

Study of Effect of Antenatal Risk Factors and Mode of Delivery on the Survival Outcome of Low Birth Weight Babies

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Background: Low birth weight is one of the most serious challenges for maternal and child health in both developed and developing countries. It is the single most important factor that determines the changes of child survival. Nearly 50% of neonatal deaths occur among LBW babies. The survivors among them are at a higher risk of developing malnutrition, recurrent infections and neurodevelopment backwardness. The objective of this study is to assess the effect of antenatal risk factors and mode of delivery on the survival outcome of low birth weight babies, in Niloufer Hospital, Hyderabad.

Methods: The present study was conducted at Department of OBG, Niloufer Hospital, Hyderabad. Study Design: Cross sectional study. Sample size: 2100 consecutive live birth babies were enrolled. Inclusion Criteria: All babies with birth weight between 1500-2500gm were included in the study. Exclusion Criteria: (1). Babies with birth weight < 1500 (2). IUD babies (3). Still born babies.

Results: Incidence LBW 21.2 %, VLBW babies 2.71% and that of ELBW babies were 0.89%, Male, Female ratio was 1:1.09, 80%.

Conclusions: Interventions to improve intrauterine growth by measures like adequate nutrition before and during pregnancy, interventions to prolong gestational duration by taking measures to prevent preterm deliveries, avoid child bearing in young adolescents and in late reproductive age, improving maternal education, general improvement in nutrition and Improving sanitation and water supply.

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I. Introduction

Low birth weight is the term used to define infants who are too small. The optimal size of the newborn baby was suggested by Millar et al. He suggested 2500gm as a limit between low birth weight and optimal birth weight. According to WHO expert group any neonate weighing 2500gm or less than at birth is termed as low birth weight whether it is preterm or term. Birth weight is a good reflector of the status of maternal health. It is also true that birth weight is the single most important factor that affects neonatal mortality and morbidity. The group of neonates with poor intrauterine growth remains the cause of concern in developing countries including India.

The incidence of low birth weight in India varies between 25–30% and of which 60–65% are because of IUGR. In different parts of India the incidence areas follows Andhra Pradesh 24% Maharashtra 48% Tamil Nadu 37% Uttar Pradesh 34% West Bengal 49% Rajasthan 37%. Some of the adverse factors responsible are maternal malnutrition, anemia, inadequate prenatal care, drug abuse, birth order, maternal medical problem e.g. Pregnancy induced Hypertension, diabetes mellitus, cardiac diseases and chronic infections. The present study was undertaken to know the incidence of low birth weight babies in a mixed population having varied socioeconomic background and to study the associated maternal risk factors like social, obstetric and anthropometric factors in low birth weight babies.

II. Material And Methods

The present study was conducted in the Department of OBG, Niloufer Hospital, Osmania Medical College, Hyderabad.

The sample was selected between from 2100 consecutive live born babies delivered in the hospital during period of 3 months. The hospital being a tertiary referral government hospital included women from the very low income strata of the society of class the 4 new born babies were weighted on a beam type scale within one hour of birth.

Gestational age was determined by Dubowitz criteria. Low birth weight babies were defined as those babies with birth weight of less than 2500gm irrespective of their period of gestation. Small for gestational age babies are defined as those with weight less than the 10th percentile.

Detailed maternal data were recorded for all low birth weight neonates studied based upon direct questioning and review of the antenatal card. Maternal malnutrition for the study was defined as weight < 45 kgs and height < 145 cms. Maternal anemia was defined as Hb< 11 g/dl [31]. Bad obstetrical history (BOH) was considered when there was previous history of one or more abortions, one or more stillbirths or one or more neonatal deaths. Low birth weight babies were further segregated into small for gestational age and preterm babies in relation to their maternal data.

All babies with birth weight between 1500-2500gm were included in the study.

Exclusion criteria

- Babies with birth weight <1500
- IUDbabies
- Still bornbabies.

III. Results

During the period of study 446 live new born babies with birth weight 1500-2500gms were selected for the study, Out of 2100 consecutively delivered babies during a period of 3 months. Of the total 446 babies 76.8% were small for gestational age neonates and 23% were preterm neonates. There were 234 female low birth weight neonates out of total446.

Table 1: Incidence of low birth weight babies.

Typeofcohort	No./%
Total no. oflivebirth	2100
Total no. lbwbabies(1500-2500)	446
Incidenceoflbw	21.2

Incidence of LBW babies during study period was 21.2 %. Male and female ratio was 1:1.09.

Table 2: Distribution of babies according to their birth weight.

Weight	n=	%
1.5 –2.0 Kg	85	19.1
2.0 –2.5 Kg	361	70.9

Maximum number of low birth weight babies were belonging to weight group 2-2.5 kg (70.9 %) followed by 1.5 - 2.0 kg.

Table 3: Gestational age wise distribution of low birth weight babies.

Gestational ageinweeks	n=	%
31–33	27	6
34–36	93	21
37–40	326	73.05

73.05% of low birth weight babies belong to 37-40 weeks of gestation, followed by 34-36 weeks 21%, so maximum number of babies were term IUGR.

Table 4: Distribution of LBW babies according to LGA, AGA and SGA (weight for gestational age).

Wt. forGestationalage	n =%
LGA	2 0.4
AGA	15936
SGA	28563.6

Maximum number of LBW babies were small for gestational age 63.26% follower by appropriate for gestational age.

The correlation between maternal age, height, weight, and parity and low birth weight neonates is highlighted in Table – 5.

TABLE 5: Correlation between maternal anthropometry and low birth weight neonates (n=446)

Factor	Smallfor gestation	Preterm	Total
Maternal age (years)			
>35	7	2	9
30 -35	28	8	36
25 - 30	91	20	111
19 - 25	230	41	271
<18	9	10	19
Maternal height (ems)			
> 155	60	13	73
145 - 155	320	53	373
< 145	80	14	94
Maternal weight (kg)			
<45	85	18	93
45-55	277	49	335
> 55	15	12	27

The maximum number of LBW babies (60.9%) were born to mothers, in the age group of 19-25 year of there 82% wee SGA neonates. Singnifically. 19 LBW neonates were born to mother's age below 18 years. Table (6) Highlighted the correlation between maternal party, spacing between pregnancy and familyincome.

TABLE 6: Correlation between LBW and maternal parity, spacing and family income (n=446)

Factor	Smallfor gestation	Preterm	Total
Patiry			
Primipara	149	36	185
2 nd para	138	22	160
3 rd para	67	16	83
>3	12	06	18
Spacing			
< 2years	234	41	275
> 2years	141	30	171
Family income(Rs/month)			
> 5000	8	3	11
3000 – 5000	9	3	12
< 3000	347	76	423

Primiparous mothers were found to contribute significantly higher no. of LBW neonates (40%), and of there 85% were SGA neonate. Spacing as a factor did not show major difference the incidence of LBW neonates. Mothers belonging to income group of less than Rs. 3000/- per month gave birth to higher number of LBW neonates of, there 85% were SGAneonates.

Table 7: Obstetric, medical, and health-related characteristics of the mothers

Variable	Number	Percentage (%)
(1) History of abortion		
Yes	328	(75.0)
No	118	(25.0)
(2) Alive number of children		
≤2 children	289	(65.8)
≥3 children	157	(34.2)
(3) Birth interval from last child		
≤2 years	361	(82.6)
>2 years	85	(17.4)
(4) Pregnancy type		
Wanted & planned	412	(94.9)
Unwanted & unplanned	34	(5.1)
ANC status		
(5) Unbooked	52	(14.2)
<4 visits	269	(44.6)
≥4 visits	125	(41.2)
(6) Iron/folic acid intake		
Yes	395	(90.6)
No	51	(9.4)
(7) HIV status		
Nonreactive (-ve)	426	(90.8)
Reactive (+ve)	9	(5.9)
Unknown	13	(3.3)
(8) Bad obstetric History		
Yes	155	(34.0)
No	291	(66.1)
(9) Medical illness		
Yes	63	(12.6)
No	363	(87.4)
(10) Hemoglobin status		
Normal	229	(51.4)
Abnormal	217	(48.6)
(11) Degree of severity of anemia		
No anemia	228	(51.4)
Mild	132	(28.1)
Moderate	86	(17.7)

Table 8: Neonatal history of the neonates

Variable	Frequency	Percent (%)
Sex of neonate		
Male	212	(48.1)
Female	234	(51.9)
Complication of neonate		
Yes	47	(11.1)
No	377	(88.9)
Congenital malformations		
Yes	24	(5.7)
No	400	(94.3)
APGAR score		
Poor (<7)	321	(75.7)
Good (≥7)	125	(24.3)

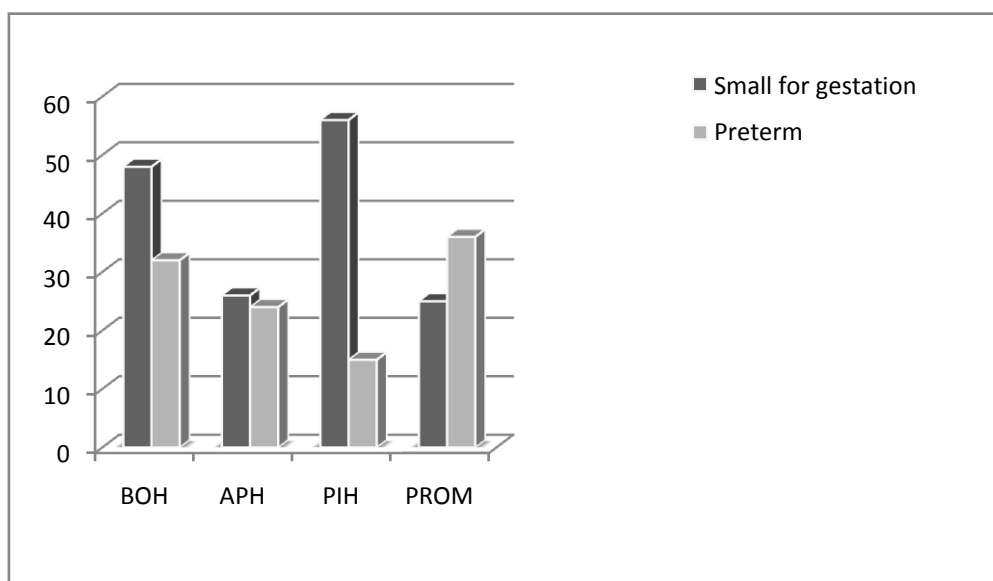
Table 9: Relationship of birth weight of LBW babies with complications of pregnancy.

Birth weight of LBW babies	Complications of Pregnancy					
	PIH		APH		PPH	
	n= 244	%	n= 51	%	n=28	%
1.5 – 2.0 Kg	109	29.82	16	29.00	7	19.44
2.0 - 2.5 Kg	135	39.69	35	52.00	21	58.33

Table 9: Relationship of birth weight with medical illness.

Birth weight	Medical illness during pregnancy											
	Anemia		TB		Chronic		UTI	RHD	Diabetes	Others		
	n=603	%	n=603	%	n=603	%	n=603	%	n= 603	%		
1.5 – 2.0 Kg	190	31.50	18	43.90	24	36.60	8	26.66	1	12.5	6	10.16
2.0 - 2.5 Kg	308	57.077	14	34.14	30	45.45	9	30	7	87.5	29	49.5

Table 7 reflects the correlation between maternal medical morbidity including anaemia, medical illness and obstetrical problems and low birth weight babies 12.6% LBW babies were born to mothers whose Hb% levels were below 10gm/dl further 17% of LBW neonates were delivered by mother whose Hb% below 8gm/dl pervert. Medical illness including rheumatic heart disease, UTI and other episode illness were observed in mothers with LBW babies in the present study. Obstetrical problems included PROM, PIH, BOH & APH. The detailed correlation between obstetrical problems and LBW neonates highlighted in Fig – 0. BOH and PIH were two important factors.



IV. Discussion

Low birth weight is one of the most serious challenges for maternal and child health in both developed and developing countries. The purpose of this study was to find out the magnitude of the problem and to study the possible determinants of Low Birth Weight and their effect on outcome of LBW babies in our Institute. Pervetudin introduced the most basic concept in the care of low birth weight babies in 1895. He stated with LBW babies we shall have to consider 3 points, one their temperature and chilling, two their feeding and three the diseases to which they are prone.

In developing countries like India the incidence of LBW is 25-35%. The increased incidence of LBW babies in developing countries are probably due to poor socioeconomic status, large population, illiteracy, poor educational status and other environmental factors.

Of the low birth weight babies, small for gestational age neonates are the care for concern, given their long term consequences. The vicious cycle of gestational age girl neonate who will in turn deliver a low birth weight child continues in our country. In present study according to gestational age 73.05% babies were term. in a study by ICMR, where in the criterion for low birth weight was taken to be <2000gm, that the mean birth weight of the mature Indian baby is about 500gm less than that of the American infant and hence the WHO definition of LBW babies of 2500gm as the dividing line cannot be applied for Indian infants.

Maternal age, parity and spacing interval are important epidemiological causative factors for the high incidence of LBW babies. Various workers in India had found the incidence of low birth weight babies ranging from 25% to 35% which are comparable with present study. The male to female ratio was 1:1.9, being statically not significant. Present study, maximum number of mothers who delivers LBW babies were of age group of 20-25 years (42.99%), in weight group 2.0-2.5 Kg. maximum number of babies were delivered by mother aged 20-25 years (82.25) followed by 26-30 years (79.88%) These figures have shown that teen aged pregnancy and maternal age more than 30 years had adverse effects on birth weight of babies. David and Lucile of Packard foundation noticed that maternal age less than 20 years and more than 30 years is a risk factor for occurrence of LBW babies. Complications of pregnancy seen in our study were PIH (17.93%) followed by Anaemia (2.95%) and P.P.H. (1.14%) (followed by) The maximum reduction in birth weight seen in PIH mothers may be because of its adverse effects on placental circulation. Among mother's medical illness contributing to birth of LBW babies in our study, anemia was found to be most common disorder (23.72%) chronic UTI (2.59%), thyroids disorders, Diabetes 0.31% Rafati S et al stated that Anemia was responsible for 13% of low birth weight babies these illnesses affect birth weight by their effects on maternal nutrition, their oxygen carrying capacity, maternal general health, and effect on placental circulation. Multivariate analysis shows that maternal age, pregnancy type, history of abortion, hemoglobin status, iron folic acid intake, and HIV status were significantly associated with term low birth weight. Also mothers less than 20 years of age delivering at the hospital were most likely to have term low birth weight, other predictor for term low birth weight was normal hemoglobin and shows that anemic mothers were likely to have low birth weight babies compared to non-anemic mothers.

There is general agreement that pregnancy outcomes are more favorable for multipara than primi para with the exception of grand multipara the present study It was found that the maximum mothers were primi para (31.70%), followed by forth para and above (30.36%), IInd Para (23.44%) and IIIrd Para 14.47% we have concluded that primi parity and multiparty have adverse effects on birth weight. Mothers with IInd parity had better birth weight (82.55%) in weight group 2.0-2.5Kg, Maximum SGA babies were delivered by primi para mother (75.55%) followed by multipara mothers , IInd para, 54.53% and IIIrd para mother. We observed that maximum numbers of LBW babies were belonging to lower socio-economic status followed by lower-middle, Middle, Upper-middle and Upper class These finding was supported by various workers as all three factors taken in this scale (education of mother, occupation of father, and income of family) had their own effects on occurrence of low birth weight babies. Maximum numbers of SGA babies were born to mothers of grade V of Kuppuswami classification, followed by grade IV (61.22%). In present study, it was observed that as level of socio-economic status improves, there was increase in the percentage of AGA babies but we found that there was less percentage of AGA babies in grade II as compare to grade III as there were less number of cases in grade II as compare to grade III of socio-economic status. Maximum number of mothers delivering LBW babies were illiterate. Better educational status of mothers imparts a better reproductivebehaviour.

Short spacing interval between pregnancies is a confounding factor to nutritional deficiency and madquate physiological recovery. It has also been observed that out come of previous pregnancy is an important confounding facts. If the previous gestation resulted in a preterm or SGA neonate or still birth the mother will be at an increased risk for both preterm or SGANEonate.

V. Conclusion

Parents and community at large must be educated and motivated to avoid early age of marriage and large family All efforts must be made at the level of individuals, parents, treating obstetricians and pediatricians, health care delivery system and country, to improve the biological outcome of each pregnancy. This will lead to improvement in overall quality of man power of our country. Birth weight is a good reflector of the status of maternal health. Prevalence of term low birth weight in this study was almost similar to the results of other studies. The factors associated with term low birth weight are pregnancy type, maternal age history of abortion, hemoglobin status, iron folic acid, and HIV status, The burden of LBW obtained in this study was in the same range as in some other countries.

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