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MATERNAL RISK FACTORS ASSOCIATED WITH LOW BIRTH WEIGHT BABIES

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ABSTRACT

OBJECTIVE: *The objective of the study was to determine the maternal risk factors associated with "Low Birth Weight Babies".*
STUDY DESIGN: *Case control study.*
PLACE AND DURATION OF STUDY: *Department of Gynaecology and Obstetrics Unit – II Sheikh Zaid Women Hospital & CMC Larkana from 1st December 2008 till 30th November 2009.*
PATIENTS AND METHODS: *A total of 300 women were included in study,150 as cases were mothers delivering alive babies at term with birth weight < 2.5 kg and 150 as control delivering babies = 2.5 kg birth weight.*
Maternal age, BMI, parity, education, socioeconomic status, no of antenatal visits, inter pregnancy interval and maternal anemia were recorded in both groups and results were evaluated.
RESULTS: *The commonest age group in both groups was 19 – 34 years, however the difference of age distribution was statistically insignificant between cases and control (P = 0.141).*
Proportions of primiparous women were high in cases and statistically significant association found with low birth weight (P < 0.001).
Majority of women in both groups were illiterate and education was statistically insignificant between two groups (P = 0.303). In both groups low and middle socioeconomic status was predominant and statistically was an insignificant associated with LBW (P < 0.148).
The proportion of women who had either no interval or less than 5 months of inter pregnancy interval was significantly higher in cases than control and revealed significant association with LBW (P = 0.009).
Majority of women in both groups were anaemic and association with LBW was insignificant (P < 0.107). Low BMI (< 18.5) was significantly associated with LBW (P < 0.007).
Statistically insignificant proportions of women were observed for antenatal visits throughout pregnancy. Antenatal visits were insignificantly associated with LBW (P<0.289).
CONCLUSION: *It was concluded that low maternal BMI, primiparity and no birth interval or interval < 5 months were significantly associated with LBW.*

KEY WORDS: LBW, Maternal Risk Factors.

INTRODUCTION

Low birth weight babies have been defined by W.H.O as weight at birth of less than 2.5 kg[1]. It contributes substantially to neonatal, infant and childhood mortality as well as morbidity[2]. Across the world neonatal mortality is 20 times more likely for low birth weight babies compared to heavier babies (> 2.5 kg) [3]. LBW is generally associated with situation in which uterine malnutrition is produced because of alteration in placental circulation[4]. babies who are undernourished in the womb face greatly increased risk of dying during their early months and years, those who survive have impaired immune function and increased risk of disease, they are likely to remain under nourished with reduced muscle strength through out their lives. Children born under weight also tend to have cognitive disabilities and lower IQ affecting their performance in schools and their job opportunities as adults[5].
LBW rates vary considerably amongst studies and countries ranging from 3.1% to 13.3%[6]. the reported incidences of LBW is about 7% in England and Wales in Sweden

only 4% babies are born weighing less than 2.5 kg and incidence of LBW in India is 29%[7]. In different parts of Pakistan incidence of LBW varies from 5% to 23%[3].

Almost 60% of new born in developing countries are not weighed, in south Asia which has the highest incidence of LBW babies that figure is almost 70%. Those new born who are weighed meanwhile are generally better off, which can lead to an under estimation of incidence of LBW[8].

The reduction of LBW also forms an important contribution to Millennium Developmental Goal (MDG) for reducing child mortality[9], therefore the rational of our study is to evaluate the risk factors associated with the LBW babies (< 2.5 kg) delivering at Sheikh Zaid Women Hospital Larkana.

PATIENTS AND METHODS

This study included 300 women admitted via out patient department or emergency at gynaecology and obstetrics unit II, Sheikh Zaid Women Hospital Larkana over a period of one year from 1st December 2008 till 30th November 2009. The weight of all babies delivering at labour room was measured without cloths to an infant weighing scale (TANITA Scale) in kilograms within an hour of delivery by trained labour room staff; scale was checked and zeroed before weighing. Mothers of the babies were approached and 300 mothers fitting the inclusion criteria i.e. delivering babies by vaginal route at term with birth weight < 2.5kg and with birth weight at 2.5kg or >2.5kg were selected for study. Mothers with eclampsia, ante partum haemorrhage, gestational hypertension, multiple pregnancies, premature rupture of membrane, medical disorders complicating pregnancy delivering babies weighing >4kg, delivering babies with congenital anomalies were excluded. Selected mothers were categorized in group A (study group) including mothers with babies weighing <2.5kg and group B (control group) weighing 2.5kg or >2.5kg. After informed consent information of risk factors were gathered through detailed interview and examination of each mother on proforma. Maternal weight was taken in kilograms on adult weighing scale (TANITA scale) and height against a wall height scale in meters within 48 hours of delivery by doctor and body mass index (BMI) was calculated.

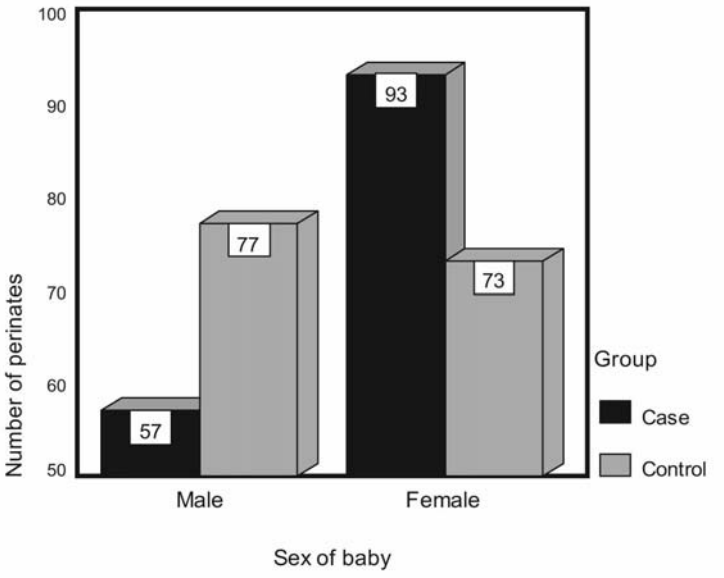
Statistical analysis was performed through SPSS-10.0. Frequencies and percentages were computed to present the categorical response variables like sex of baby, antenatal booking status, age, parity, body mass index, education status, socio-economic status, inter

TABLE-1
COMPARISON OF BODY MASS INDEX BETWEEN CASE AND CONTROL GROUPS:

BMI (kg/ m^2)	Group Case (n = 150)	Control (n = 150)	Odd ratio
< 18.5	42 (28.0)	20 (13.3)	—-
18.5 – 24.9	91 (60.7)	100 (66.7)	88.7
25.0 – 29.9	13 (8.7)	27 (18)	212.1
30.0 – 39.9	3 (2)	3 (2)	381.5
> 39.9	1 (0.7)	0 (0)	108.0

Significant difference between two groups ($\div^2$=14.13, p=0.007).

FIGURE-1
COMPARISON OF SEX OF BABY BETWEEN CASE AND CONTROL GROUPS:



Statistically significant difference of gender between case and control groups ($\div^2$=5.39, p=0.002).

TABLE-2
COMPARISON OF INTER PREGNANCY DURATION BETWEEN CASE AND CONTROL GROUPS:

Inter pregnancy interval	Group Case (n = 150)	Control (n = 150)	Odd ratio
No or < 5 months	72 (48.0)	44 (29.3)	—-
> 5 months	78 (52.0)	106 (70.7)	1.35

Significant association of either no or inter pregnancy interval < 5 months with low birth weight ($\div^2$=11.02, p=0.009).

pregnancy interval and anemia. Chi-square test was applied to compare the aforementioned categorical response variables between case and control groups. Logistic regression analysis was performed to assess the significance of variables, odd ratios and the predictors of low birth weight. P-value = 0.05 was considered statistically significant result.

RESULTS:

Among 150 low birth weight babies, 57 (38%) were males and 93 (62%) females while male predominance was observed in control group where 77 (51.3%) were males and 73 (48.7%) females. Significant difference of gender distribution was thus revealed between case and control groups **(Figure – 1)**

Statistically insignificant proportions of women were observed who had none of antenatal visit throughout the pregnancy in case and control groups respectively 32% and 28.7%, those having 1 or 2 antenatal visits 36.7% and 31.3% and having more than 3 antenatal visits 31.3% and 40%. Statistically insignificant association of antenatal visits with low birth weight ($\div^2$=2.482, p=0.289).

The commonest age group in both case and control groups was 19-34 years in which 82.7% of cases and 89.3% of controls were found, however the difference of age distribution was statistically insignificant between case and control groups. Although, majority of the cases and controls respectively 60.7% and 66.7% were having the desired range of BMI = 18.5-24.9 kg/m^2 but the proportion of low BMI from the desired range (<18 kg/m^2) was significantly higher in case than control group respectively 28% and 13.3% **(Table – 1).** Proportion of primiparous women were significantly higher in cases of low birth weight than control group (45.3% vs. 26%), that reveals significant association of primigravida with low birth weight ($\div^2$=12.22, p<0.001, Odd ratio = 2.81) as shown in **Figure - 2**.

Majority of the women in case and control groups were illiterate respectively 64.7% and 60% followed by primary educated 13.3% and 14.7%, secondary educated 18% and 24% and over secondary/ vocational educated 4% and 1.3%. This data reveals statistically insignificant difference between two groups ($\div^2$=3.64, p=0.303).

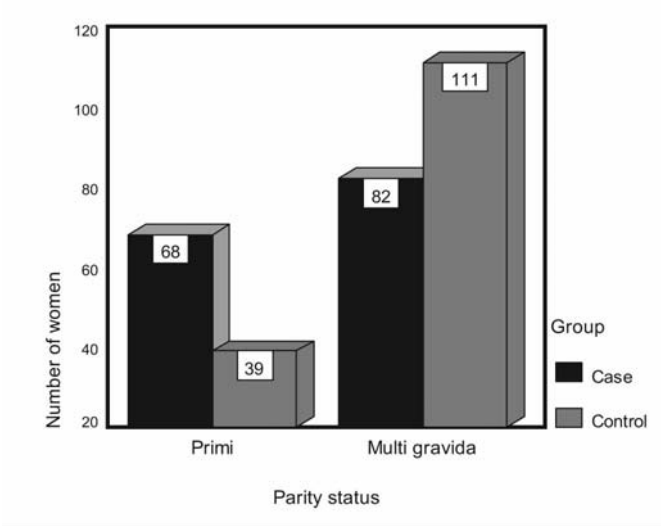
In both case and control groups, low or middle socio-economic status was predominant and statistically similar proportion was observed in both groups that reveals insignificant association of low or middle socio-economic status with low birth weight ($\div^2$=3.82, p=0.148).

The proportion of women who had either no interval or less than 5months of inter pregnancy interval was significantly higher in case than control group (48.0%vs.29.3%) that reveals significant association of either no or inter pregnancy interval <5months with low birth weight ($\div^2$=11.02, p=0.009) as shown in **Table – 2.**

Majority of the women were anemic (Hb <11 gm/dl) in case and control groups respectively 80% and 86% that reveals statistically insignificant association of anemia with low birth weight ($\div^2$=1.91, p=0.167, Odd ratio = 1.74).

BMI, parity and inter-pregnancy interval were the three predictors as risk factor of low birth weight babies.

FIGURE-2
COMPARISON OF PARITY STATUS BETWEEN CASE AND CONTROL GROUPS:



Statistically significant association of primigravida with low birth weight ($\div^2$=12.22, p<0.001, Odd ratio = 2.81).

DISCUSSION

This study has been done at a tertiary care unit where majority of women, coming are illiterate belonging to lower social class, with poor nutritional status and anemic. Although illiteracy, poor social class and number of antenatal visits, anemia were not significantly associated with LBW in our study but these factors were present in majority of mothers at our setup.

Our study analysis show that low maternal BMI, primiparity and no or short birth interval were significantly associated with LBW.

LBW was more common in female babies as compared to male babies (93% vs 73%) same sex distribution have been seen in[13-11-10-12] studies.

The relationship between a low maternal BMI and adverse pregnancy outcomes has been known for several decades. The result of our study on this show statistically significant association and this is consistent with other studies. A study by Nusrat Khan[10] show the importance of BMI where higher value of BMI had projective effect against LBW. Bhattcharya Setall[14] from United Kingdom, had also studied BMI in relation to adverse pregnancy outcomes, he found increased risk of LBW but his study also concluded that low BMI as compared to obese had better pregnancy outcomes. In contrast Ohjha N[15] and Elishibly[16] did not found any statistically significant association between low BMI and LBW.

Statistically significant association has been found in our results of primiparity and risk of LBW, this finding is supported by other studies like, Wanzhen Gao etall[17], Elishibly[16], Som S etall[13] and Mohammad Aziz[12] in there studies show this association. Elishibly found LBW risk of 12.2% in first born babies which was twice that of infants of mutiparons mothers in his study. Babak[18] in his study concluded that LBW is four to five fold greater for first births as compared with high order births.

In contrast, Yasmeen[19] found multiparity as risk factor of LBW and Herbest[20] and Nustrat Khan[10] found no association with LBW.

Our result show positive association of No birth interval or short birth interval with LBW, this result may reflect higher portion of primi mothers in cases compared to control

group. There is a lot of studies show this association, Nusrat Khan[10] found that short interval as an independent risk factor for LBW same as Herbert Peter[20] found in his study. Shiva Rafati et all[21] also supports this finding. World wide birth interval has been taken of different duration and from full term to previous abortion; we think this aspect needs further research where standard definition and criterion should be made to evaluate it fully in muti gravda women as risk factor for LBW. In contrast Kleijar[22] found no association of birth interval with LBW, Yasmeen[19] had found both long and short birth interval to be associated with LBW.

In our study proportion of antenatal visits were nearly same, although more booked women (60%) were seen in control as compared to cases (47%) but there was no statistically significant association found (OR = 1.21).

Much of debate has been done on antenatal visits, it is thought by good ANC mothers can be diagnosed early of risk factors, treated properly and can be educated properly regarding pregnancy care. Nasira Tasnim[23] had found that less than three visits are associated with LBW as compared to seven or more. Nusrat Khan[10] seen in his study those higher portions of women in his case-control study were having less antenatal visits but it was statistically insignificant. Education and social class was insignificantly associated with LBW in our study. Nearly equal portion of education status and social class seen in our study same was seen for socioeconomic status in studies of Wanzhen[17] and JMD Thompson[24].In contrast I Naheed[7], Mohammad Aziz[12] and Som S et all[13] found low social economic status as risk factor of LBW.

Nusrat khan [10] in his study did not found maternal education as a risk factor of low birth weight. In contrast Som S et all[13], Shiva Rafati[21] show positive influence of maternal education on birth weight.

Maternal anemia has been related to poor out comes like Low birth weight and preterm delivery. Maternal anemia in our study was not found to be associated with low birth weight, compared to studies by S.A Rizvi[2], Umber Jalil[25], Yasmeen[19] and Amalia Levy[26] where they show positive association. In contrast Nuserat Khan[10] study supports our results where he did not found any association of maternal anemia and risk of low birth weight babies.

Mean age group in our study was age 19-34 years, we did not found any association of age distribution with the risk of LBW, same was observed in study by JMD Thompson[24] who did not found age as risk factor even after controlling the confounding variables. In comparison different studies [13,3,27] show teenage as risk factor of low birth weight. S A Rizvi[2] and Babal[18] show advance maternal age as risk factor of low birth weight babies.

Since the majority of factors which leads to delivery of LBW neonates are preventable, it is hoped that with close cooperation of gynecologists and pediatricians along with training of mothers and young women, the number of such incidences would be minimized.

CONCLUSION

It is concluded from our study that maternal low BMI, primiparity and no or short birth interval are associated risk factors for delivery of low birth weight babies.

SUGGESTIONS

We suggest that we should pay more attention to the primigravidas and there health care needs, women should be educated about risks of short birth interval and proper contraception should be offered to at risk women and further studies should be done on inter pregnancy interval in multiparous women. For appropriate weight gain during pregnancy, pregnant women need to be counseled about healthy diet and weight before and throughout pregnancy should be carefully monitored to promote optimal outcomes for mother and infant.

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