Maternal and neonatal factors among low birth weight babies: A tertiary care hospital based study.

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Abstract

Low birth weight (LBW) at birth may be the outcome of either preterm birth (before 37 weeks of gestation) or retarded fetal (intrauterine) growth. By National Family Health Servey-3(NFHS) report, proportions of low birth weight babies were found 23% for rural and 19% for urban population. The causes of low birth weight are complex and interdependent, and various maternal factors are known to influence the birth weight of neonates. The present study was conducted in the department of Pediatrics, Sri Siddhartha Medical College Hospital, Tumkur, Karnataka, India. A total of 100 consecutive newborn babies with birth weight 2500gms or less were included in this study. Male babies were 57% and 43% were female babies. In this study 51% of the mothers were in the age group of 21-25yrs with mean ± SD: 23.62±4.15. In this study 65% of the babies were in the birth weight range of 1500-2499grams and 30% of the babies were in the range of 1001-1499grams with mean ± SD: 1615.98±388.24. In this study 39% of the mothers had less interpregnancy interval, 20% mothers had consanguineous marriage, 15% of the mothers had previous history of low birth weight babies and 16% of the mothers had history of abortion. Thirty six percent of the mothers had severe pregnancy induced hypertension and 28% of the mothers had anemia. Acute gastroenteritis and decreased liquor in mothers had a significant association with low birth weight with p value =0.0044 and 0.0002 respectively. The most important factor influencing the birth weight of new born is the socioeconomic environment that has the direct influence on maternal nutrition, height, weight and Hb%. Meanwhile, young maternal age, high parity, lack of birth spacing, lack of education, APH, toxemia, UTI and malaria are additional factors responsible for LBW babies in our set up. Health education, socioeconomic development, maternal nutrition, and increasing the use of health services during pregnancy, are all important for reducing low birth weight babies.

Introduction

Low birth weight (LBW) has been defined by the World Health Organization (WHO) as weight at birth of less than 2500 g. LBW at birth may be the outcome of either preterm birth (before 37 weeks of gestation) or retarded fetal (intrauterine) growth. [1] LBW is considered the single most important predictor of infant mortality, especially of deaths within the first month of life. [2] It continues to remain a major public health problem worldwide especially in the developing countries. More than twenty million low birth weight babies are born every year throughout the world, in spite of considerable efforts to improve the maternal and child health quality. About half of all deaths in perinatal period are directly or indirectly related to low birth weight. [3] Low birth weight is the strongest determinant of infant morbidity and mortality in India. By NFHS-3 report, proportions of low birth weight babies were found 23% for rural and 19% for urban population. [4] India alone has more than 7 million low‑birth babies. In countries where the population of LBW infants is less, short gestational period is the major cause. In countries where the proportion is high (e.g. India), the majority of cases can be attributed to fetal growth retardation. [5] According to the in-utero fetal programming hypothesis (Barker hypothesis), size at birth is related to the risk of developing disease later in life. Although the Barker hypothesis originally focused on low birth weight, there is evidence that high birth weight may have its own set of complications later in life such as hypertension and diabetes mellitus. [6] The causes of low birth weight are complex and interdependent, and various maternal factors

are known to influence the birth weight of neonates. Maternal age, anthropometric parameters such as height, weight, body mass index (BMI), weight gain during pregnancy, nutritional status, socioeconomic status, and parity are some of the well-established determinants of the birth weight of the neonate. [7] Other factors that contribute to LBW are chronic health problems and infections in mothers, alcohol, smoking, and babies with birth defects. [8] If the maternal risk factors associated with low birth weight are detected early and addressed properly, the low birth weight and the consequences thereof can be reduced [9]. The present study was undertaken to identify the epidemiological factors affecting low birth weight in a tertiary care hospital.

Material and methods

The present study was conducted in the department of Pediatrics, Sri Siddhartha Medical College Hospital, Tumkur, Karnataka, India. Ethical clearance for the study was taken from the college ethical committee. A total of 100 consecutive newborn babies with birth weight 2500gms or less, were included in the study. Elaborate history was taken with the help of a pre-tested proforma which stressed on the presence of risk factors, that are associated with LBW like previous history of LBW, still births, abortions, low socio-economic status, maternal age, short interpregnancy interval, antenatal history of drug intake, tobacco chewing, alcohol consumption, smoking, maternal history of pregnancy induced hypertension (PIH), anemia, eclampsia, antepartum hemorrhage, Polyhydramnios, chronic hypertension, diabetes mellitus, chronic diseases, multiple gestations, urinary tract infection, gastroenteritis, fever with rash, exposure to radiation, trauma, blood transfusions . This is followed by a complete clinical examination of every low birth weight baby and the clinical course in the hospital was followed closely till discharge.

Results

A total of 100 consecutive new born low birth babies were studied. Fifty seven percent babies were male and 43% were female babies. Of these babies 65% of the babies were born to multipara mothers and 35% of them were born to primipara mothers. Of the 100 mothers studied 17% were unbooked mothers and 83% of the mothers were booked cases. In this study 70% of the mothers were lower socioeconomic status, 5% of the mothers were lower middle class and 25% of the mothers were upper lower class according to modified Kuppuswamy scale. In this study 51% of the mothers were in the age group of 21-25yrs. Twenty two percent of the mothers were in the age group of 19-20yrs and 21% of the mothers were in the age group of 26-30yrs with mean ± SD: 23.62±4.15. In this study 65% of the babies were in the birth weight

range of 1500-2499grams and 30% of the babies were in the range of 1001-1499grams (table-1) with mean ± SD: 1615.98±388.24. In this study 39% of the mothers had less interpregnancy interval, 20% mothers had consanguineous marriage, 15% of the mothers had pervious history of low birth weight babies and 16% of the mothers had history of abortion. Thirty six percent of the mothers had severe pregnancy induced hypertension and 28% of the mothers had anemia (table-2). Acute gastroenteritis and decreased liquor in mothers had a significant association with low birth weight with p value =0.0044 and 0.0002 respectively.

Table 1. *Birth weight (grams)*

Birth weight(grams)	No. of babies	%
<1000	5	5.0
1001-1499	30	30.0
1500-2499	65	65.0
Total	100	100.0

Table 2. *Clinical features of mothers studied.*

Clinical features	No. of mothers (n=100)	%
PIH	36	36.0
Anemia	28	28.0
Eclampsia	10	10.0
APH	16	16.0
Liquor	2	2.0
H/o chronic disease	2	2.0
Twin pregnancy	24	24.0
h/o PROM > 18 hrs	23	23.0
UTI	3	3.0
Gastroentritis	4	4.0
H/o fever with rash	2	2.0
Drug intake	4	4.0
Antenatal steroids	36	36.0
Blood Transfusion	19	19.0

Discussion

Birth weight is now widely used as an indicator of health status of individuals and populations as it has strong associations with both childhood and adult health. It is associated with childhood growth, cognitive deficit and disability [10]. Different studies have revealed that significantly associated risk factors for the birth weight of a newborn vary according to the geographical location and the study population. The mean low birth weight observed in our study was 1615.98 grams. The inter-pregnancy interval and the number of antenatal visits were having statistically significant association with low birth weight. Similar association was reported by Negi et al [11]. With increasing maternal age, the birth weight decreased significantly. This is consistent with previous studies; however

some studies showed increasing birth weight as maternal age advanced [12-14]. Low maternal hemoglobin concentration was associated with low birth weight babies in our study as suggested by other studies [15]. Iron and calcium supplementation during pregnancy was associated with lower incidence of low birth weight and the association was significant.

Previous studies have shown maternal hypertension to be associated with low birth weight [10, 16]. Maternal hypertension is thought to cause LBW by affecting placental blood flow thus limiting nutrient supply. In the present study 36% of the mothers had pregnancy induced hypertension. Multiparity and higher number of births is a common feature seen in women of low socioeconomic status which is also a factor associated with low birth weight [10]. In our study 65% of the low birth weight babies were born to multipara mothers. Urinary tract infection was also having strong association with low birth weight. Matin et al [17] reported significant association between low birth weight and urinary tract infection. In the present study 3% of the mother of low birth weight babies had urinary tract infection. Gastroenteritis was seen in 4% of the mothers who had low birth weight babies.

Conclusions

Low birth weight babies are high in our set up like other developing countries. The most important factor influencing the birth weight of new born is the socioeconomic environment that has the direct influence on maternal nutrition, height, weight and Hb%. Meanwhile, young maternal age, high parity, lack of birth spacing, lack of education, APH, toxemia, UTI and malaria are additional factors responsible for LBW babies in our set up. Health education, socioeconomic development, maternal nutrition, and increasing the use of health services during pregnancy, are all important for reducing low birth weight babies. Simple awareness is required in the general population for improving the birth weight of newborns.

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