

Original Research Article

A study of epidemiological co-relates of low birth weight babies born in tertiary care hospital

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ABSTRACT

Background: To study the Epidemiological Factors related with the low Birth weight Babies born in tertiary care Hospital of teaching Medical Institution.

Methods: The present study was a cross sectional observational study carried out in the Post Natal ward of Obstetric department of a tertiary care hospital of a metropolitan city, data collection was done from the Mothers of low birth weight babies by conducting face to face interview in the post-natal ward with a predesigned, structured Performa. Data was analyzed using statistical package for social science program.

Results: The study showed that most of mothers of the babies were between the age group of 22 to 30 years 87 (58.3%) while 49 (32.8%) were below the age of 21 years and 13(8.7%) were above 30 years of age. Most of the study subjects 70 (47.0%) belongs to the lower socioeconomic status where as 62 (41.6%) and 17 (11.4%) belong to upper lower and middle socioeconomic class respectively. It was observed in the present study that maternal education, socioeconomic status, parity, maternal weight gain during pregnancy, height of the mother, tobacco habits either chewing or smoking, birth order of the baby are the factors, significantly associated with low birth weight of the baby.

Conclusions: Socioeconomic development, maternal nutrition, and increasing the use of health services during pregnancy, are all important for reducing LBW. There is need to strengthen the existing maternal services at the basic level of community.

Keywords: Epidemiological co-relates, Low birth weight, Tertiary care hospital

INTRODUCTION

Low birth weight (LBW) is defined by the World Health Organization (WHO) as weight at birth less than 2500g (5.5 lb). Low birth weight continues to be a significant public health problem globally and is associated with a range of both short- and long-term consequences. Overall, it is estimated that 15% to 20% of all births worldwide are LBW, representing more than 20 million births a year.¹ Indian standard for LBW Babies is 2000g.² Low birth weight rate at the population level is an

indicator of a public health problem that includes long-term maternal malnutrition, ill health and poor health care. On an individual basis, low birth weight is an important predictor of newborn health and survival. In developing countries, including India, the majority of LBW infants because of intrauterine growth retardation (IUGR) are born small at term (>37wk of gestation) with only 6.7 per cent born prematurely. Low birth weight leads to an impaired growth of the infant with its attendant risks of higher mortality rate, increased morbidity a, impaired mental development b, and the risk

of chronic adult disease. Infants who weight 2,000-2,499 g at birth have a four-fold higher risk of neonatal death than those who weight 2,500-3,499g. The more severe the growth restriction within the LBW category, the higher is the risk of death.³ LBW is considered the single most important predictor of infant mortality, especially of deaths within the first month of life. There are numerous factors contributing to LBW both maternal and fetal. Weight at birth is directly influenced by general level of health status of the mother. Maternal environment is the most important determinant of birth weight, and factors that prevent normal circulation across the placenta cause poor nutrient and oxygen supply to the fetus, restricting growth. The maternal risk factors are biologically and socially interrelated; most of which are modifiable. A multi factorial inter-relationship exists between the environment in which pregnant mothers live and the growth of the fetus.⁴ Incidence of low birth weight is 15.5 per cent of all births, or more than 20 million infants worldwide, are born with low birth weight. The level of low birth weight in developing countries (16.5 per cent) is more than double the level in developed regions (7 per cent). More than 95 per cent of low birth weight babies are born in developing countries.⁵

It is therefore imperative to identify risk factors for LBW in various communities in the country in order to come up with feasible intervention strategies to minimize the problem. The purpose of this study is to identify the epidemiological factors affecting birth weight and also to know the relationship of socio economic, obstetric and anthropometric factors of mother with LBW.

METHODS

The present study was a cross sectional observational study carried out in the Post Natal ward of Obstetric department of a tertiary care hospital of a metropolitan city. The study subjects, selected by quota sampling, were mothers who delivered babies in study duration of 3 months in the tertiary care hospital. The inclusion criteria for the mothers of the infants were live-birth singleton newborn Babies or Twins, Babies born by normal vaginal delivery, Babies with low birth weight (less than 2.5 kg) Babies with birth weight of 2.5 kg or more than 2.5 kg. Thus, the Sample size collected was 149 and the data collection was done from the Mothers by conducting face to face interview in the post-natal ward with a predesigned, structured Performa. Data was analyzed using statistical package for social science program (SPSS 16.0 version) and Chi Square test was used to test association between low birth weight and the suspected factors. A 'p' value of <0.05 was considered statistically significant.

RESULTS

The study showed that most of mothers of the babies were between the age group of 22 to 30 years 87 (58.3%)

while 49 (32.8%) were below the age of 21 years and 13 (8.7%) were above 30 years of age (Figure 1).

It was observed that 79 (53%) of study subjects got married when they were above the age of above 18 yrs while 70 (47%) got married when they were less than 18 yrs. The results showed that that 83 (55.7%) of study subjects were having their first baby when they were in the age group 15-20 yrs, 45 (30.2%) of study subjects had their first pregnancy when they were in the age group of 21-25 yrs, 21 (14.1%) of study subjects had their first pregnancy when they were in the age group of above 25 yrs of age.

Most of the study subjects 70 (47.0%) belongs to the lower socioeconomic status whereas 62 (41.6%) and 17 (11.4%) belong to upper lower and middle socioeconomic class respectively (Figure 2). Regarding the education status, it was observed that 101 (67.8%) of study subjects were educated up to secondary level while 39 (26.2%) of study subjects were illiterate. Only 9 (6%) of study subjects were up till higher secondary level. Most of the study subjects were house wives (73.2%), some work as daily wage workers (16.8%) and (10.1%) were employed in either government or private sector.

The results showed that 105 (70.47%) study subjects gave birth to babies with birth weight ≥ 2.5 kg while frequency of low birth weight babies was 29.53% as 44 mothers gave birth to the babies with weight less than 2.5kg (Figure 3).

Table 1: Socio economic factors associated with low birth weight babies.

Epidemiological factors (co relates)	Birth weight of the babies		P value
	< 2.5 kg	≥ 2.5 kg	
Education status of mother			
Illiterate	20(74.35%)	19(48.71%)	0.003*
Primary	10(27.77%)	26(72.22%)	
Secondary	11(16.92%)	54(83.07%)	
Higher secondary	3(33.33%)	6(66.66%)	
Occupation of mothers			
Housewife	23(52.27%)	86(81.90%)	0.006*
Laborer	15(34.09%)	10(9.52%)	
Service	6(13.63%)	9(8.57%)	
Socio economic status			
Lower	39(88.63%)	31(29.52%)	0.001*
Upper lower	1(2.27%)	61(58.09%)	
Middle	4(9.09%)	13(12.38%)	
Religion			
Hindu	20(45.45%)	53(50.47%)	0.57
Muslim	24(54.54%)	52(49.52%)	

*Chi square test- p value <0.05 is considered statistically significant.

Table 1 and 2 shows the epidemiological co relates of the low birth weight babies. It was observed in the present

study that maternal education, socioeconomic status, parity, maternal weight gain during pregnancy, height of the mother, tobacco habits either chewing or smoking, birth order of the baby are the factors, significantly associated with low birth weight of the baby. However maternal age, age at first pregnancy, age at marriage, occupation, Religion and planned or unplanned pregnancy, sex of the baby, were not identified as significant risk factors for LBW babies.

Table 2: Maternal factors associated with low birth weight babies.

Epidemiological factors (co relates)	Birth weight of the babies		p value
	< 2.5 kg	≥2.5 kg	
Age at marriage			
≤ 18	24(54.54%)	46(43.80%)	0.23
>18	20(45.45%)	59(56.19%)	
Age at first pregnancy (years)			
15-20	27(61.36%)	56(53.33%)	0.25
21-25	14(31.81%)	31(29.52%)	
More than 25	3(6.81%)	18(17.14%)	
Parity			
≤3	24(54.54%)	53(50.47%)	0.33
>3	20(45.45%)	52(49.52%)	
Birth order of the baby			
>3	29(65.90%)	37(35.23%)	0.001*
≤3	15(34.09%)	68(64.76%)	
Wight of mother during pregnancy (in kgs)			
<45	20(45.45%)	58(55.23%)	0.03*
45-55	12(27.27%)	36(34.28%)	
≥55	12(27.27%)	11(10.47%)	
Height of the mother (in ft)			
<5	17(38.63%)	23(21.90%)	0.03*
≥5	27(61.36%)	82(78.09%)	
Planned or unplanned pregnancy			
Planned	43(97.72%)	97(92.38%)	0.21
Unplanned	1(2.27%)	8(7.61%)	
Tobacco use (smoking / chewing)			
Yes	21(47.72%)	14(13.33%)	0.001*
No	23(52.27%)	91(86.66%)	
Sex of the baby born			
Male	24(54.54%)	56(53.33%)	0.89
Female	20(45.45%)	49(46.66%)	

*Chi square test- p value <0.05 is considered statistically significant

DISCUSSION

Weight of the newborn is a universal undisputed predictor of healthy infancy and childhood. The risks of peri-natal and infant mortality rates are greater among the low birth weight infants. In addition to increasing risk of mortality, low birth weight is also found to be associated with morbidity and long term developmental problems among those babies who survive. The incidence of low birth weight was considerably decreasing in western world over the past years due to increased standard of living of the people, and increased fund allocation for health care by the government. In a country like India

where there are economic constraints the present study was done to find the relationship between various epidemiological correlates of low birth weight like socio demographic factors, economic factor, maternal factors with low birth weight so that appropriate measures can be taken to reduce the incidence.

In this study Percentage of low birth weight babies was 29.53%, which is more than the prevalence of LBW (21.5%) observed in National Family Health Survey-3, this was expected as the study was carried out in tertiary care hospitals where many of the pregnant women are referred from the peripheral hospitals because of high risk pregnancy. In present study, lower socioeconomic status, maternal education, parity, gestational weight, height and smoking were significantly associated with low birth weight. However maternal age, age at first pregnancy, age at marriage, occupation, Religion and planned or unplanned pregnancy were not identified as significant risk factors for LBW babies. Our findings on maternal age as a risk factor are consistent with the stud, epidemiology of low birth weight in Ahmadabad6 and rural Karnataka in India.⁷ A cohort study on low birth weight and associated maternal factors in an urban area reported maternal age to be significantly associated with LBW on multivariate analysis.⁸

In present study maternal education level is associated with increased risk for LBW. A community based study on Socioeconomic and Demographic factors associate with birth weight in Kerala did not find an association of LBW with level of maternal education.⁹ While study on factors affecting low birth weight found that maternal education had significant association with birth weight of newborn.¹⁰ In our study, it was observed that the working status of mother which affects the birth weight of the babies specially the type of maternal occupation had significant effect on the birth weight similar findings were obtained in a Study done in Wardha, Maharashtra, which showed that 67.8% of LBW babies belonged to mothers who were laborers by occupation.¹⁰

In present study lower socio economical status had significant association with LBW, various other studies done in India also found significant association between socioeconomic status and birth weight of baby.^{8,11} Socioeconomic status is closely associated with other health behaviors such as tobacco and alcohol use, and several studies have found an association between social factors and poor pregnancy outcome. Low socioeconomic status and low educational status leads to low health consciousness, lower nutritional status and lesser antenatal checkups, leading to the increased risk of LBW babies.

Mothers <5 ft of height delivered a higher proportion of LBW babies. In this study there is significant association between height of mother and birth weight of baby, the findings are consistent with the other studies.^{8,12} While a study done by Amin N, Abel R, Sampathkumar V. on

Maternal risk factors associated with low birth weight reported that there is no significant association between height of mothers and birth weight of baby.¹³

The relationship between gestational weight and LBW was significant in this study. Out of 44 LBW babies, most of the mothers 20 (45.45%) had gestational weight <45 kg. Study by Malik S, on maternal Biosocial factors affecting low birth weight showed the similar findings.¹⁴ In present study sex of baby not associate with LBW babies, the study of Radhakrishnan, et al. also showed no association between Sex of neonate and LBW.⁹

In present study planned or unplanned pregnancy was not found to be a significant risk factor for LBW, a study by Joseph et al also reported that Unplanned pregnancy was not found to be a significant risk factor for LBW.¹⁵ In present study habit of smoking is closely associated with increased risk of LBW finding is consistent with the findings of other studies in Mumbai and other parts of India.^{8,16} A case control study from tertiary care teaching hospital in rural Southern India showed similar results like Frequency of low birth weight babies had significant association with mother's weight and age, parity, birth interval, bad obstetric history, per-capita income and illiteracy.¹⁵ Factors which failed to show a significant relation with low birth weight were mother's height, sex of child, number of antenatal visits, family structure and maternal diseases complicating pregnancy.

There are some limitations of the study which include-Lifestyle factors such as tobacco and alcohol use were self-reported and might be imprecise. Present study is unable to definitively say whether any factor was directly associated with low birth weight. As it is a hospital-based study the results cannot be generalized to the whole community.

CONCLUSION

As there are several factors interacting in this phenomenon, so it is not feasible to single out any particular factor affecting low birth weight. Among the various epidemiological factors, the maternal factors like antenatal care, parity, inter pregnancy interval and bad obstetric history are found to influence birth weight. Socioeconomic development, maternal nutrition, and increasing the use of health services during pregnancy, are all important for reducing LBW. Hence, it is the need to strengthen the existing maternal services at the basic level of community.

Recommendations

Low birth weight is significant public health problem and multiple factors are associated with it so to reduce birth weight prolonged approach is needed. Every pregnant woman need to be registered early in antenatal clinic and regular visit should be done thereafter. Mother craft education can be included as a component of ANC Care

program. Monitoring of maternal weight is in pregnancy is recommended Effective nutritional education is highly recommended. Supervised nutritional supplementation to the pregnant woman should be focused. Mother's education had significant impact on low birth weight; hence girl's education should be emphasized.

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