Study of maternal sociodemographic factors influencing low birth weight in institutional deliveries

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Abstract

Background: Birth weight act as an important public health indicator. Low birth weight is more common in developing countries than in developed countries. Mothers living in lower socio-economic conditions frequently have low birth weight infants. Maternal sociodemographic factors are more influential than other factors and affect neonatal birth weight. **Aim:** To study the maternal sociodemographic factors influencing low birth weight in institutional deliveries. **Material and Methods:** A total of 326 postnatal women who delivered single live baby were studied for sociodemographic characters and its effect on birth weight. Chi-square test was used to measure association between LBW and socio-demographic factors. **Results:** The incidence of low birth weight in this study was 28.8%. Association of low birth weight with maternal age group, living in rural area and illiteracy factors were highly significant. However, the association between low birth weight and occupation of mothers was insignificant, although the proportion of low birth weight babies in housewives were more. **Conclusion:** Many of the risk factors responsible for LBW can be identified prior to pregnancy. For reducing the prevalence of LBW in India, public health strategy needs to pay attention on health education.
Key Word: Neonates, postnatal mothers, low birth weight, socio-demographic factors

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Access this article online	
Quick Response Code:	Website: www.medpulse.in
	Accessed Date: 14 March 2019

INTRODUCTION

Birth weight act as an important public health indicator as it is a strong predictor of neonatal as well as lifelong health outcomes.[1]Low birth weight is more common in developing countries than in developed countries. Mothers living in lower socio-economic conditions frequently have low birth weight infants. Many factors affect the period of gestation and fetal growth, and thus, the birth weight. They relate to the infant, the mother or the physical environment and play an important role in determining the infant's birth weight and future health.[2]Numerous factors are associated with LBW. Of these, maternal factors (demographic, socioeconomic and medical) are more influential than other factors and affect birth weight through biological and non-biological (medical and non-medical) means.[3]Some of the biosocial factors like maternal age, maternal education, parity, sex of the baby and socio-economic conditions etc., besides others have been postulated to determine the birth weight of a newborn. In view of above complications associated with increased prevalence of low birth weight in our country and its impact on socio economic status, the present study was carried out at a tertiary care hospital with a purpose to know the association between maternal sociodemographic factors and its effect on the low birth weight babies.

MATERIAL AND METHODS

This hospital based cross sectional analytical study was conducted in a tertiary care hospital over a period of two years with approval from institution's ethics committee. A total of 326 postnatal women who delivered single live baby willing to participate in the study were included after informed written consent. A neonate could be enrolled only once and written informed consent was obtained from the mother before their enrollment.

Inclusion criteria
- All live born neonates of mothers willing to take part in the study.

Exclusion criteria
- Mother with multiple pregnancies
- Mother with last menstrual period not known
- Neonates with congenital malformations
- Neonates with chromosomal anomalies
- Hemolytic disease of the newborn
- Sick newborn

Measurements

Birth weight: For measuring birth weight electronic scales which provide reasonably valid and precise readings were used. Birth weight was recorded in kilograms. Babies were weighed naked immediately after birth. A transfer paper placed on the scale and the newborn weighed as quickly as possible never leaving unattended and the scale cleaned between uses. Babies weighed in a weighing machine on lever actuated weighing scales to the nearest 50g. The machine balanced to zero position each time before taking the measurement. The weighing machine checked periodically by known standard weights.

Age of the mothers: It was calculated according to the format given in questionnaire. Age was recorded to the nearest completed year.

Residence: Urban and rural areas were classified according to definition laid by census of 2011 by Government of India.[4]

Education: Education status of the mothers were defined in three sub categories.[4]

Occupation: House wife: The mothers who were not working except daily house hold work.

Service holder: Mother who were working in government or private sectors.

Statistical analysis: The collected data was analyzed using Microsoft office window excel 2013 and SPSS version 16 (SPSS 16.0 for Windows, release 16.0.0. Chicago: SPSS Inc). The categorical data was summarized as percentage and proportions. The data was analysed using a Chi- Square for quantitative data. Chi-square test was used to calculate p value. We considered the association or difference to be significant when the p value was less than 0.05.

RESULTS

Total number of newborns enrolled in this study was 326, out of which 94 was low birth weight and 232 was normal weight babies. So, the incidence of low birth weight in this study was 28.8%. In the present study, out of 326 newborns, 94 were low birth weight. In normal weight babies 110(47.4%) were females and 122 (52.6%) were males, whereas in low birth weight babies 49(52.1%) were females and 45(47.9%) are males. Although the percentage of females were more in low birth weight but the association of sex with low birth weight was found to be statistically insignificant (p>0.05).
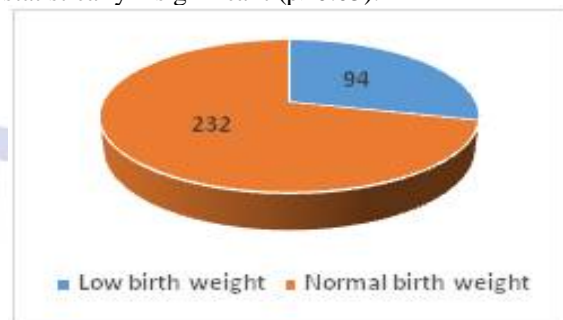

Figure 1: Proportions of low birth weight

Maternal age was divided into three groups: <20 years, 21-30 years and >30 years. Total number of newborns in 21-30 years maternal age groups were 162 (49.7%) out of which normal birth weight babies constituted 131(56.5% of normal birth weight babies) and low birth weight babies were 31 (33% of low birth weight babies). Similarly, total number of newborns in <20 years maternal age groups were 145 (44.5%) out of which normal birth weight babies constitute 88(37.9% of normal birth weight babies) and low birth weight babies were 57 (60.6% of low birth weight babies). On the other hand, total number of newborns in >30 years maternal age groups are 19 (5.8%) out of which normal birth weight babies constitute 13(5.6% of normal birth weight babies) and low birth weight babies were 6 (6.4% of low birth weight babies). Association of low birth weight with maternal age group was found to be highly significant as p value<0.001.

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Table 1: Distribution of low birth weight according to sociodemographic variables

Sociodemographic variables	Birth weight		Statistical significance
	Low	Normal	
Maternal age			
<20 years	31 (33%)	131 (56.5%)	χ2=15.25; df=2;p<0.001
21-30 years	57(60.6%)	88 (37.9%)	(Highly Significant)
>30 years	06 (6.4%)	13 (5.6%)	
Residence			χ2=45.80; df=1;
Rural	54 (57.4%)	45 (19.4%)	p<0.001
Urban	40 (42.6%)	187 (80.6%)	(Highly Significant)
Education			
Illiterate	71 (75.5%)	108 (46.6%)	χ2=22.73; df=2; p<0.001
Primary	19 (20.2%)	105 (45.3%)	(Highly Significant)
Secondary plus	04 (4.3%)	19 (8.2%)	
Occupation			χ2=22.73; df=2; p<0.001
Housewife	85 (90.4%)	191 (82.3%)	(Highly Significant)
Service	09 (9.6%)	41 (17.7%)	
Baby sex			χ2=22.73; df=2; p<0.001
Male	45 (47.9%)	122 (52.6%)	(Highly Significant)
Female	49 (52.1%)	110 (47.4%)	

The incidence of newborns was99 (30.4% of total newborns) belonging to mother who were living in rural areas, whereas the incidence in case of mothers living in urban area was 227(69.6% of total newborns) in the present study. Similarly, the incidence of low birth weight newborns was 54(57.4 % of low birth babies) belonging to mothers who were living in rural areas, whereas the incidence of low birth weight newborns in case of mothers living in urban area were 40(42.6% low birth weight babies). On the other hand, the incidence of normal birth weight newborns was 45 (19.4% of normal birth babies) belonging to mothers who are living in rural areas, whereas the incidence of normal birth weight newborns was 187(80.6% of normal birth babies) belonging to mothers who were living in rural areas. As per statistical analysis, the association low birth weight with the mother living in rural areas was highly significant (p value<0.001). Maternal education ranged from to graduation and was divided into 3 groups- illiteracy, primary education and secondary education. The incidence of newborns in illiterate mothers was 179(54.9% of total newborns, in mothers having primary education was 124(38% of total newborns)and incidence was 23(7.1% of total newborns). In 94 low birth weight babies, incidence was 71 (75.5%) in illiterate mothers,19(20.2%) in mothers received primary education and 4(4.3%) in mothers who received secondary and above education. Similarly, in 232 normal birth weight babies , incidence was 108 (46.6%) in illiterate mothers,105(45.3%) in mothers received primary education and 19(8.2%) in mothers who received secondary and above education. As per the statistical analysis, the association of low birth weight with

maternal illiteracy is significant in present study(p value<0.001). Maternal occupation was divided into groups: housewife and service holder. The incidence of newborns in housewife mothers was 276(84.7% of all newborns), in service holder mothers the incidence was50 (15.3%of all newborns). In low birth weight babies, the incidence was 85(90.4%) in mothers who were not doing any job and 9(9.6%) in mothers who were doing service. The incidence was 191 (82.3%) in normal birth weight babies in housewives and 41(17.7%) in service holders. The association between low birth weight and occupation of mothers is insignificant (p value>0.05), although the proportion of low birth weight babies in housewives were more.

DISCUSSION

Low birth weight has been associated with a lot of short term and long term complications. In the present study, maternal sociodemographic factors influencing low birth weight are studied. Due to diverse sequelae, low birth weight can be perceived as the greatest public health problem facing the globe. But as the etiology is diverse, though prevention is difficult still the incidence of LBW can be reduced by strong and applicable strategies. In the present study 71.16% of the newborns were of normal birth weight and incidence of low birth weight was 28.83%, which is very similar to the UNICEF data on low birth weight.[5] Incidence of low birth weight neonates was found to be 28.35% and 27.76% in a study done by Malik S et al[6] and Paliwal ASV et al[7]respectively which is almost comparable to the present study. In a study done by Roy S et al,[8]Ram R et al[9] and Agrawal G et al[10] the incidence of low birth weight babies was 33.6%, 33% and

32.3% respectively, which is slightly higher as compared to the present study. In a study done by Bala K *et al*[11] it was seen that 76.9% neonates had normal birth weight and 23.1% had low birth weight, which is lower than the present study. In the present study, number of males in low birth weight population were 55 and females 50.The percentage of males was 13.8% and females were 13.8% with female to male ratio of 1.108:1. Although the percentage of females are more in low birth weight but the association of sex with low birth weight is statistically insignificant(p>0.05) which is similar to the study by Boratne AV *et al*[12] and Anitha CJ *et al*.[13] In contrast to these studies, a study done by Roy S *et al*[8] in which prevalence among males were 27.9% and females were 40.2% showed significant association of female sex with low birth weight. In the present study, significant association was found between maternal age of < 20 years and low birth weight. A study done by Malik S *et al*[6] showed significant association between extremes of maternal age that is <20 years and > 30 years which is comparable to our study. A study done by Deshmukh JS *et al*[14] found a strong association between maternal age <20 years and low birth weight similar to our study. In the present study, the association low birth weight with the mother living in rural areas was highly significant (p value<0.001). Singh A *et al*[15] showed that the mothers living in rural areas had more incidence of low birth weight and the association was significant which is comparable to our study. Kader M *et al*[16] showed that risk of low birth weight was significant in mothers residing in rural areas which is comparable to our study. In this study, in low birth weight babies, incidence was 71 (75.5%) in illiterate mothers,19(20.2%) in mothers received primary education and 4(4.3%) in mothers who received secondary and above education. A study done by Rafati *et al*[17] showed a significant association between mothers who were illiterate and low birth weight which is comparable to our study. Roy S *et al*[8] and Makhija K *et al*[18]also showed that educational status was found to be quite significant with low birth weight, in that study illiterate mothers had higher low birth weight incidence which is comparable to our study. Deshpande JS *et al*[14]from rural area of Western Maharashtra showed a similar association with low birth weight and maternal illiteracy which is comparable to present study. The contrasting study in which no association was found between low birth weight and maternal illiteracy was conducted by Anitha CJ *et al*.[13] In our study, the association between low birth weight and occupation of mothers was insignificant (p value>0.05), although the proportion of low birth weight babies in housewives were more. Siza JE *et al*[19] showed no association with occupation of mothers with low birth weight which is

comparable to our study. Lekea-Karanika V *et al*[20] showed that commercial workers had significant association with low birth weight babies. In a similar study by Agrawal G *et al*[10] housewives had more incidence of low birth weight babies and the association was significant.

CONCLUSION

Many of the risk factors responsible for LBW can be identified prior to pregnancy. For reducing the prevalence of LBW in country like India public health strategy needs to pay attention on health education. Interventional programs should be encouraged not only in health sectors but also in all those sectors concerned with social development and social welfare programs. Improved educational status can thereby help in improving the socio-economical status of the family.

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Source of Support: None Declared
Conflict of Interest: None Declared