

Maternal Factors Associated with Low Birth Weight Babies

1. Sabreena Talpur 2. Gulfareen Haider 3. Farida Wagan 4. Razia Tariq Qureshi

1. Sr. Registrar. Obs & Gynae, PUMHS, Nawabshah 2. Assoc. Prof. Obs & Gynae, Isra University Hospital, Hyderabad 3. Assoc. Prof. Obs & Gynae, PUMHS, Nawabshah 4. Asstt. Prof. Obs & Gynae, PUMHS, Nawabshah

ABSTRACT

Objective: To determine the maternal factors associated with low birth weight babies in women age of 15-35 years.

Study Design: Case control study.

Place and Duration of Study: This study was carried out in the department of gynecology and obstetrics, Isra University Hospital (IUH) Hyderabad, Sindh from 02-05-2009 to 02-11-2009.

Materials and Methods: Total 200 women were included in the study. 100 as cases and 100 as control. Mothers aged 15-35 years, who deliver live or dead singleton baby through vaginal delivery or cesarean section after 37 week of gestation were included in the study while others who have delivered newborn with congenital abnormalities, had multiple pregnancy or known chronic illness (hypertension, tuberculosis, diabetes mellitus) were excluded from the study.

Results: The mean $\pm$ SD of maternal age (years) in cases was 26.40 ± 4.77 and controls was 26.23 ± 4.36 with P-value 0.739. The mean $\pm$ SD of maternal weight (Kg) in cases was 53.13 ± 8.93 and in controls was 64.97 ± 13.72 with P-value < 0.001 .

Maternal history of smoking and anemia had significant association with low birth weight with P-Value of 0.005 and < 0.001 respectively.

Conclusion: It was concluded from our study that malnutrition, anemia, short stature like under weight & height are important risk factors for low birth weight.

Key Words: Low Birth Weight, Maternal Risk Factors, Prevention

INTRODUCTION

Low-birth weight (LBW) is defined as the birth weight less than 2.5 kg. It is a high priority and potentially preventable public health problem, particularly in the developing countries. Globally every year 18 million LBW babies are born of which 90% are in developing countries. In South Asia, the problem is most acute with as many as 59% of all newborns being LBW¹. Approximately 25% of newborns in Pakistan have LBW. In neighboring country Bangladesh the living conditions are same as that of Pakistan, the prevalence varies between 23-60%^{2,3}.

There are numerous maternal and fetal factors contributing to LBW. The maternal risk factors are biologically and socially interrelated. However most of them are modifiable. A short inter pregnancy interval may leave the woman in a compromised nutritional state and at a higher risk. In addition to this breast feeding places further nutritional demands on the mother. Anemia and LBW are interrelated with each other⁴.

Women with a poor obstetric history such as previous abortions, LBW babies, still birth, intrauterine death are also at higher risk. Smoking during pregnancy increases the risk. Low socioeconomic status, unemployment and low level of education of parents are also included in risk factors^{5,6}.

Antenatal care (ANC) plays an important part in reducing LBW. Appropriate ANC may reduce the

prevalence of LBW by providing early risk assessment to manage preexisting medical conditions such as urinary tract infection and anemia, and by offering health behavior advice such as smoking cessation and nutritional counseling^{7,8}.

Smoking during pregnancy increases the risk⁹. The adverse effects of Cigarette smoking are mediated through nicotine and carbon monoxide lead to chronic fetal deficiency of oxygen and LBW.

LBW infants have higher rates of morbidly and mortality from infectious disease, malnutrition and growth failure. These children are also more likely to have abnormal cognitive development, neurological impairment, and poor school performance¹⁰.

In addition to this deafness, blindness epilepsy and chronic long disease all are found more commonly in the LBW babies¹¹.

More recent evidence indicates that LBW babies are at greater risk of cardiovascular disease, hypertension, and diabetes in adult life as compared to their normal birth weight counterparts¹².

In Pakistan, although vital statistics and national nutritional surveys are carried out and the prevalence of LBW has been found out to be 12-25% there is no research work pursued on risk factors of LBW among women age 15-35 years. This population of woman is not biologically at high risk but most child bearing occurs. In this age group and preventable risk factors among this age group need to be assessed.

The problem of infant mortality is multifaceted, but from a public health prospective, the key goal is prevention of LBW due to preventable causes this goal cannot be achieved without a much better understanding then we currently have of the risk factors of LBW.

The result of this project will be of important for the health's of children of Pakistan and will also provide information to the Government and other responsible agencies which may help in planning appropriate measures to reduce the neonatal and infant morbidity and mortality.

The objective of this study is to determine the maternal factors associated with low birth wt babies in the age of 15-35years.

MATERIALS AND METHODS

This prospective, case control study was carried in Obstetrics & Gynae Department of Isra university hospital Hyderabad from 02-05-2009 to 02-11-2009. Total 200 women were included in this study, 100 as cases and 100 as controls.

Mothers aged 15 – 35 years, who delivered live or dead singleton baby after 37 weeks of gestation through normal vaginal delivery or caesarian section were included in this study. Weight of new born was measured within 24hours in kilograms without cloths to an infant weighing scale (TANITA Scale).

Cases were those women who had give birth to baby weighing < 2.5 kg while controls were those women who gave birth to baby weighing > 2.5 kg.

Mothers who have delivered newborn with congenital anomaly and had multiple pregnancy or known chronic illness were excluded from study.

After taking verbal informed consent, information of risk factors was gathered through detailed interview and examination of each mother on pre-designed proforma. Maternal weight was taken in kilograms on adult weighing scale and height against a wall height scale in centimeters within 48 hours of delivery and body mass index was calculated.

Low maternal weight means BMI of women < 20. Short stature means height of women < 150 cm. Smoking was estimated by taking history including two or more cigarettes / day for six months.

Anemia was estimated on clinical examination of woman and also by means of investigation i.e. Hb level ($\leq 10\text{gm/dl}$). All the data was carefully recorded and analyzed by using statistical package for social sciences (SPSS) version 10.0 was used to calculate odds ratio, and 95% confidence interval. Comparison between cases and controls was done by using chi-square test for categorical data and student's t test for means. The results were analyzed, as mean $\pm$ SD of different variables and by univariate logistic regression.

P-value of <0.05 was taken as significant.

RESULTS

In this study 100 newborns who were weighing < 2.5 Kg and having gestational age 37 weeks or more were taken as cases and another 100 newborns with birth weight ≥ 2.5 kg and gestational age 37 weeks or more were taken as controls.

In our study, among cases, 45 (45 %) were booked while 55 (55 %) were unbooked, while in control group 65 (65 %) were booked and 35 (35 %) patients were unbooked.

The mean $\pm$ SD of maternal age (years) was in cases 26.40 ± 4.77 and controls 26.23 ± 4.36 with P-value 0.739 (Table 1).

Table No.1: Comparison of means between cases and controls (n=200)

Characteristics	Cases n =100 mean $\pm$ SD	Controls n=100 means $\pm$ SD	P- value [¥]
Wt of neonate (Kg)	2.27 ± 0.19	3.13 ± 0.40	<0.001*
Maternal age (Years)	26.40 ± 4.77	26.23 ± 4.36	0.793
Maternal Wt (Kg)	53.13 ± 8.93	64.97 ± 13.72	<0.001*
Maternal Ht (cm)	153.29 ± 3.96	155.29 ± 4.04	0.001*
Gestational age in weeks	38.35 ± 1.24	38.61 ± 1.19	0.132
Maternal BMI (wt in Kg/Sq.Ht in m)	22.65 ± 3.94	27.02 ± 5.90	<0.001*
Maternal HB (in mg/dl)	9.62 ± 1.13	10.94 ± 1.19	<0.001*

[¥] Calculated by student's t-test

* P-value significant at level <0.05

The mean $\pm$ SD of maternal weight (Kg) was 53.13 ± 8.93 cases and of controls 64.97 ± 13.72 with P-value < 0.001 (Table 1).

Maternal age and height were compared in cases and control group but results were not statistically significant (Table 2).

Maternal history of smoking and anemia had significant association with low birth weight with P Value of 0.005 and <0.001 respectively (Table 3).

DISCUSSION

Low birth weight is an important determinant of neonatal morbidity, mortality and poor neurologic outcome^{13,14}. Reduction of low birth weight also forms an important contribution to Millennium Developmental goal (MDG) for reducing child mortality¹⁵.

Table No.2: Distribution of various variables among cases and controls

Age Group	Cases n =100	Controls n =100	Odd Ratio (95%CI)	P- value [¥]
15-19 years	5	5	1.0	-
20-29 years	62	69	0.9 (0.3-3.3)	0.899
30-35 years	33	26	1.3 (0.3-4.9)	0.728
Height Group				
<150 cm	12	9	1.0	-
151-155 cm	55	35	1.2 (0.5-3.1)	0.222
156-160 cm	29	37	0.6 (0.2-1.6)	0.715
>160 cm	4	19	0.2 (0.04-0.63)	0.318
Weight Group				
<45 Kg	15	9	1.0	-
46-49 Kg	27	9	1.8 (0.6-5.5)	0.303
50-59 Kg	35	18	1.2 (0.4-3.2)	0.763
≥60 Kg	23	64	0.2 (0.1-0.6)	0.002*
BMI				
<18.5 (Underweight)	12	9	1.0	-
18.5-22.9 (Normal)	50	20	1.9 (0.7-5.1)	0.222
23.0-24.9 (Overweight)	15	9	1.3 (0.4-4.1)	0.715
25.0-29.9 (Obese-I)	17	22	0.6 (0.2-1.7)	0.318
≥ 30.0 (Obese-II)	6	40	0.1 (0.03-0.38)	<0.001 *

Table No.3: Comparison of cases with controls regarding other risk factors for L.B.W

Characteristic	Cases n =100	Controls n =100	Odd Ratio (95%CI)	P-value [¥]
H/O smoking				
No	86	97	1.0	0.005*
Yes	14	3	5.3 (1.5-18.9)	
H/O of previous LBW Baby				
No	88	95	1.0	0.076
Yes	12	5	2.6 (0.9-7.6)	
Maternal Anemia †				
No	21	58	1.0	<0.001*
Yes	79	42	5.2 (2.8-9.7)	

[¥] Calculated by Chi square test

* Significant at level <0.05

† Anemia defined as Hemoglobin ≤10 mg/dl of blood

The result of this study showed significant association of cigarette smoking with LBW as out of 100 cases 14

cases have a positive history of smoking similarly. Same is seen in study conducted by Moore et al from USA who have demonstrated the importance of smoking as risk factors for LBW¹⁶.

The result of present study showed that the maternal age is not significant risk factor for LBW. But in another study, maternal age is an important determinant of LBW especially in extremes of reproductive age pregnancies have poor outcome in the form of LBW¹⁷. In the present study maternal age ranges from 15 – 35 years.

Women between 18 – 35 years of age are considered not to be at high risk so this may be the reason in this study that maternal age was not significantly associated with LBW.

The result of this study showed that the history of previous LBW babies was significantly associated with LBW. Same is seen in study conducted by Verhoeff et al reported that past history of IUGR babies increase the chance of recurrence of the same¹⁸.

In this study results shows that maternal anemia is significantly associated with LBW. The findings were in agreement with other studies of anemic pregnant women carried out at Pakistan¹⁹.

In take of iron supplements during pregnancy was also found to have a protective association with LBW. This finding is consistent with some other studies of iron supplementation and pregnancy outcome²⁰. In other study, the effect of iron deficiency on fetal growth is not very clear but folic acid deficiency has been found to lead to LBW²¹.

According to Pakistan Integrated Household Survey (2000), 22 (30 %) of pregnant women seek ANC²². However the results from this study have showed that almost 75% of women participating in the study received ANC during pregnancy. The reason for this difference could be due to the fact that no documented information regarding ANC was available and information gathered from interviews was relied upon. Moreover this high prevalence of ANC could be due to the reason that it was a hospital based study.

CONCLUSION

It is concluded from this study that maternal anemia, low BMI, malnutrition, smoking and history of LBW babies are significantly associated with LBW. It is suggested that following steps may help to reduce the burden of LBW babies.

- 1) Nutritional supplementation in pre-pregnancy and during pregnancy
- 2) Prompt detection and management of high risk pregnancies like anemia and low BMI
- 3) Avoidance of smoking
- 4) proper and regular ANC
- 5) Avoidance of pregnancies at extremes of age

- 6) improve maternal education and property workup about previous LBW babies
- 7) Give interval between two pregnancies which is at least two years to improve maternal general health.

REFERENCES

1. Fauchs GJ. Low birth weight. Global forum for health research [Online]. [Cited 2003 June 20]. Available from: <http://www.globalforumhealth.org/Non complaint pages/ forum3 Forum3doc326.htm>
2. Yasmin S, Osrin D, Paul E, Costello A. Neonatal Mortality of low birth weight infants in Bangladesh. *Bull World Health Organ* 2001; 79:608-14.
3. Khan N, Jamal M. Maternal risk factors associated with low birth weight. *J Coll Physicians Surg Pak* 2003; 13:25-8.
4. Khan MM. Effect of maternal anaemia on fetal parameters. *J Ayub Med Col* 2001; 13:3-41.
5. Dickute J, Padaiga Z, Grabauskas V, Nadisauckiene RJ, Basys V, Gaizauskiene A. Maternal socio-economic factors and the risk of low birth weight in Lithuania. *Medicina (Kaunas)* 2004; 40:475-82.
6. Keeley RD, Birchard A, Dickinson P, Steiner J, Dickinson LM, Rymer S, et al. Parental attitudes about a pregnancy predicts birth weight in a low-income population. *Ann Fam Med* 2004; 2:145-9.
7. Islam A, Malik F. Role of traditional birth attendants in improving reproductive health. *J Pak Med Assoc* 2001; 51:218-22.
8. Krueger PM, School TO. Adequacy of prenatal care and pregnancy outcomes. *J Am Osteopath Assoc* 2000; 100:98:L 485-92.
9. Magee BD, Hattis D, Kivel NM. Role of Smoking in low birth weight. *J Reprod Med* 2004; 49 (1): 23-7.
10. Ellenberg J, Nelson KB. Birth weight and gestational age in children with cerebral palsy or seizure disorders. *Am J Dis Child* 1999;133: 1044-48.
11. Saw SM, Chew SJ. Myopia in children born Premature or with LBW. *Acta ophthalmol Scand* 1997; 75 (5): 548-50.
12. Suzuki T, Minami J, ohroi, Ishimitsou T, Matsuoka H. Relationship between birth weight and cardiovascular risk factors in Japanese young adults. *Am J Hypertens* 2000; 13 (8): 907-13.
13. Mc Cowhn LM, Harding JE, Stewart AW. Umbilical artery doppler studies in small for gestational age babies reflect disease severity. *Br J Obstet Gynecol* 2000; 107:916-25.
14. Change TC, Robson SC, Boys RJ. Prediction of the small for gestational age infant, which ultrasonic measurement is best. *Am J Obstet Gynecol* 2000; 80: 1030-8.
15. UNDP 2002, Human development report 2002, deepening democracy in fragmented world, Oxford University Press.
16. Moore ML, Zaccaro DJ. Cigarette smoking low birth weight and preterm births in low income African American Women. *J Perinatol* 2000; 20: 176-80.
17. Khushwaha KP, Rai AK, Rathi AK, Sirohi R. Pregnancy in adolescent: fetal, neonatal and maternal outcome. *Indian J Pediatr* 1999;30:501-4.
18. Vickers MH, Breier BH, Cutfield WS, Hofman PL, Gluckman PD. Fetal origins of hyperphagia, obesity and hypertension and postnatal amplification by hypercaloric nutrition. *Am J Physiol Endocrinol Metab* 2000; 279: 83-7.
19. Raha FWL, Qureshi N, Emanuel F. Maternal anaemia and Farah emanual. Maternal anemia and its impact on perinatal outcome. *Trop Med Int Health* 2004; (4(9):786-489.
20. Lindsey H. Allen. Anemia and iron deficiency: effects on pregnancy outcome. *Am J Clin Nutr* 2000;71 (Suppl): 1280 S-4S.
21. Black RE. Micronutrients in pregnancy. *Br J Nutr* 2001;85 (Suppl. 12):S193-7
22. UNICEF Globalr Database Antenatal Cak (on live) *(cited 2004 at august) available from <http://www.chindinfo.orgledb/antenatal /database2.5htm>.

Address for Corresponding Author:

Dr. Sabreena Talpur

9-B, Khalid Housing Society Near Muslim Society,

Qasimabad. Hyderabad

Mobile No: 0300-3041557, 0333-2567759

Email: stalpur07@yahoo.com