LOW BIRTH WEIGHT AND ASSOCIATED MATERNAL FACTORS IN AN URBAN AREA

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Objective: *To study the prevalence of low birth weight (LBW) and its association with maternal factors* ***Design:*** *Cohort study.* ***Setting:*** *Urban community.* ***Subjects:*** *Cohort of 210 pregnant women.* ***Results:*** *The LBW prevalence was 30.3%. On multivariate analyses the maternal factors significantly associated with LBW were anemia (OR-4.81), low socioeconomic status (OR-3.96), short birth interval (OR-3.84), tobacco exposure (OR-3.14), height (OR-2.78), maternal age (OR-2.68), body mass index (OR-2.02), and primiparity (OR 1.58).* ***Conclusion:*** *Anemia, low socioeconomic status, short stature, short birth interval, tobacco exposure, low maternal age, low body mass index, and primiparity are significantly risk factors for LBW.*

Key words: *Anemia, Low birth weight, Maternal factors.*

INSPITE of consistent efforts to improve the quality of maternal and child health, more than twenty million low birth weight (LBW) babies are born every year throughout the world. Half of all perinatal and one third of all infant deaths are directly or indirectly related to LBW(l). It is generally acknowledged that the etiology of LBW is multifactorial(2). Most of our knowledge of the factors which affect the birth weight of the offspring has been derived from hospital based studies which are associated with inherent biases. It has been emphasized that **a** community based prospective study would help to define the exact role of various factors affecting birth weight. With this background and fortified by the fact that limited number of community based prospective studies are available, we undertook this study to define the extent of LBW problem in an urban area and investigate the maternal factors associated with this condition.

Subjects and Methods

A house to house survey was carried out in the urban field practice area attached to the Department of Preventive and Social Medicine. Government Medical College, Nagpur, from January to May 1994. From a population of 10,101 surveyed, 210 pregnant women were identified for this study. A sample size of 200 was estimated from a pilot study on 68 pregnant women (p = 0.03, **a** = 0.05, (3 = 0.2). Nine women were excluded from the study (no birth weight in 2, abortions in 3, stillborn in 3 and 1 delivered triplets). All the pregnant women were followed at monthly intervals till delivery. The last visit was done nearest to the expected date of delivery for collecting delivery data. Relevant information related to maternal factors, namely, socio-economic status, parity, age, height, anemia, birth interval, body mass index, weight gain and tobacco exposure was collected from the study subjects. The weight of the pregnant women was recorded by beam balance to the nearest 100 g and height was recorded by scale attached to beam balance to the nearest 0.5 cm. To assess the nutritional status of the pregnant women, body mass index (BMI) was estimated, using maternal weight at 36-40 weeks of gestation. Socioeconomic status was assessed by modified Kuppuswamy's scale(3). Maternal weight gain was calculated only for those women who were registered at 12 weeks of gestation (in 108 women), considering negligible weight gain till 12 weeks of gestation. The weight gain from the twelth week to term gestation represents the total weight gain during pregnancy(4). Birth interval was analyzed in 120 women excluding primipara. Hemoglobin estimation was done by Sahli's method and hemoglobin level at 36-40 weeks of gestation was considered for analysis. All babies were weighed within one hour after birth in case of hospital delivery and within 24 hours in case of home delivery. Appropriate technique was demonstrated to the nursing personnel for recording the correct weight of the baby. The World Health Organization definition of LBW was used, i.e., birth weight less than 2500 g(5) in this study. Chi square test was used to study the significance of difference between proportions. Student t-test was used to study differences between groups for continuous variables. Multiple logistic regression analysis was carried out by using MULTLR programme.

Results

The LBW prevalence in the present study was 30.3%. *Table I* depicts the results of univariate analysis of maternal factors associated with LBW. The factors observed to be significantly associated with LBW included socioeconomic status, parity, maternal height, pregnancy weight gain, tobacco exposure and anemia.

TABLE I– *Maternal Factors Associated with LBW Univariate Analysis*

Risk Factors	LBW (n=61)	Non LBW (n=140)
Age (yrs) (mean, sd)	22.4 (3.3)	22.9 (2.3)
Primipara* (%)	31.0 (50.8)	50.0 (35.7)
Birth interval[1] (mo) (mean, sd)	26.2 (14.3)	29.5 (9.5)
Hemoglobin (G/dl)* (mean, sd)	9.9 (0.8)	11.2 (8.0)
Weight gain in[2], ** pregnancy (kg) (mean, sd)	5.2 (1.4)	6.8 (1.7)
Height (cm)* (mean, sd)	143.9 (5.1)	148.8 (20.1)
Tobacco exposure (%)*	33 (54.1)	45 (32.1)
Low SE status (%)**	45 (73.7)	35 (25)

1 = LBW (n=31), Non LBW (n=89)
2 = LBW (n=34), Non LBW (n=70)
* $p < 0.05$; ** $p < 0.001$

Confounder control by multiple logistic regression analysis revealed that significant factors (in descending order of odds ratio) were anemia, low socio-economic status, short birth interval, tobacco exposure, maternal height, maternal age, BMI and primiparity (*Table II*).

Discussion

The 30.3% prevalence of low birth weight and the mean birth weight of 2669 grams observed in this study is comparable to earlier reports(6-9). The association of anemia, low socioeconomic status and pregnancy weight gain with low birth

TABLE II–*Unweighted Multiple Logistic Regression Analysis of Maternal Factors Associated with LBW*

Maternal factors	Odds ratio	95% confidence interval	Regression coefficient
Anemia	4.81	1.68-12.43	1.48
Socioeconomic status	3.96	2.10-6.46	1.22
Birth interval	3.84	2.12-8.42	1.51
Tobacco exposure (tobacco chewing, passive smoking)	3.14	2.08-4.88	1.15
Height	2.76	1.92-3.92	1.01
Maternal age	2.68	1.70-3.81	1.02
Body mass index	2.02	1.26-3.14	0.79
Primipara	1.58	1.20-2.10	0.51

weight observed in this study has also been reported from other developed and developing countries(2,10-13).

Ghosh *et al.(11)* documented that mothers who were less than 140 cm in height were more prone to have LBW and our findings are in conformity with their observations. Parity is also an important determinant of birth weight. In the present study primipara had 1.62 times more risk of delivering LBW babies; earlier studies also reported similar findings(14).

Risk of delivering LBW was 3.12 times higher in women who had history of tobacco chewing and were also exposed to passive smoking. The most widely accepted explanation is that, smoking causes fetal hypoxia by increasing carboxyhemoglobin levels, attenuating blood oxygen unloading to fetal tissue and reducing maternal blood supply to the placenta(15). The concentration of tar, nicotine, carbon mono-oxide, carbon dioxide are 2 to 10 times higher in side stream smoke than in the mainstream smoke(16). Studies have shown that passive smoking and tobacco chewing reduces the birth weight(17,18).

The results of this study suggest that for reducing LBW, the strategy needs to focus attention on nutrition education to facilitate better weight gain during pregnancy, encouraging wider birth interval, avoidance of tobacco chewing and exposure to passive smoke and discouraging teenage pregnancy.

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