	Normal birth weight	Total
<18 months	20 (51.3%)	19 (48.7%)	39 (100%)
18-24 months	s 26 (21.1%)	97 (78.9%)	123 (100%)
>24 months	12 (8.1%)	137 (91.9%)	149 (100%)
Total	58 (18.6%)	253 (81.4%)	311 (100%)

 χ 2= 38.9; Df = 2; p < 0.001.

Table 4: Anaemia and birth weight of the baby.

Hb% of	Birth weight		
mother	Low birth weight	Normal birth weight	Total
<6 gm%	9 (22%)	32 (78%)	41 (100%)
6-7.9 gm%	42 (37.2%)	71 (62.8%)	113 (100%)
8-9.9 gm%	38 (12.1%)	275 (87.9%)	313 (100%)
>10 gm%	12 (7.4%)	151 (92.6%)	163 (100%)
Total	101 (16%)	529 (84%)	630 (100%)

 χ 2= 51.2; Df = 3;p < 0.001.

Table 5: Bad obstetric history and birth weight of the baby.

	Birth weight		Total
Bad	Low-birth	Normal	
obstetric	weight	birth	
history		weight	
Present	27 (26.2%)	76 (73.8%)	103 (100%)
Absent	74 (14%)	453 (86%)	527 (100%)
Total	101 (16%)	529 (84%)	630 (100%)

 χ 2= 9.4; Df = 1; p < 0.05.

Table 6: Obstetric complications and birth weight of the baby.

Obstetric	Birth weight		Total
complications	Low birth	Normal birth	
	weight	weight	
Present	50 (38.2%)	81(61.8%)	131 (100%)
Absent	51 (10.2%)	448 (89.8%)	499 (100%)
Total	101 (16%)	529 (84%)	630 (100%)

 $\chi 2 = 60.2$; Df = 1; p < 0.001.

DISCUSSION

The proportion of low birth weight in the present study was 16 %, which was less than national incidence of low birth weight (22%), according to NFHS-III.

The other hospital based studies have shown the proportion of low birth weight ranging from 13.3% to 34.7%. Sharma et al and Shyam et al conducted a retrospective study, found low birth weight proportion as 17.5% and 19% which is similar to present study.^{7,8} Idris et al found the proportion of low birth weight as 32%, which is higher compared to the present study.³

In the present study, the proportion of low birth weight babies was higher in teenage mothers (34.2%) and in above 30 years age group (36.8%). A highly significant association was found between maternal age and birth weight of baby (p<0.001).

Ghosh et al and Kamaldoss et al found 34.3% and 32% of low birth weight in teenage mothers, similar to present

study. 9,10 Deswal et al found 30.9% of low birth weight in teenage mothers. 11

Gawande et al shows higher low birth weight percentage in the teenage mothers (41%), which decreases as the age advances. Again low birth weight percentage increases beyond 30 years of age (50.7%), which is similar to present study. This may be due to associated complications of pregnancy as the age advances. Krammer reported two studies with no association between maternal age and birth weight of baby.

In the present study, 29% of the illiterate mothers gave birth to low birth weight babies, which was very high compared to mothers with higher education.

Joshi HS et al found that 45% of the mothers who were illiterate gave birth to low birth weight babies which is significantly high compared to educated mothers. ¹³

Amin et al found that around 50% of mothers in each educational level were found to deliver LBW babies, indicating no effect of mother's education on LBW. 14

In the present study, percentage of low birth weight was higher in mothers having height less than 140 cm (28%) and in 140-145 cms (28.5%). A highly significant association was found between maternal height and birth weight of baby (p<0.001).

Malik et al found a strong correlation between birth weight and maternal height. Maternal height <145 cm contributed significantly to a high rate of L.B.W. (38.5%). Amin et al found 61.7% mothers with height <150cm delivered LBW babies, which was statistically not significant. 14

In the present study, the percentage of low birth weight babies was higher in second para and above (18%) compared with primiparous mothers (14%). Joshi and Pai observed that the percentage of LBW increased with increase in parity. Lesser percentage of low birth weight is seen in primiparous mothers (23%) compared to higher parity (34%), which is similar to the present study. Gawande et al found higher percentage of low birth weight (43%) in primiparous mothers. 12

In the present study, the percentage of low birth weight was high (51.3%) when interpregnancy interval was less than 18 months. The percentage decreased to 8% when interpregnancy interval was more than 24 months. A highly significant association was found between interpregnancy interval and birth weight of baby (P<0.001). Gawande et al reports higher percentage of low birth weight babies (44.7%) when interpregnancy interval was less than 18 months. Negi KS et al found 34.5% of low birth weight new borns in mothers with interpregnency interval of <12 months compared to >12 months (17%). The compared to 12 months (17%).

In the present study, 22% of the mothers with severe anaemia and 37.2% of the mothers with moderate anaemia delivered low birth weight babies as compared to only 7.4 % in normal mothers, which was statistically highly significant (p<0.001). Ghosh et al found incidence of LBW babies among non-anaemic and mild anaemic mothers was about 20%.

26.2% mothers delivered low birth weight babies as compared 14% mothers in whom bad obstetric history was not present. Idris et al found that 44% of the mothers with previous bad obstetric history delivered low birth weight.³ Negi KS et al found that 34% of the mothers with previous bad obstetric history delivered low birth weight compared to only 10% in mothers with no bad obstetric history.¹⁷

The percentage of low birth weight babies was higher (38.2%) in mothers with obstetric complications during present pregnancy, as compared to mothers having no obstetric complications (10.2%). A highly significant association was found between obstetric complications and birth weight of baby. Idris et al found a high incidence of low birth weight babies among mothers with obstetric complications (60.26%) as compared to present study. Kamaldoss et al found that high risk pregnant mothers (34%) had a high percentage of LBW than low risk pregnant mothers (20.3%). Deswal et al found that mothers who had toxemia of pregnancy were about 5 times more at risk of having LBW babies as compared to those not having it. 11

Thus concluding, a number of factors like teenage pregnancy and mothers age above 30 years, illiteracy of the mothers, lower socioeconomic status, short birth spacing, lack of Antenatal care, inadequate consumption of IFA tablets, anemia during pregnancy, improper dietary intake, tobacco consumption, bad obstetric history, obstetric complications during the present pregnancy were found to be significantly associated with low birth weight.

Most of these factors can be managed easily by providing adequate antenatal care.

ACKNOWLEDGEMENTS

I thank Prof. and HOD, Department of Community Medicine, Dr. Sundar M, for having given the opportunity to conduct the study. I thank Department of OBG for giving the valuable suggestion and for their kind cooperation. I am grateful to all the post natal mothers who actively participated in the study.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

Institutional Ethics Committee

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Cite this article as: Sumana M, Sreelatha CY, Girija BS, Sundar M, Gowda D. Low birth weight and its determinants in a teaching hospital of Karnataka, India. Int J Community Med Public Health 2016;3:610-4.