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Impact of socioeconomic status of family on the birth weight- A cross sectional study from Eastern India

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Abstract

Introduction: Despite a lot of progress in the field of neonatology in last few years, low birth weight babies still pose a challenge for an optimal outcome. Maternal socioeconomic status and malnutrition is directly or indirectly linked to the birthweight. We intended to study the effect of socioeconomic status of family with birthweight in eastern part of India. **Objective**: To assess the effect of socioeconomic status of family on birth weight and to assess the effect of anemia on birthweight. Materials and Methods: A cross-sectional study was conducted in Gouri Devi Institute of Medical Sciences and Hospital, Durgapur, West Bengal, from 1st March 2019 to 28th February 2020. Data was collected from the mothers who visited the Paediatrics OPD with their child during the study period. Mothers were asked to fill a pre-designated case record form. Details of antenatal, natal and postnatal records were sought and noted. For the purpose of assessment of socioeconomic status, education, occupation and income of family were recorded. Socioeconomic status family were classified in to 3 major categories; lower (lower and upper lower), middle (lower middle and upper middle) and upper as per modified Kuppuswamy classification. Maternal nutrition status was assessed by body mass index (BMI) and anemia. **Results:** Out of the 229 babies, 79 babies had low birthweight and 150 babies had normal birthweight. 35.5% of babies were found to have low birthweight. Babies born to mother with primary education (68.55%) were found to have more LBW babies than with higher education. Twenty eight (35.44%) LBW babies belong to middle class (class II and class III) and 51(64.56%) LBW babies were from lower class (P<0.05). Mothers of 194 (84.71%) out of 229 babies had anemia. Similarly only 5(6.33%) LBW babies belong to non-anemic mother where as 74(93.67%) of LBW babies were from mothers with low hemoglobin. Anemic mothers were more likely to deliver LBW baby. **Conclusion:** Low maternal education, low socio-economic status and maternal anemia were associated with increase in the risk of low birth weight babies.

Keywords: Birth weight, low birthweight (LBW), prematurity, intrauterine growth restriction (IUGR), anemia

Introduction

Despite a lot of progress in the field of neonatology in last few years, low birth weight babies still pose a challenge for an optimal outcome. Low birthweight (LBW) is defined as birthweight less than 2500 grams. LBW babies are further subdivided in to very low birthweight (<1500 grams) and extremely low birthweight babies (<1000 grams) [1]. Low birth weight babies suffer from multiple complications like respiratory distress syndrome, sepsis, necrotising enterocolitis, hypoglycemia, hyperbilirubinemia, hypothermia, patent ductus arteriosus and others. Two basic etiologies of LBW include

prematurity and intrauterine growth restriction (IUGR). Maternal, fetal and placental factors are implicated in the pathogenesis of LBW. Among the maternal factors, maternal malnutrition during pregnancy is an important factor affecting the growth of the fetus. In developing countries like India, a significant number of adults also suffer from malnutrition attributed to poverty. In India 51.4% of women of reproductive age were found to be anemic [2]. As per the NFHS 4 data (2015-2016), LBW babies account for 16% of total live births in India [3].Maternal socioeconomic status and malnutrition is directly or indirectly linked to the birthweight. Multiple studies have been done on it in different parts of India and abroad. Although Government of India provides data of LBW, poverty and malnutrition, these are based mainly on national statistics. There is dearth of reliable local databases that would be relevant for actual clinical correlation. Therefore we intended to study the effect of

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socioeconomic status of family with birthweight in eastern part of India.

Objectives

Primary objective:To assess the effect of socioeconomic status of family on birth weight

Secondary objective: To assess the effect of anemia on birthweight

Materials and Methods

A cross-sectional study was conducted in Gouri Devi Institute of Medical Sciences and Hospital, Durgapur, West Bengal from 1st March 2019 to 28th February 2020. Appropriate ethical clearance was taken from the Institute Ethics Committee. Consent of parents was taken in a written consent form. Data were collected from the mothers who visited the Pediatrics Out Patient Department with their

Results

child during the study period. Mothers were asked to fill a pre-designated case record form. Details of antenatal, natal and postnatal records were sought and noted. For the purpose of assessment of socioeconomic status, education, occupation and income of family were recorded. Socioeconomic status family were classified in to 3 major categories; lower (lower and upper lower), middle (lower middle and upper middle) and upper as per modified Kuppuswamy classification [4]. Maternal nutrition status was assessed by body mass index (BMI) and anemia. Anemia in pregnancy is defined by WHO as hemoglobin value less than 11gm/dl. We considered WHO criteria for identifying anemic mothers. Data collected were analysed with appropriate statistical method. Power of study was taken as 80% and P value <0.05 was taken as significant.

Table 1: Distribution of babies based on birthweight

Birthweight	Number of Babies	Percentage
< 2500gram	79	35.5%
≥2500 gram	150	65.5%
Total	229	100%

Table 2: Maternal education related to birthweight

Education of Mother (N=229)	LBW (N=79)	Normal Birthweight (N=150)	P value
Illiterate / Primary (157)	64 (81.01%)	93 (62.00%)	
Secondary/ Higher Secondary (53)	13 (16.45%)	40 (26.66%)	0.0071**
Graduation or more (19)	2 (2.53%)	17 (11.33%)	

LBW: Low birthweight, ** P< 0.01: Highly significant

Table 3: Occupation of head of Family affecting birthweight

Occupation of family head (n)	LBW (N=79)	Normal Birthweight (N=150)	P value
Professional	0	0	NS
Semi professional (16)	4	12	NS
Clerical/shop/farm (46)	12	34	NS
Skilled worker (34)	11	23	NS
Semi skilled worker (57)	20	31	NS
Unskilled worker (76)	32	44	NS
Unemployed	0	0	NS

Table 4: Socioeconomic status of family affecting the birth weight

Socioeconomic status (n)	LBW (N=79)	Normal Birthweight (N=150)	P value
Upper (Class I) (0)	0	0	
Middle (Class II and III) (118)	28(35.44%)	76(50.67%)	0.036*
Lower (Class IV and V) (111)	51(64.56%)	74(49.33%)	

*P value <0.05: significant

Table 5: Maternal anemia affecting the birthweight

Maternal Parameters (n)	LBW (N=79)	Normal Birthweight (N=150)	P value
Non anemic (35)	5(6.33%)	30(20.00%)	0.006**
Anemic (194)	74(93.67%)	120(80.00%)	

** P< 0.01: Highly significant

Two hundred twenty nine (229) babies were enrolled in this study. Data from these babies were collected and analyzed with appropriate test. Results of the observations are summarized in following tables and graphs. Table 1 shows distribution of babies based on birthweight. Out of the 229 babies, 79 babies had low birthweight and 150 babies had normal birthweight. Of all the babies 35.5% were found to be low birthweight. Table 2 shows effect of maternal education of mother on birthweight of babies. Of all the mothers 68.55% were either illiterate or educated up to primary level where as 8.29% of mothers were educated to the level equivalent to graduation or above. Babies born to mother who are illiterate or educated up to primary level were found to have more LBW babies than with higher education and was found to be statistically significant. Table 3 Shows significance of occupation of head of family affecting the birthweight. Most commonly parents were found to be unskilled (n=76) and semiskilled worker (n=56). There

were no professionals or unemployed member in our study population. Incidence of LBW babies in semiprofessional, clerical, skilled, semiskilled and unskilled groups were 25%, 26%, 32%, 35%, and 42% respectively. Although 65.82% of total LBW babies were contributed from family with unskilled and semiskilled workers together, it was not found to be statistically significant. Table 4 shows effect of socioeconomic status on birthweight of newborn babies. Twenty eight (35.44%) LBW babies belong to middle class (class II and class III) and 51(64.56%) LBW babies were from lower class. On comparing these two groups with birthweight difference was found to be significant. Table 5 shows effect of maternal anemia on birthweight of newborn. Out of 229 mothers 194 (85.15%) had anemia. Out of total 79 LBW babies 5 (6.33%) belong to non-anemic mothers where as 74 (93.67%) belong to anemic mothers. Anemic mothers were more likely to deliver LBW baby and were found to statistically significant.

Discussion

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Around 15% of babies are born low birth weight worldwide. More than 50% of these LBW babies are from South East Asia [5]. A study by Apte A et, al, found prevalence of LBW to be 16.49% in India [6]. Similarly another study from India found incidence of LBW to be 21.8% [7]. In our study, we found 35.5% of babies were with low birth weight. There are multiple factors affecting the birthweight of the baby. Higher incidence of LBW babies in our study could have been attributed to multiple factors such as prematurity, poor antenatal check up, low socioeconomic status, anemia, inadequate assess to health care and others.Education of parents especially mother has impact on weight of the newborn. Low maternal education increases the risk of prematurity and low birthweight [8]. In our study we had 2 illiterate mothers and 155 (67.68%) mothers with primary education. Our results revealed 81.01% of LBW babies were born to mothers with nil or primary education where as 2.5% of LBW babies were from graduate/ postgraduate mothers. Our results clearly indicate that mothers' education has positive impact on birthweight. Similar findings were also reported in other studies [9, 10]. Since maternal education has significant impact of birthweight, it is very prudent to focus on this aspect during policy making and implementation.

Income of a person is directly reflected by the occupation of the head of family. Earning capacity of a person not only affects his daily life style but also impacts on his health expenditure. Occupation of parent adversely affects the birthweight [11, 12]. However we could not find any significant difference in birth weight in different occupation groups. Most of the family members in our study belong to laborer, unskilled or semiskilled worker. None of the family members were professionals and very few were semiprofessionals. Low number of samples along with very few people in higher occupation groups could have led to no significant difference in birthweight in our result.Poverty and malnutrition go hand in hand. Poor socioeconomic status of family deprives them from quality health care. Although government is trying its level best to provide essential healthcare for all, still there is gap in providing the basic health care to this population. Multiple factors play a role which includes lack of awareness, illiteracy, poor income, inaccessible healthcare, poor hygiene, overcrowding etc. In our study population, we didn't find a single family belonging to upper class (class I). When we compared the middle class (class II and III) with lower class (class IV and V), we found significant difference in birthweight between these two groups. Similar results were also obtained from previous studies [13, 14].Anemia and malnutrition often coexist. In developing countries like India where malnutrition is so prevalent, anemia is expected to affect a large number of people. It is well established that maternal anemia adversely affects the growth of fetus. In our study we found 84.71% of mothers were anemic. There was significant difference in the weight of newborns of anemic and non-anemic mothers. A study from rural areas of Maharashtra revealed maternal anemia in more than 90% of cases [15]. Even mild anemia had significant impact on increase in LBW babies.

Limitations

Although data collected from all mothers were verified by reviewing past records, many important information might have been missed which could have a significant impact on this study. Another limitation of this study is that there are many other factors that play a role in producing LBW babies which were not taken in to account. Owing to sociodemographic diversity and low sample size, it may not be possible to project this data for national level. Multi center studies with larger sample size are needed to know the exact etiology of LBW babies.

Conclusion

In our study, nearly one third of babies were of low birthweight. Poor maternal education, low socioeconomic status and maternal anemia were associated with increase in the risk of low birth weight babies. This study highlights the loco-regional issues pertaining to low birthweight and the need for a remedy. Rural belt adjacent to a city need to be relooked and appropriate policy changes at local level is the needed. Reducing the burden of low birth weight babies can be achieved by need based interventions at local and national level.

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