

Determinants of Low Birth Weight: A Case Control Study in Pravara Rural Hospital in Western Maharashtra, India.



Healthcare

KEYWORDS : Low Birth Weight, Case-control study, maternal determinants

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ABSTRACT

Background: Low Birth Weight (LBW) is getting a public health importance due to the numerous factors like its high incidence, association with mental retardation and a high risk of perinatal and infant mortality and morbidity, human wastage and suffering, very high cost of special care and intensive care units and its association with social economic under development. The objective of the study is to know the important maternal determinants of Low Birth Weight. Method and Materials: The hospital based case control study done in Pravara Rural Hospital from September 2013 to April 2014. Total 763 case papers of mothers (277 cases and 486 controls) and their singleton newborn babies were studied. Result: After using Multivariate logistic regression analysis, maternal age (<19 years), residence (rural), maternal weight (<45kg), gestational age (<37 week), Bad Obstetric History and Pregnancy induced hypertension was found as a risk factor associated with low birth weight. Conclusion: Adequate measures should be taken to delay the age at marriage and prevent the teenage pregnancy. Rural mothers should be educated on the importance of good nutrition and encourage for health service utilization. Women with preterm babies must be monitored and topmost priority should be given in emergency obstetric service as well as newborn care.

INTRODUCTION

Low Birth Weight is a multifaceted socio-medical major public health problem. It is indicator of maternal and child health programs and is a determinant of neonatal and infant mortality. Globally, more than 20 million infants are born with Low Birth Weight. Asia constitutes 72% of Low Birth Weight infants born in developing countries. India alone accounts for 40% of Low Birth Weight in the developing world and more than half of those in Asia (1). In 2010 more than 10% babies born were premature. More than 1 million babies died as a result of prematurity (2).

The level of Low Birth Weight in developing countries is more than double that of developed world. Overall, almost 70 percent of all LBW occur in Asia. Among the 20 million LBW born each year, 7.8 million were born in India (3). LBW is getting a public health importance due to the numerous factors like its high incidence, association with mental retardation and mortality and morbidity, human wastage and suffering, very high cost of special care and intensive care units and its association with socioeconomic underdevelopment (2).

LBW reflects inadequate nutrition and ill health of the mother (2). Low Birth Weight indicator is a good summary measure of a multifaceted public health problem that includes long-term maternal malnutrition, ill health, hard work and poor pregnancy health care (3). Hence this study was conducted to explore the maternal determinants of low birth weight.

MATERIAL AND METHODS:

The record based case control study was conducted in Maternity Wards of Pravara Rural Hospital, Loni in Western Maharashtra from Sept. 2013-April 2014. After taking the permission from the hospital authority all the required data was collected. The sample size was calculated by using the formula, $n = \frac{(r+1)}{r} \times \frac{(Z_1 - Z_2) \times (1-P)}{(P_1 - P_2)}$

where, Alpha error = 5 %, Beta error = 20 %, Confidence level = 95 %, Power of test = 80% and Odds Ratio = 1:2. The estimated sample was 232 for cases and 464 for control. In this study total 800-case papers were screened. Due to incomplete data in case paper, 37 were excluded. Among 763, 277 were cases (i.e. birth weight less than 2.5kg) and 486 were control (Birth weight more than 2.5kg).

All the mothers who had delivered the live born singleton new-

born babies with birth weight less than 2.5 kg was selected as a case and mothers who had delivered singleton newborn babies more than 2.5 kg as a controls group. Ethical clearance was obtained from Institutional ethical committee of Pravara Institute of Medical Science.

The data were entered and analyzed in SPSS (Version 21). Descriptive statistics, Chi-square and Odds Ratio were calculated. Multivariate regressions were applied to infer the risk associated with each of the factors. P value <0.05 was considered statistically significant.

RESULTS

Majority of mothers on both case and control group belongs to the age group of 20-24 (61.4% and 66.0%, respectively) following with 25-29 age group (20.6% and 20.6% respectively). Only 0.7% of cases and 1.2% of the control group were from age group above 35. The mean age of mother in case group was 22.56 ± 6.534 years and that in control group in 22.72 ± 6.366 (Table no.1).

Table 1: Distribution of participants according to maternal age

Age of mother	Group		Total
	Cases	Control	
≤19 years	39 (14.1%)	45 (9.3%)	84 (11%)
20-24 years	170 (61.4%)	321 (66.0%)	491 (64.4%)
25-29 years	57 (20.6%)	100 (20.6%)	157 (20.6%)
30-34 years	9 (3.2%)	14 (2.9%)	23 (3.0%)
>35 years	2 (0.7%)	6 (1.2%)	8 (1.0%)
Total	227 (100%)	486 (100%)	763 (100%)

The Odds Ratio was used to identify the significant factor associated with LBW. Univariate analysis revealed that maternal age less than 19 years, Age at marriage less than 18 years, maternal weight, Gestational age less than 37 weeks, Bad obstetric history and pregnancy induced hypertension was found to be significantly associated with LBW. Except age at marriage less than 18 years which was significant at univariate analysis all

other factors was found to be independent risk factor for the LBW by multivariate analysis. It was found that women giving birth at less than 37 weeks of gestation has 9.6 times greater risk of giving LBW babies than that of complete week of gestation. Women with bad obstetric history have 1.7 times more risk of giving birth to LBW than of normal pregnant women. Women with pregnancy Induced Hypertension have 2.5 times more risk of giving birth to LBW babies (Table no.2 and 3).

Table no. 2: Univariate Logistic Regression Analysis

S.No.	Variables	Unadjusted Odds Ratio	95% CI	p Value
1.	Maternal age less than 19 years	0.623	0.394-0.983	0.042
2.	Residence (rural/urban)	0.568	0.408-0.789	0.001
3.	Age at marriage less than 18 years	0.708	0.510-0.982	0.038
4.	Maternal weight (<45kg)	0.633	0.443-0.903	0.012
5.	Completed week of gestation (<37 week)	11.606	7.257-18.562	<0.001
6.	Bad Obstetrics History	1.972	1.419-2.742	<0.001
7.	Pregnancy Induced Hypertension	2.953	1.913-4.558	<0.001

P value less than 0.05 is considered as significant

Table-3: Multivariate Logistic Regression Analysis

S.No.	Variables	Adjusted Odds Ratio	95%CI	p value
1.	Maternal age ≤ 19 years	0.543	0.314-0.937	0.028
2.	Residence (rural/urban)	0.654	0.451-0.950	0.026
3.	Maternal weight (<45kg)	0.600	0.399-0.901	0.014
4.	Completed week of gestation (<37 week)	9.574	5.905-15.521	<0.001
5.	Bad Obstetrics History	1.665	1.130-2.452	0.010
6.	Pregnancy Induced Hypertension	2.452	1.483-4.054	<0.001

P value less than 0.05 is considered as significant

DISCUSSION

In this study, majority of mothers on both case and control group belongs to the age group of 20-24 (61.4% and 66.0% respectively) following with 25-29 age group (20.6% and 20.6% respectively). Only 0.7% of cases and 1.2% of the control group were from age group above 35. The mean age of mother in case group was 22.56 ± 6.534 years and that in control group in 22.72 ± 6.366. The number of mother age less than or equal to 19 is high among cases than in control. 14.1% of mothers in case and 9.3% of mother in control were less than or equal to 19 years old.

In this study, the Univariate regression analysis shows that the risk factors associated for Low Birth Weight were Maternal age less than 19 year, Residence (rural), Age at marriage less than 18 years, Maternal weight (<45kg), Completed week of gestation (<37 week), Bad Obstetric History and Pregnancy Induced Hypertension. Similarly the study conducted by Deshpande J in the same area identified the significant risk factors associated with LBW are pregnancy-induced hypertension, pre-pregnancy maternal weight <45 kg, maternal height <145 cm and Inadequate antenatal care(4). Kumar G in his study also identified the significant risk factors as pre pregnancy maternal weight (<45kg) (OR=6.77), anemia in pregnancy (Hb<11gm%) (OR=3.11), age less than 20 years (OR=2.96) and maternal height (<145 cm) (OR=2.79). (5)And in a Nagpur study done

by NagargojeM.M also found Unfavorable outcome of previous pregnancy (OR=2.47), place of residence (rural)(OR=2.06), height<145cms(OR=1.91), weight <40kgs (OR=1.87), birth interval of <24months(OR=1.81), Hb level <11 gram% (OR=1.59), BMI<18.5kg/m2 (OR=1.48) and presence of any morbid condition during current pregnancy (OR=1.39) as significant risk factor for LBW. (6) Malik in his study also found a strong correlation existed between birth weight and maternal height, weight, age, ANC visits and risk status at pregnancy. A short, malnourished, young, unregistered or primiparous mother was associated with a higher rate of LBW. (7)Gautam B in his study found maternal pre-delivery weight less than 45kg, maternal age less than 19 years, iron supplementation for less than 100 days, pregnancy interval less than 12 month, complication during pregnancy, Anemia, No of ANC less than 3, Late registration of pregnancy, Height <145cm, Weight <45kg and female sex of the newborn. (8)

In this study, after using multivariate logistic regression, the significant risk factor of Low Birth Weight with adjusted Odds ratio were Maternal age ≤ 19 years, Residence (rural), Maternal weight (<45kg), Completed week of gestation (<37 week), Bad Obstetric history and Pregnancy Induced Hypertension. Kumar G on his study revealed that pre pregnancy maternal weight (<45kg) (OR=7.02), anemia in pregnancy (OR=4.37) and maternal age less than 20 years (OR=3.96) were the significant risk factors of low birth weight of term babies. (5) In Nagpur study analysis it was found that place of residence (rural) (OR=2.11), unfavorable outcomes of previous pregnancy (OR=1.96) and presence of morbid condition during current pregnancy (OR=1.44) were found significantly associated with LBW.(6)In the study of Malik also noted that maternal weight, parity and ANC visits independently affected the birth weight of the new born. (7).Deshmukha JS in his study found 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 prim parity (OR=1.58).(9)Gautambabu found maternal age less than 19 years (OR=9.74), maternal pre-delivery weight less than 45kg (OR=14.62), iron supplementation for less than 100 days (OR=8.25), pregnancy interval less than 12 month (OR=5.06), complication during pregnancy (OR=4.96) and female sex of the newborn (OR=4.17) as significant risk factor of LBW.(8)

CONCLUSION:

The health status of the mother directly affects the weight of the baby so the nutrition status of the mother is important determinants of birth weight of the baby. Rural mothers should be educated on the importance of good nutrition. They should be encouraged for utilization of health service to ensure 100% ANC registration. Adequate measures should be taken to delay the age at marriage and prevent the teenage pregnancy because teenage mothers are not physiologically mature and which may lead to LBW. LBW is one of the determinants of neonatal and infant death. Women with preterm babies must be monitored and topmost priority should be given in emergency obstetric services as well as newborn care. Mothers having a bad obstructive history should be given proper care and should be kept in observation. Pregnancy Induced Hypertension should be managed promptly and complications during pregnancy should be managed.

Since the study is in rural area, training of ASHA and peripheral health worker to detect anemia and other risk factors at an early stage of pregnancy and subsequent management/referral should be done. Proper health education should provide, to change the knowledge, attitude and practices regarding misbeliefs related to pregnancy. Education on adequate iron supplementation and counseling on the use of proper birth spacing methods should be done.

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