A Study on Maternal Factors Associated With Term Low Birth Weight Neonates

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I. INTRODUCTION

• Birth weight is not only a critical determinant of child survival, growth and development but also a valuable indicator of maternal health, nutrition and quality of life.

• WHO defines low birth weight (LBW) as weight at birth less than 2500g regardless of gestational age. LBW can be further categorized as very low birth weight (VLBW) which is less than 1500g and extremely low birth weight (ELBW), which is less than 1000g.

• LBW is caused by either by either due to preterm birth or infant being small for gestational age or combination of both.

• The level of LBW in developing countries(16.5%) is more than double the level in developed countries (7%). India has 28% prevalence rate of LBW among live births, among them more than half are born at term.

• This high occurrence of LBW in developing countries is multifactorial and consist of a complex interaction of maternal, placental and fetal factors. But, maternal factors play a major role in LBW.

• LBW is a major contributor for infant morbidity and mortality (36%), constitues about 4 million deaths per year . Hence LBW is considered as a sensitive index of nation's health and development. Reducing incidence of LBW is one of the most serious challenges in maternal and child health in developing countries .

• Therefore, studies on epidemiological factors associated with LBW are highly demanding to solve current issue among institutional deliveries so that suitable recommendations can be made to prevent LBW.

II. AIM & OBJECTIVES:
1) To determine the incidence of term low birth weight (LBW).
2) To study the common maternal factors of low birth weight.
3) To study feto-maternal outcome in low birth weight infants.

III. MATERIALS AND METHODS
Study design:
• A hospital based cross sectional study was undertaken to study the maternal factors associated with term LBW infants .

Study area and study period:
• The study was done over a period of 6 months in Government Victoria Hospital (GVH -Visakhapatnam) from the period of december 1st 2021 to may 31st 2022.

Source population:
• All mothers who delivered at GVH of visakhapatnam during the study period .

Study population:
• Cases- mothers who delivered term LBW neonates(<2500g) during study period at GVH
• Controls- mothers who delivered NBW neonates(2500g -4000g) during study period at GVH
• Inclusion criteria:
for cases- Term(>37 completed weeks) LBW child , singleton live births
for controls- NBW singleton live births.

• Exclusion criteria –(for both cases and controls) preterm LBW, major congenital anomalies, multiple gestation, still born and dead born.

• Sample size was calculated using the formula 4pq/L2(where p=prevalence, q=100-p,L=allowable error).considering p=28%in india and allowable error as 18%, sample size comes out as 158 for 6 months . We have taken it as 200.

• Randomized sampling method is done for selection of cases and controls.

Data collection tools and analysis:
• With prior verbal consent , the socio- demographic and behavioral maternal factors were collected through interview.
• Maternal anthropometric measurements like Height was computed through physical assessment and ANC, gestational age and any relevant medical illness were extracted through reviewing of mother's medical record for both cases and controls within the first 6 h of delivery.
• Birth weight of every newborn was measured using electronic weighing scale.
• Data collected , entered in Ms-excel and results were analyzed using SPSS 21 version.

IV.   RESULTS
• **Study population:**

Table 1: distribution of study population

POPULATION	NUMBER
TERMLOW BIRTH WEIGHT	79
TERM NORMAL BIRTH	121 WEIGHT
TOTAL	200

Mean birth weight :

LBW	1800g
NBW	2840g

Table 2-Distribution of LBW and NBW on basis of Maternal Age:

CHARECTERISTICS	MOTHERS OF LBW	%LBW	MOTHERS OF NBW	%NBW	TOTAL MOTHERS
<20 YEARS	26	56.5%	20	43.4%	46
20-30 YEARS	42	33.3%	84	66.6%	126
>30 YEARS	11	39.2%	17	60%	28

Table 3 –Association between maternal age and LBW: (significant)

| CHARECTERISTIC	MOTHERS OF LBW	MOTHERS OF NBW	CHI SQUARE	P VALUE
<20 YEARS	26	20	7.5	0.025
20-30 YEARS	42	84		
>30 YEARS	11	17		

MATERNAL AGE & LBW

■ MOTHERS OF LBW   ■ MOTHERS OF NBW
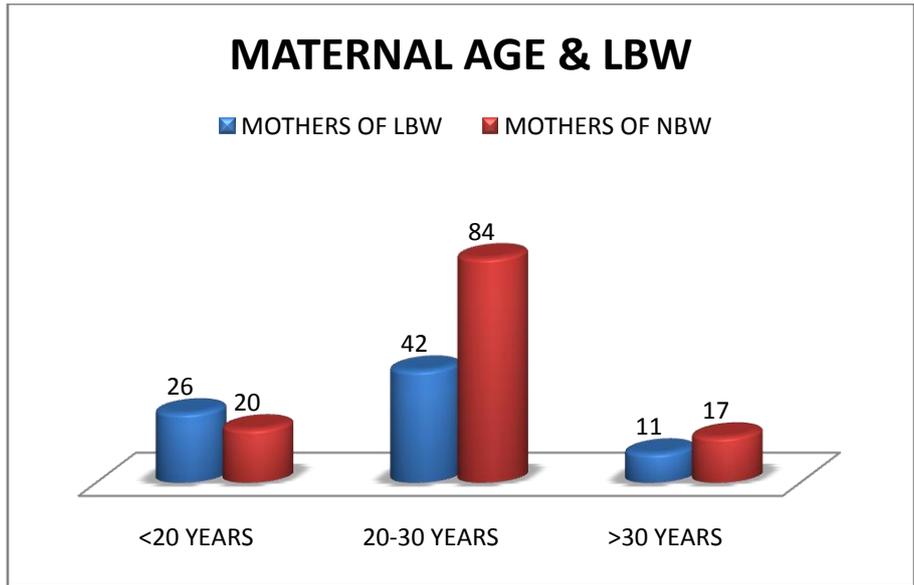
Table 4 – Distribution of LBW and NBW on the basis of weight of mother :

CHARACTE RISTICS	MOTHERS OF LBW	% LBW	MOTHERS OF NBW	%NBW	TOTAL MOTHERS
<45 Kgs	42	52%	38	47%	80
>45 Kgs	37	30%	83	69%	120

Table 5 –association between the weight of mother and LBW (significant)

| CHARACTERI STICS	MOTHERS OF LBW	MOTHERS OF NBW	CHI SQUARE	P VALUE
<45Kgs	42	38	9.4	0.002136
>45Kgs	37	83		

MATERNAL WEIGHT & LBW

■ MOTHERS OF LBW   ■ MOTHERS OF NBW
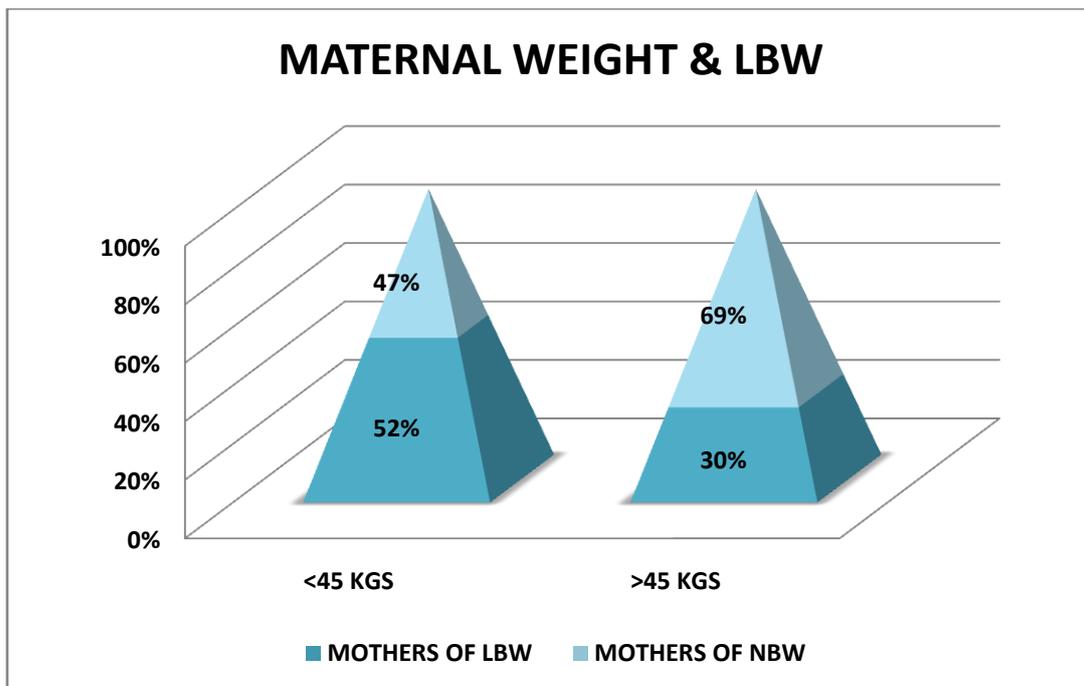
Table 6-distribution of LBW and NBW on the basis of height of mother :

CHARECTERISTICS	MOTHERS OF LBW	%LBW	MOTHERS OF NBW	%NBW	TOTAL MOTHERS
<145CMS	15	53%	13	46%	28
>145CMS	64	37%	108	62%	172

Table 7-Association between maternal height and LBW: (not significant)

CHARACTERISTICS	MOTHERS OF LBW	MOTHERS OF NBW	CHI SQUARE	P VALUE
<145CMS	15	13	2.6	0.1
>145CMS	64	108		
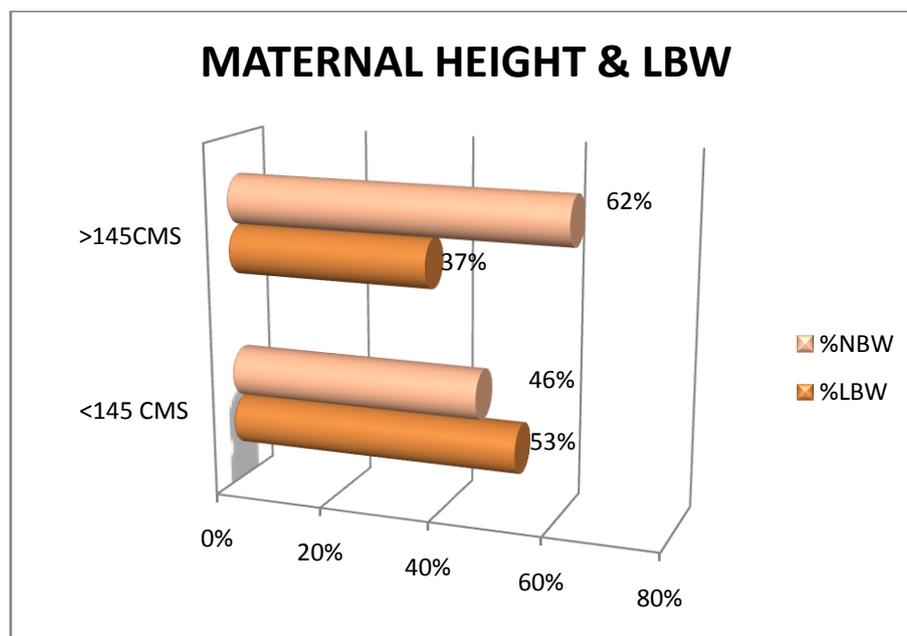
Table 8-Distribution of LBW and NBW on basis of anemia in mothers:

CHARECTERISTICS (ANEMIA)	MOTHERS OF LBW	%LBW	MOTHERS OF NBW	%NBW	TOTAL
PRESENT	59	53%	52	46%	111
ABSENT	20	22%	69	77%	89

Table 9 – Association of LBW with maternal anemia: (significant)

CHARACTERICTIS (ANEMIA)	MOTHERS OF LBW	MOTHERS OF NBW	CHI SQUARE	P VALUE
PRESENT	59	52	19.457	0.00001
ABSENT	20	69		

MOTHERS OF LBW

■ PRESENT
■ ABSENT

25%

75%
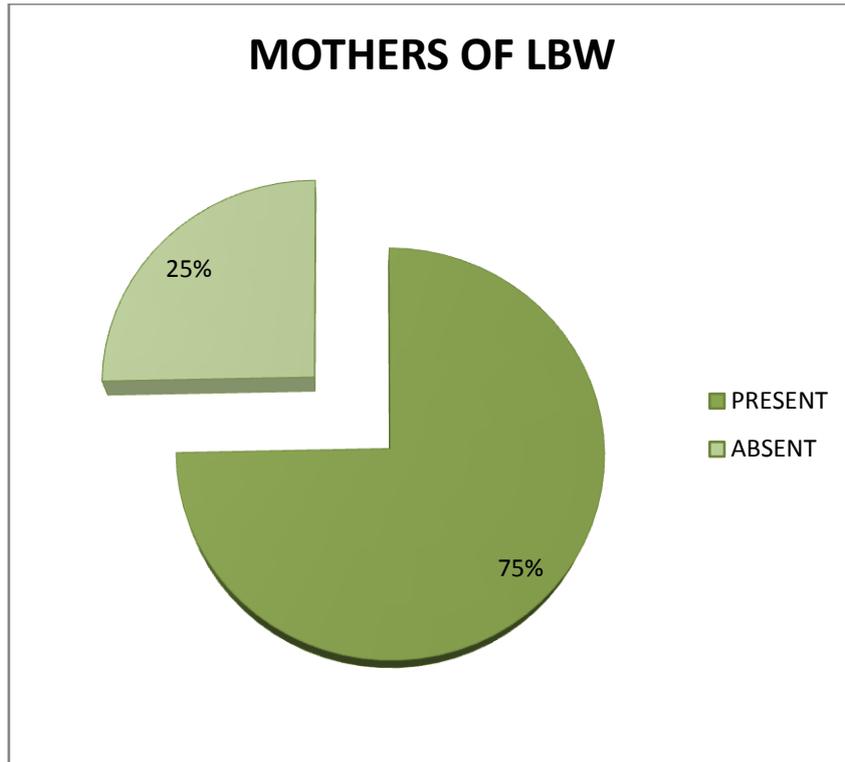
Table 10: distribution of LBW in pregnancy weight gain:

PREGNANCY WEIGHT GAIN	LBW	%LBW	NBW	%NBW	TOTAL
<10 Kgs	68	47%	76	53%	144
>10 Kgs	11	19%	45	80%	56

Table 11: Association of LBW with pregnancy weight gain : (significant)

PREGNANCY WEIGHT GAIN	LBW	NBW	CHI SQUARE	P VALUE
<10 Kgs	68	76	12.8	0.0003
>10 Kgs	11	45		

PREGNANCY WEIGHT GAIN & LBW

■ %LBW   ■ %NBW

47%   53%

19%   80%

<10 KGS   >10 KGS
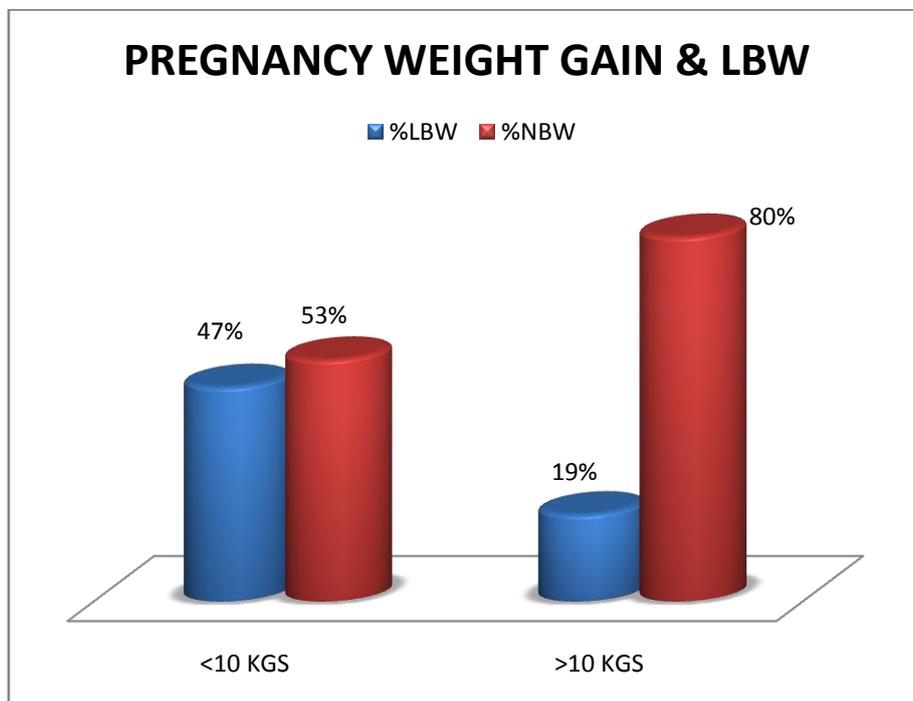
Table no 12: distribution of LBW with number of ANCs :

ANCs	LBW	%LBW	NBW	%NBW	TOTAL
NO	11	40%	16	59%	27
1-2	36	54%	30	45%	66
3-4	32	29%	75	70%	107

Table 13: association of LBW and ANCs (Significant):

ANCs	LBW	NBW	CHI SQUARE	P VALUE
NO	11	16	10.39	0.005
1-2	36	30		
3-4	32	75		
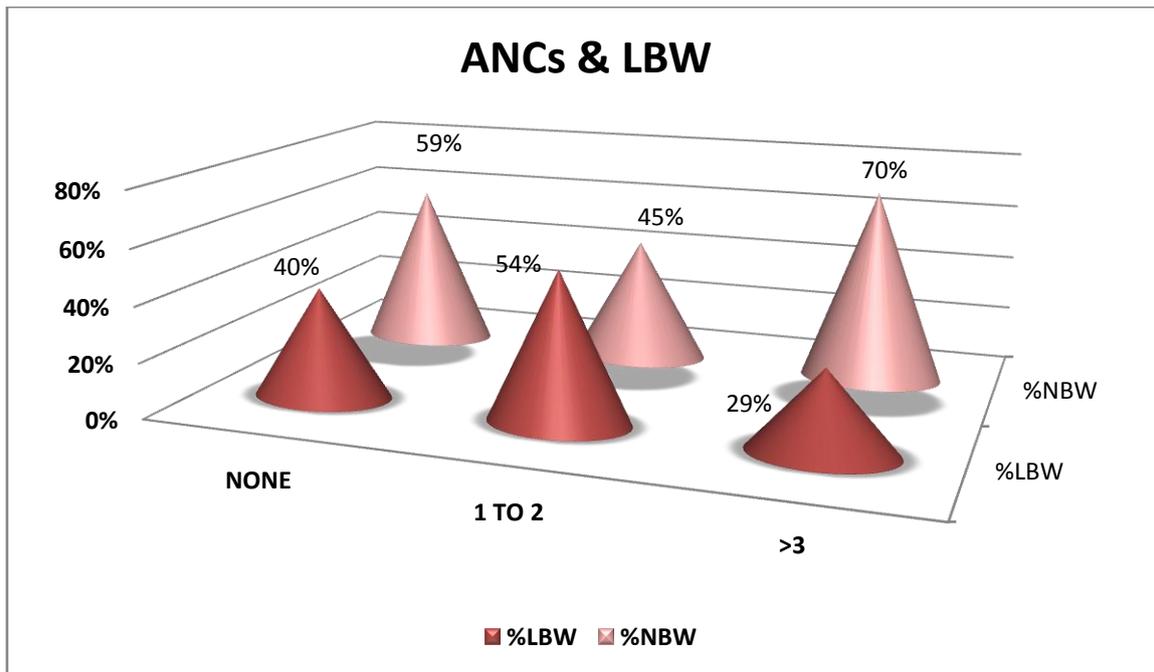
Table 14: Type of pregnancy related complications and LBW:

COMPLIC ATIONS	LBW	%LBW	NBW	%NBW	TOTAL (% TOTAL
NO	43	55%	101	84%	144(72%)
APH	6	8%	4	3%	10(5%)
PROM	7	10%	4	2%	11(5.5%)
HTN/PE	17	21%	7	6%	24(12%)
GDM	6	7%	5	4%	11(5.5%)
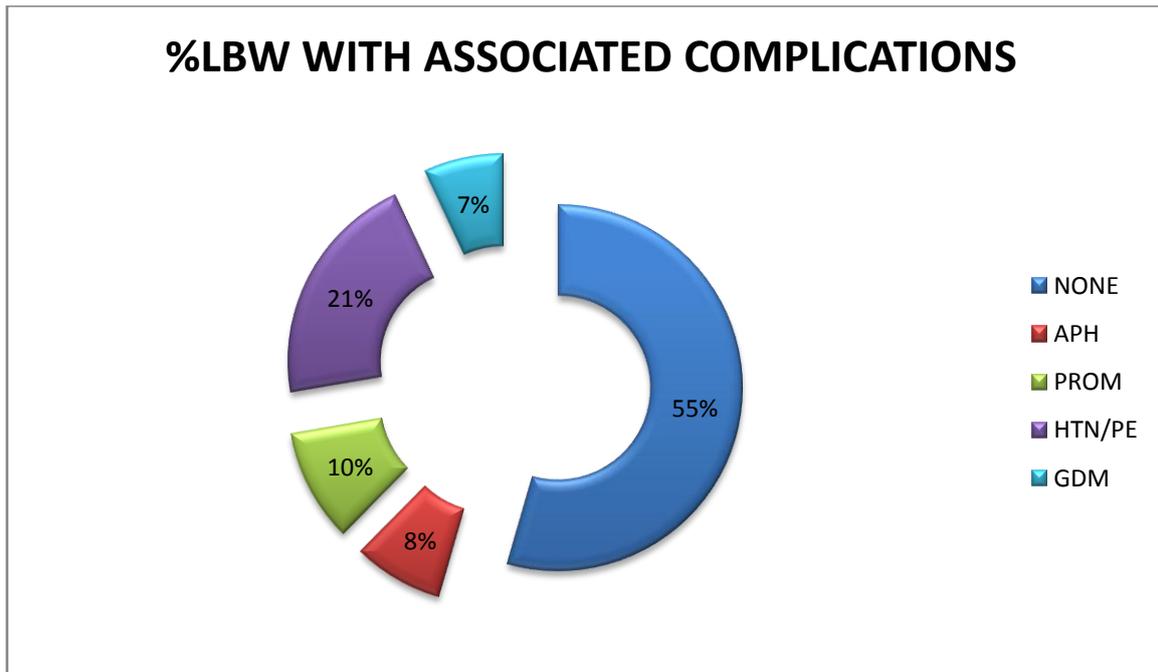
Table 15 : perinatal outcome in LBW:

CHARACTER	NVD	C-SECTION	NICU ADMISSION
LBW(79)	68	11	22
NBW(121)	91	3O	7

V.   ISCUSSION

This study is to assess maternal determinants of term LBW in GVH.

We observed that the relationship between maternal age and birth weight in our finding correlates with the U shaped curved pattern i.e. low birth weight increases in teenage pregnancies then it progressively decreases till 30 years and again increases in >30 years age .

Out of total of 200 mothers 80 had weight of <45 kgs and the proportion of LBW among them was 52% and 30 % of mothers with weight of >45 kgs delivered LBW.

We could-not find any association between maternal height and LBW, but the proportion of LBW was high in mothers with height < 145 cm in comparison to mothers with height >145.

This study also revealed that mothers who did not follow ANC were three times more likely to have low birth weight baby than mothers who have 3–4 ANC follow ups.

From the table 8 and 9 it is clearly understood that mothers with anaemia(53%) gave birth to more number of LBW babies in comparison to those without anaemia(22%).

Pregnancy weight gain <10 kgs is another significant factor of LBW in our study.

46% of cases (LBW) and 16% of controls had pregnancy related complications . Of them hypertensive disorders account for 21% of LBW and 6% of NBW. Gestational diabetes accounts for 6% of LBW and 4% of NBW.

 Of the total newborns, NICU admissions were 36% of LBW and 6% among the NBW

VI. CONCLUSION:

The study suggests that inadequate ANC follow-up, maternal age, weight, height, pregnancy weight gain, and maternal anemia, hypertension, diabetes were significant predictors of low birth weight. Perinatal morbidity and mortality was comparatively more in LBW.

Almost all the factors identified in our study are modifiable and thus preventable with good antenatal care.Health professionals should screen and counsel pregnant mothers who are at risk of having infants with LBW and ensure that women have access to essential health information on the causes of low birth weight.

Nutritional education to improve the weight gain during pregnancy, and prevention and proper management of chronic medical illness also has a major role for decreasing incidence of LBW.

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