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A STUDY ON MATERNAL RISK FACTOR FOR LOW BIRTH WEIGHT CHILDREN

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ABSTRACT

Birth weight is the most important factor that affects infant and child mortality. The aim of the present study of pregnant women to study the proportion of low birth weight babies and to find out the maternal risk factors affecting the birth weight of newborns and its significance. Information regarding biological and obstetric history and present pregnancy was collected. These women were followed up till their delivery and birth weight was recorded with 24 hours of delivery. The main factors which were significantly associated with LBW were maternal factors such as, age at delivery; short inter pregnancy interval, inadequate antenatal care, and parity. From this case study we emphasize that several biological factors associated with low birth weight children.

INTRODUCTION

Birth weight is the single most important criterion for determining the neonatal and infant survival. Low Birth Weight (LBW) is a sensitive indicator of the socio-economic conditions and indirectly measures the health of the mother and the child. Babies with a birth weight of less than 2500 g irrespective of the period of their gestation are termed as Low Birth Weight (LBW) babies [1]. In India 30-35% babies are LBW and more than half of these LBW newborns are full term babies [2]. LBW being one of the global indicators of community health, it is imperative that periodic monitoring be undertaken to evaluate the impact of preventive health services.

INDIA Scenario

Infants who weigh less than 2.5 kg. at birth represent about 30% of all live birth in India; more than half of these are born at term.

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In most part of India the mean birth weight is between 2.7 and 2.9 kg. The criteria laid down by W.H.O where 2.5 kg. is the dividing line between the LBW baby and mature baby cannot be applied to Indian infant. It was assessed by Indian Scientist by maturity respiratory distress and feeding problem that 2 kg, or less should be taken as the criterion of LBW of Indian babies. When this criterion was applied the incidence of LBW babies having a birth weight of 2 kg. was found to 5.5% against 25 - 30% when criteria was less than 2.5kg.

Premature infants have a far greater risk for developing hyaline membrane disease, apnoea, intracranial haemorrhage, sepsis, retrolental fibroplasis, and other conditions related to physiological immaturity. Low birth weight is determined by the interaction of the both socio-demographic and biological factors. Many biological factors have been postulated to determine the birth weight of the new born. The principal among these are maternal age, weight, height, education, parity, antenatal care, race, maternal smoking, hard manual labour, genetic factor, place of residence and sex of the baby. The effect of these factors have been shown to be dependent on geographic

location of study [3,4]. Keeping all these in view an attempt has been made to carry out a study on maternal risk factors for LBW babies at Nilofur General Hospital, which is a tertiary Lower level care center at Hyderabad, Telangana, India.

MATERIALS AND METHODS

This was prospective study carried out babies born at Nilofur hospital Hyderabad between September to November, 2013. Two groups of post natal mothers who delivered babies in the preceding 7 days were included in the study. First group included mothers who gave delivery to term low birth weight babies. Term was defined as completion of 37 weeks of gestation mothers who had significant illnesses during pregnancy were excluded and mothers who delivered babies with significant congenital anomalies excluded. Second group included mothers who delivered normal birth weight babies normal birth weight

was defined as birth weight of 2500 to 4000 grams. Each group included 100 mothers. Mothers were interviewed and different maternal variables, age of the mother, height, antenatal checkup, weight, mode of the delivery, sex of the baby and parity and maternal hemoglobin were recorded. All the relevant information regarding mother and new born was documented on prestructured proforma. The Pre-Pregnancy weight of mother was not available in all mothers, hence mother weight was recorded immediately after delivery on a weighing machine measured nearest to 100 grams. The height of mother was measured on sadiometer.

Statistical Analysis

Chi square test was used for calculating P value. P value was considered significant if < 0.05. When more than 2 groups were available chi square for trend was seen by using SPSS version 10 software.

RESULTS

Table 1. Maternal age association with LBW

Maternal Age in years	Total	<2.5 Kg Body weight		>2.5 Kg Body weight	
		Number	%	Number	%
<20	36	25	69.4	18	50
20-29	146	65	44.5	76	52
>30	18	10	55.5	06	33.3

Table 2. Maternal weight association with LBW

Maternal Weight	Total	<2.5Kg body weight		>2.5 Kg Body weight	
		Number	%	Number	%
<50	85	58	68.2	47	55.2
51-60	75	32	42.6	33	44
More than	40	10	25	20	50

Table 3. Height association with LBW

Height	Total	<2.5 Kg Body weight		>2.5 Kg body weight	
		Number	%	Number	%
<135	20	16	80	08	85
135-144	125	55	44	56	42.4
145-165	45	26	56.5	29	48.8
>165	10	4	40	07	80

Table 4. Paternal age association with LBW

Paternal Age		<2.5 kg Body weight		>2.5 Kg Body weight	
		No	%	No	%
<20	06	04	66.6	03	50
21-25	57	29	50.8	27	47.3
26-30	110	53	48.1	57	51.8
>30	27	14	51.8	13	48.1

Table 5. Parity association with LBW

Parity	Total	<2.5 Kg Bw		>2.5 kg bw	
		No	%	NO	%
Primi	53	32	60.3	22	41.3
Multi	140	62	44.2	72	51.4
Grand Multi	07	6	85.71	06	85.7

Table 6. Maternal antenatal checkup association with LBW

Maternal antenatal Checkup	total	<2.5 Kg body weight		>2.5 Kg body weight	
		No	%	NO	%
00	11	06	54.5	08	72.7
1-3	25	15	60	14	56
>4	164	79	48.1	78	47.5

Table 7. Previous history association with LBW

History of abortion other siblings		<2.5 kg bw		>2.5 kg bw	
	total	No	%	No	%
A	13	07	53.8	07	53.8
P	07	O5	71.4	06	85.7

Table 8. Maternal obs complications Association with LBW

Obs complications	Total	<2.5kg bw		>2.5kg bw	
		No	%	No	%
PIH	22	16	72.7	14	63.6
Oral hydrominus	15	12	80	4	26.6
APH	08	06	75	2	25
PROM	25	19	76	07	28

Table 9. Maternal Hb Association with LBW

Maternal Hb	Total	<2.5kg bw		>2.5 kg bw	
		No	%	No	%
<10	24	14	58.3	15	62.5
10-11	130	66	50.7	75	57.69
>11	46	20	43.4	10	21.7

Table 10. Mode of delivery associated with LBW

Mode of delivery	Total	<2.5 kg bw no	%	>2.5 kg Bw	
				No	%
CS	138	60	43.4	70	50.7
VD	62	40	64.5	30	48.3

Table 11. Sex of baby associated with LBW.

Sex of the baby	Total	<2.5 kg b.w No	%	>2.5kg Bw No	%
Male	144	59	38.1	75	52
Female	56	41	80.3	25	44.6

RESULTS AND DISCUSSION

This present study was undertaken to know the influence of various maternal factors in low-birth weight babies and to correlate with other various anthropometric factors. The present study was taken up because LBW was one of the most serious challenges in maternal and child health especially in a developing country like India. It was a major contributing factor to perinatal & infant mortality and morbidity. The Low Birth weight accounts for 70% of all perinatal and 50% of all infant mortality. A LBW carries a risk of dying 5 times more in perinatal period and 3 time more in infancy [5].

Maternal Age

The mothers were divided into three groups depending on age as < 20, 20 - 29, and 30 and more. Mother age showed significance that there was less chance of LBW babies between age 20 - 29 years. Among these most of the mothers were in the age group 20 - 24 years. Incidence of LBW babies was 55.3% and incidence of normal weighing babies was 69.4% in maternal age group 20 - 24 years. Therefore, when re-classified into four groups it showed that there was no significant P value in 20 - 24 age group. But between 25 to 29 years, there was reduced chance for delivering low birth weight babies. where highest weight of neonates were found in the age group of mothers between 25 to 29 years. Maternal age and birth weights had significant association as per studies of several workers Measurement of baby's weight at birth is a useful indicator of his/ her intrautertne environment. Indirectly it is a reflection of the health and nutritional status of the mother and the care she receives during pregnancy. Birth weight has predictive value regarding survival and it is a useful parameter in predicting the future

growth and development of the child. It can be used in identifying at risk families and help in the decision making during implementation of intervention programmes; especially in countries and regions with limited resources. Recognizing the importance of birth weight measurement, World health Assembly in 1981, recommended it to be one of the twelve - (12) global indicators for monitoring health of the community [6].

There was no association of birth weight with maternal age according to study of several studies. In this study there was no significant trend between maternal age and birth weight. As the maternal age increased birth weight did not increased.

Maternal weight

The mothers were classified according to weight into 3 groups as <50 kg, with 51 - 60 kg. and more than 60 kg. 58% LBW of the mothers were < 50 kgs. 42.6% of the mothers were in 51 to 60 kgs. group. 25% of mothers in more than 60 kgs. There was significant P value in more than 60 kg. group [6].

Maternal height

Maternal height was divided into four groups as < 145 cm, with 145-154 cm, with 155-164 cm. and more than 164 cm. Most of the mothers were in 145 - 154cm. group and there was no significant P value in any group with linear regression analysis there was no trend between maternal height and birth weight. Prevoius study showed that with an increase in height of the mother, the mean birth weight of the new born increased [6,7]. On other hand in mothers from low socio-economic group maternal height had a strong effect on the frequency of low birth weight infant.

Paternal age

In the present study paternal age ranged from 18 years to 45 years had been classified into four groups as <20 years, with 21 - 25 years, with 26 - 30 years and more than 30 years. In low birth weight babies most of the fathers were in 21 - 25 years age group whereas in normal weight babies most of the fathers were in age group in 26 to 30 years. There was no statistical significance of father age with birth weight[7].

Number of Maternal Antenatal Check Dps ranged from 0 to 12. No. of maternal ANC's are classified into three groups one who do not have antenatal check up, two with 1 to 3 and 3 with 4 and above. Most of the mothers had 4 or more antenatal checkups. Among the mothers who did not have antenatal checkups 54.5% had LBW babies. In those mothers who had 4 and more antenatal checkups the LBW babies percentage was 48.1%. On statistical analysis there was no significant association with number of antenatal checkups and birth weight[8]. On linear regression analysis, there was no significant trend between no. of antenatal checkups and birth weights. Not only number of the antenatal checkups depends on the birth

weight, quality of the antenatal care also important criterion. Parity ranged from 1 to 5 and was classified into three groups as Primi, Multi, and Grand Multi (G4 or more). Most of the mothers were multi parous. In primi the low birth weight babies percentage was 60.3. In multis the low birth weight babies percentage was 44.2. On statistical analysis there was significant association between parity and birth weight as noticed in primi and multi. In primi there was greater chance of delivery of low birth weight babies [8].

Previous obstetrics history

Number of previous abortions and other sibling deaths were considered In mothers with history of previous abortions LBW babies were 53,8%. In mothers with history of other sibling deaths LBW babies were 61.9%. On statistical analysis there was no significance in incidence of low birth weight babies in mothers with previous history of abortions and other sibling deaths.

Obstetric and other complications

In the study many systemic diseases and obstetric complications were noticed. The number of mothers with systemic diseases are very few. Epilepsy noticed in 5 mothers, Asthma in 2 mothers, polio in 2 mothers, hypothyroidism in 2 mothers, congenital heart disease noticed in 4 mothers, Hepatitis B infection in 4 mothers, HIV infection in 3 mothers, Cholilithiasis in 1 mother, Bicornuate uterus in 1 mother, Fibroid uterus in 1 mother. As this number was less statistical significance was not found. The significant numbers of patients were present with obstetric complications like PIH, Oligo Hydromnious, Antepartum hemorrhage (abruptio and placenta privia) and premature rupture of membranes. In 22 PIH mothers 72% LBW babies were present. In 15 Oligo hydromnious mothers 80% LBW babies were present. In antepartum hemorrhage mothers 75% LBW babies were present. In 27 Premature rupture of membrane mothers 76% LBW babies were present. There was statistical association noticed in Oligo hydromnious mothers with birth weight. There was no statistical association with PIH and APH probably because many cases in the present study were referral cases with complications. APH and PIH were equally distributed in both LBW babies and normal weighing babies. In O.P, Ghai28 study there was association between antepartum hemorrhage with low birth weight. In the specific study showed PIH in mothers was significantly associated with low birth weight. Probably peripheral based or any other under based study will throw mere light in this aspect [9-11].

Blood groups in the study similar to normal distribution in population, as 0 +ve is the most common blood group and AB -ve is rare. AB-ve mothers were absent in this study. Most of mothers with blood group 0+ve. In AB+ve mothers 81.1% are LBW babies. On statistical analysis there was a near significance found with .AB+ve blood group and low birth weight. There was

significance association established with AB blood group and rate of low birth weight.

Maternal Hemoglobin percentage ranges from 6.5 gm. % to 13.5 gm. %. It was classified into three groups as < 10, 10 to 11 and > 11. According to WHO < 11 gm. % considered as anaemia in pregnancy, in India < 10 gm% was considered as anaemia. If we consider <11% as anaemia 78% of the mothers in study are anaemia and if we consider <10% as anemia only 18% of mothers were anemic.

Most of the mothers had Hemoglobin percent of 10 to 11 gm. On statistical analysis, there was no significant association of Hemoglobin gram percentage with birth weight. On linear regression analysis there was no trend between Hemoglobin gm % and birth weight. Several studies indicated by severe maternal anaemia (Hb. < 6 gm.%) increased the incidence of low birth weight babies but mild to moderate anaemia (Hb >6 to 10 gm. %) did not influence the birth weight of the offspring. Our study did not have any case with hemoglobin less than 6.5 gm% [11].

Mode of Delivery

As the present study was done in tertiary level care center, all modes of deliveries were noted. The cesarean sections included both elective and emergency. Vaginal deliveries included spontaneous vaginal deliveries, episiotomy vaginal deliveries and forceps deliveries. Among 138 cesarean sections 43.4% LBW babies and among 62 vaginal deliveries 64.5% low birth weight babies were delivered [12]. On statistical analysis there was significant association established between mode of delivery and low birth weight, as the cesarean section associated with low birth weight in the present study was due to complicated pregnancies which were referred to tertiary care center.

Sex of the baby

Male babies were higher in number compared to the female babies. Among male babies 38.1% were low birth weight babies. Among female babies 80.3% were low birth weight babies. On statistical analysis there was near significance established between the sex of the baby and low birth weight. There was less incidence of low birth weight in male babies.

Anthropometric Measurements

For all the babies length, head circumference, chest circumference, mid arm circumference and foot length were recorded [12].

CONCLUSION

The study was conducted to know the influence of various maternal and biosocial factors in low-birth weight babies and to correlate with other anthropometric measures like mid arm circumference and foot length. From these results we found that various maternal factors responsible for development of maternal risk for Low birth weight child.

Age at delivery, short birth interval, inadequate antenatal care, poor maternal nutrition, high parity, history of abortion, still birth and low birth weight babies in previous deliveries; come out as major factors associated with LBW in newborns. The present study suggests that improvement in maternal nutrition during pregnancy, avoiding close birth spacing, delayed child bearing in young females (<20years), universal coverage of adequate antenatal care, are essential for reducing the LBW in newborns. This can be achieved by including health education component for adolescents (both males and females) and pregnant mothers in Maternal and Child health related program, especially in rural areas where literacy rate is very low by utilizing grass route level health workers already existing in community.

CONFLICT OF INTEREST:

The authors declare that they have no conflict of interest.

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