

Original Research Article

Maternal biosocial factors influencing new born birth weight at a municipal corporation maternity home in Bangalore city

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ABSTRACT

Background: Birth weight of new born is known to be influenced by several maternal biosocial factors. The study was undertaken to find association of various maternal biosocial factors influencing birth weight of the new born.

Methods: The study subjects were 150 postnatal women and their new born delivered in an Urban Municipal Corporation Maternity Home. Study subjects were chosen by purposive sampling. Socio demographic and pregnancy related information was collected by interview method and from antenatal records.

Results: The proportion of low birth weight noted was 8.6%. Statistically significant association was noted between new born birth weight and maternal health status during pregnancy which includes weight gain during pregnancy, intake of iron and folic tablets and antenatal check-up. Maternal haemoglobin levels had a positive correlation with new born birth weight.

Conclusions: Maternal health is vital for new born wellbeing. Birth weight of new born has shown steady improvement over a period of time and this is as a result of availability of better maternal health care services in urban corporation maternity home.

Keywords: Low birth weight, Maternal, Haemoglobin level, Weight gain, Socio-economic factors

INTRODUCTION

Normal birth weight reduces the chances of morbidity and mortality in infancy and serves as an indicator of good antenatal care of mother. Low birth weight is one of the most important factors which determine the survival chances of the child. Among low birth weight (LBW) babies, infant mortality rate is about 20 times greater compared to normal weight babies.¹ The 29th World Health Assembly defined low birth weight as weight at birth of <2,500 g (up to and including 2,499 g) irrespective of gestational age.

The prevalence of low birth weight varied from 8.3% to 31.3% in different studies.^{2,3} Over the years, the drop in

prevalence of low birth weight could, perhaps be due to better antenatal care provided to the pregnant women.² Under RCH progme, Government of India has recommended that during pregnancy, antenatal women should have a minimum of four antenatal visits and consume hundred iron and folic acid tablets. NRHM figures shows that women who had received any antenatal care has increased from 75.3% to 89.6% and percentage of mothers who have received three or more than three antenatal visits has increased from 51% to 68.7%.⁴ A minimum of 4 regular antenatal check-up builds up effective contact of these mothers with health care providers in the health facilities where appropriate guidance is available which is essential for early identification of risk factors of low birth weight.⁵

Studies done under different settings have shown that birth weight of new born is influenced by several maternal biological and social factors like education, socio-economic status, maternal weight gain during pregnancy and regular antenatal check-up.⁶⁻⁹ With this background, the study was undertaken to find the association of various maternal biosocial factors influencing birth weight of the new born.

METHODS

The present descriptive study was conducted in an Urban Municipal Corporation Maternity Home, in Bangalore South. The maternity home is situated in urban field practice area of Kempegowda Institute of medical Sciences, Bangalore. The study subjects were 150 postnatal women and their new born delivered in the maternity home who were selected by purposive sampling. Data was collected over a period of four months, from September 2013 to December 2013.

The subjects who were willing to participate and those who had antenatal records were included in the study. Preterm babies, mothers with medical or obstetric complications and with multiple gestations were excluded from the study. Among those who were eligible for study, informed verbal consent was obtained. Permission from hospital authorities was taken to conduct the study prior to data collection.

Data was collected using a pre tested, open ended questionnaire. Data on maternal age, literacy, religion,

type of family and socioeconomic status from the mothers was collected by interviewing them by the authors. Information regarding antenatal visits, total and third trimester weight gain during pregnancy and haemoglobin levels were obtained from antenatal records. History regarding day time rest and exposure to second hand smoking during pregnancy was also obtained. Two hours of rest in day time was considered adequate for a woman during pregnancy.¹⁰ Haemoglobin level of more than 11 g/dl was considered normal, levels between 10–10.9 g/dl was considered mild anaemia, 7–9.9 g/dl as moderate anaemia and <7 g/dl as severe anaemia.¹¹

The babies were weighed naked on spring type of weighing scale to the nearest of 50 g at birth within 48 hours of birth. Statistical analysis was done using Chi-square test to find association between maternal biosocial factors and birth weight of new born. Linear regression analysis was also used to find relation between maternal haemoglobin levels and new born birth weight.

RESULTS

In the present study 150 mothers and their new born were studied within 48 hours of birth in an urban municipal corporation hospital. Majority of the study subjects i.e. 121 (80.67%) were in the age group of 18 to 25 years, 135 (90%) subjects were literate and 123 belonged to Hindu religion. Out of 150 subjects, 85 (56.67%) lived in nuclear families and 80 subjects belonged to lower middle class and remaining 70 (46.67%) belonged to upper middle class of socio-economic status.

Table 1: Association of new born birth weight with maternal social factors (N =150).

Socio demographic variables	Birth weight <2500 g N (%)	Birth weight >2500 g N (%)	Total N (%)	Fishers exact probability
Maternal age in (years)				
18-25	9 (7.43)	112 (92.56)	121 (80.67)	0.455
>26	4 (13.79)	25 (86.20)	29 (19.33)	
Educational status of the mother				
Literate	11 (8.14)	124 (91.85)	135 (90)	0.623
Illiterate	2 (13.33)	13 (86.66)	15 (10)	
Religion				
Hindu	11 (8.94)	112 (91.05)	123 (82)	0.999
Others	2 (7.40)	25 (92.59)	27 (18)	
Type of family				
Nuclear	6 (7.05)	79 (92.94)	85 (56.67)	0.052
Joint	7 (10.76)	58 (89.23)	65 (43.33)	
Socio economic status				
Lower middle	6 (7.50)	74 (92.50)	80 (53.33)	0.053
Upper middle	7 (10.0)	63 (90.0)	70 (46.67)	

*Modified Kuppuswamy's socioeconomic classification, $p < 0.05$ is considered significant.

The proportion of low birth weight observed was 8.6% i.e. 13 new borns weighed less than 2500 g. The mean birth weight observed in this study was 2950.67 (SD±403.92) g. Among the normal birth weight babies, 84 (56%) had birth weight of 2.5 kg to 2.9 kg, 44

(29.33%) had 3 to 3.4 kg and 9 (6%) had birth weight of 3.5 to 4 kg. Age of mother and socio-demographic factors like educational status of mother, religion, type of family and socio-economic status did not show any statistically

significant association with birth weight of new born (Table 1).

Out of 150 mothers, 134 (89.33%) mothers had registered at a health centre in first trimester of pregnancy. It was also observed that 135 (90%) mothers had more than four antenatal check-ups and 117 (78%) of subjects had

consumed a minimum of hundred iron and folic acid tablets during pregnancy. Haemoglobin levels of more than 11 g/dl was observed in 100 (66.67%) mothers during third trimester of pregnancy. In this study, 5 (3.33%) out of 85 male new borns had low birth weight and 8 (12.30%) out of 65 female new borns had low birth weight (Table 2).

Table 2: Association of new born birth weight with maternal biological variables (N =150).

Biological variables	Birth weight <2500 g N (%)	Birth weight >2500 g N (%)	Total N (%)	Fishers exact probability
First antenatal visit				
In 1 st trimester	8 (5.97)	126 (94.02)	134 (89.33)	0.0001
In 2 nd & 3 rd trimester	5 (31.25)	11 (68.75)	16 (10.67)	
Total number of antenatal visits				
≥ 4	5 (3.70)	130 (96.29)	135 (90)	<0.0001
<4	8 (53.33)	7 (46.66)	15 (10)	
Sex of the new born				
Male	5 (5.88)	80 (94.11)	85 (56.67)	0.241
Female	8 (12.30)	57 (87.69)	65 (43.33)	
Intake of iron & folic acid tablets				
100 tablets	2 (1.70)	115 (98.29)	117 (78)	<0.0001
<100 tablets	11(33.33)	22 (66.66)	33 (22)	
Maternal 3rd trimester haemoglobin levels				
≥11 g%	5 (5.0)	95 (95.0)	100 (66.67)	0.024
<11 g%	8 (16.0)	42 (84.0)	50 (33.33)	
Rest during day time				
Adequate	5 (4.20)	114 (95.79)	119 (79.33)	<0.001
Inadequate	8 (25.80)	23 (74.19)	31 (20.67)	
Second hand smoking				
No	11 (8.20)	123 (91.79)	134 (89.33)	>0.05
Yes	2 (12.5)	14 (87.5)	16 (10.67)	

Table 3: Correlation of new born birth weight with maternal factors (N =150).

Maternal factors	R	R ²	F value	P value
Total weight gain during pregnancy	0.755	0.57	196.255	<0.001
Third trimester weight gain	0.668	0.447	119.568	<0.001
Maternal haemoglobin level	0.649	0.473	133.039	<0.001

F values obtained by linear regression analysis.

It was observed that antenatal visit in first trimester of pregnancy and more than four antenatal check-ups during pregnancy had positive influence on birth weight of new born which was statistically significant. Consumption of 100 iron and folic acid tablets and normal haemoglobin levels of mother (>11 g%) during pregnancy was also significantly associated with birth weight of new born (>2500 g). Adequate day time rest had a positive influence on birth weight of new born which was found to be statistically significant. In this study, second hand smoking and sex of new born did not show statistically significant association with birth weight of new born (Table 2).

Weight gain throughout pregnancy, particularly third trimester weight gain and improvement in haemoglobin

levels was significantly associated with proportionate increase in birth weight of new born (Table 3).

DISCUSSION

The proportion of low birth weight noted was 8.6% of new born. The frequency of LBW observed in the present study is similar to the results of a study conducted in a hospital in Belagam, Karnataka.² The frequency of LBW in this study is less compared to other studies, ranging from 29% to 34.7%.^{2,3,7,11,12} This variation in the present study could have been due to, exclusion of complicated cases, as the pregnancies with complications were referred to tertiary care centres. The mean birth weight of new born in the present study was 2950.67 g which is similar to mean birth weight of new-borns in a study

conducted by Raghunath in Indore district of Madhya Pradesh.¹⁴ In contrast, mean birth weight observed in present study is slightly higher when compared to mean birth weight observed in other studies.^{2,8} The variation noted in the birth weight in the present study may be because of improvement in nutritional status of mother and better availability of maternity health care services in urban areas.

In the present study no significant association was noted between birth weight and maternal education, type of family, religion and socio economic factors which was also observed in a study conducted in urban slum area of Bhopal and Lrishna district of Andhra Pradesh.^{8,15}

A significant association was observed between birth weights and early antenatal visits regular antenatal follow up, intake of 100 iron and folic acid tablets, maternal haemoglobin more than 11 g% and adequate rest. Similar observations were reported in several studies.^{6-8,11} In the current study a significant association between birth weight of new born and maternal third trimester haemoglobin levels was noted. Various other studies also have showed similar relation with maternal haemoglobin levels.^{6,8,16,17}

In a study conducted by Biswas in west Bengal, no significant association was observed between sexes of new born and birth weight which is similar to observation in present study.⁵ In the present study 16 subjects reported exposure to second hand smoking at work and home environment. In contrary to observation made by Metgud, in present study no significant association was observed between second hand smoking and birth weight.⁶

CONCLUSION

In the current study the proportion of Low Birth Weight was 8.6%. There was a significant association between new born birth weight and maternal variables like weight gain during pregnancy, intake of iron and folic acid tablets, haemoglobin levels and regular antenatal care. A positive correlation was noted between new born birth weight to maternal weight gain and haemoglobin levels. This scenario reflects the improvement in the availability of better maternal health care services in urban corporation maternity home.

Limitation of this study was the small sample size. Studies with a larger sample size should be done so that more conclusive evidences can be obtained on importance of prenatal nutrition, IFA supplementation and regular antenatal visits on birth weight of new born.

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