

**MATERNAL AND NUTRITIONAL DETERMINANTS OF LBW : A
HOSPITAL BASED STUDY IN SCCL MAIN HOSPITAL
KOTHAGUDEM**

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ABSTRACT

Back ground: This is a prospective study aimed to assess the incidence and associated maternal risk factors of low birth weight among newborn babies born in SCCL main hospital, Kothagudem, Telangana. **Method:** The present study was a prospective observational study. It was conducted for a period of 6 months from Jan 2018 to June 2018. A suitable data collection form was designed for study. As per the inclusion and exclusion criteria, the following data was collected from data sources. The collected data was compiled in Microsoft office access 2010 format. The data was analyzed using graph pad prism version 5.0. **Results:** A total of two hundred and fifty

(250) patients were studied. Data collection was done through a designed data collection form consisting of demographic characters, educational level Antenatal Data, Neonatal data. The results of the study showed that the Incidence of Low birth weight (LBW) was found to be 15%. Out of 250 cases 212 cases (85%) accounted for Normal Birth Weight (NBW), weighing more than >2,500 grams 38 cases were found to be Low Birth Weight (LBW) accounting for 15%, weighing below <2,500. Male and female neonates percentage was found to be 34.2%(13 cases) and 65.7%(25 cases)4 respectively. Mother's Mean Hb% in LBW and NBW was 10.32 ±1.06, 10.48 ± 1.57 respectively. Mean birth space was 2.66 ± 2.16, 4.0 ± 2.73 in LBW and NBW respectively. Mean gestational weeks was 35.63 ± 2.66

and 36.50 ± 3.028 in LBW and NBW respectively. Mean birth weight was 2.02 ± 0.304 , 3.2 ± 0.41 in LBW and NBW respectively. **Conclusion:** It was concluded that there is a relationship between maternal height, Gravida, Consanguinity, Mode of delivery, Gender of baby, Haemoglobin %, H/O previous abortions and H/O present illness with Low Birth Weight. In order to reduce LBW there should be better education regarding the care to be taken for pregnant women.

KEYWORDS: Low Birth Weight, Maternal Risk Factors, Illness At Pregnancy.

INTRODUCTION

Birth weight is a strong predictor of maternal and new-born health and nutrition. Birth weight is the first weight of the new-born babies obtained after birth. For live births, birth weight ideally measured within the first hour of life, before there is a significant postnatal weight loss has occurred. The birth weight of an infant is the associated and most important determinant of the baby survival, illness, growth and development. According to the World Health Organization (WHO), low birth weight (LBW) is defined as an infant birth weight of less than 2,500 g, irrespective of the gestational age. World health organization estimates that 20 million (15.5%) LBW babies are born annually worldwide and 95% occur in developing countries and 7% in developed regions of the world. There is significant variation across the main geographic regions on low birth weight. there is a considerable variation of low birth weight ranging from 6% to 18% across the main geographic regions. Among these there is a highest incidence of low birth weight in sub region of South –central Asian 27%.there is a considerable variation in incidence which much lower within sub regions of Asia.^[1] Low birth weight babies are grouped based on Birth weight, Weeks of gestation, Intrauterine growth retardation.^[2,3,4] LBW is caused by premature birth, intra uterine growth restriction or both. The separation of these two conditions is a bit of complicated in low birth weight case.^[9] The risk factors include demographic characteristics, clinical risks that can be diagnosed before being pregnant and those that may only be diagnosed at some point of pregnancy, behavioural and environmental factors, risks associated with health care (together with insufficient prenatal care), and a separate group of things whose relationship to low birth weight is more tenuous, together with stress, uterine irritability, and insufficient plasma volume expansion.^[10]

The purpose of the study is to find the incidence of LBW, to explore associated risk factors of LBW babies.

METHODS

The present study was a prospective observational study. This study was conducted in the department of gynaecology and Obstetrics; Singareni Collieries Company Limited Main Hospital, Kothagudem. The study was conducted for a period of 6 months from Jan 2018 to June 2018. Inclusion criteria involved all live born babies during study period and Singleton babies. Exclusion criteria involved IUD babies and Still born babies.

Patient data was collected from Patient case sheet, Patient interview, antenatal reports. A suitable data collection form was designed for study. As per the inclusion and exclusion criteria, the following data was collected from data sources. Mother's Demographic Details, Mother's dietary habits, Antenatal Data, Neonatal data The collected data was compiled in Microsoft office access 2010 format. The data was analysed using graph pad prism version 5.0.

RESULTS

A total of 250 pregnant women were studied during the study period. Out of 250, 212 (85%) mothers delivered babies with Normal Birth Weight (NBW), 38 (15%) mothers delivered Low Birth Weight (LBW).

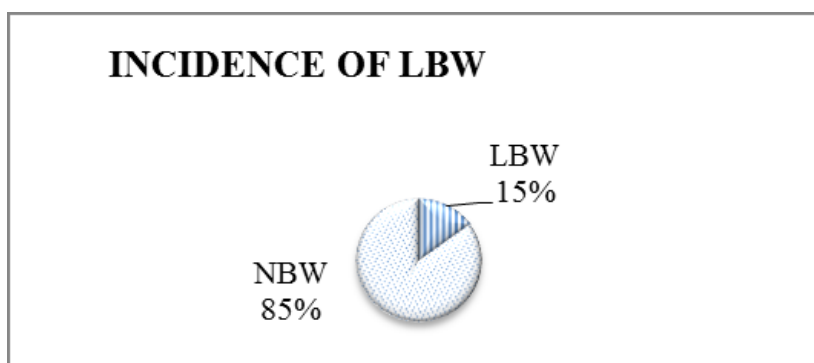


Fig-1: Represents Incidence of LBW.

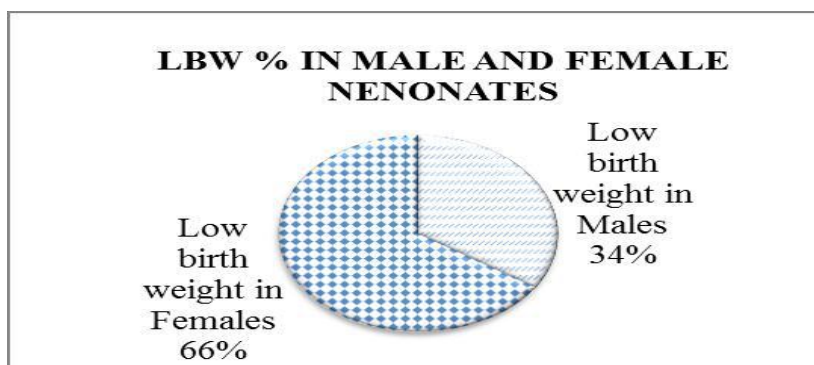


Fig. 2: Represents percentage of LBW in male and female neonate.

Various Maternal Health Parameters and Birth Weight

Table. 3: Various Maternal Health Parameters And Birth Weight.

Variabels	Sub Groups	Birth Weight		Odds Ratio (95% CI)	Significance
		LBW	NBW		
Haemoglobin %	<10g%	14(36.8)	89(41.9)	--	X ² =6.96 P=0.03*
	10.1g%-11.0g%	18(47.3)	58(27.3)	1.97(0.91-4.27)	
	11.1g%-14g%	6(15.7)	65(30.6)	0.58(0.21-1.6)	
H/O of Previous Abortions	0	22(57.8)	167(78.7)	--	X ² =7.66 P=0.02*
	1	11(28.9)	32(15.9)	2.609(1.153-5.906)	
	2	5(13.1)	13(6.1)	2.920(0.9494-8.979)	
H/O of Present Illness	PIH	13(34.2)	17(8.0)	4.28(1.59-11.49)	X ² = 15.84 P=0.04*
	GDM	4(10.5)	4(1.8)	5.6(1.19-26.15)	
	ANEMIA	1(2.6)	1(0.47)	5.6(0.32-97.10)	
	FEVER	1(2.6)	1(0.47)	5.6(0.32-97.10)	
	HYPERTHYROIDISM	0(0)	2(0.9)	1.07(0.04-24.08)	
	HYPOTHYROIDISM	10(26.3)	56(26.4)	--	
	UTI	2(5.2)	5(2.3)	2.24(0.38-13.19)	
	VOMITING	0(0)	4(1.8)	0.59(0.02-11.96)	
	TYPHOID	0(0)	3(1.4)	0.76(0.03-16.01)	

HAEMOGLOBIN %

Haemoglobin % was divided into 3 categories (Fig-12)

1. <10g% 2.10.1g%-11.0g% 3.11.1g%-14g% Significant low birth weight was seen more among Hb% 10.1g%-11.0 g% (P=0.03*) (Table -3). Hb%-10.1g%-11.0g% (OR = 1.97, 95% CI=0.91-4.27), 11.1g%-14g% (OR = 0.58, 95% CI = 0.21-1.6) compared to <10g% of Hb%.

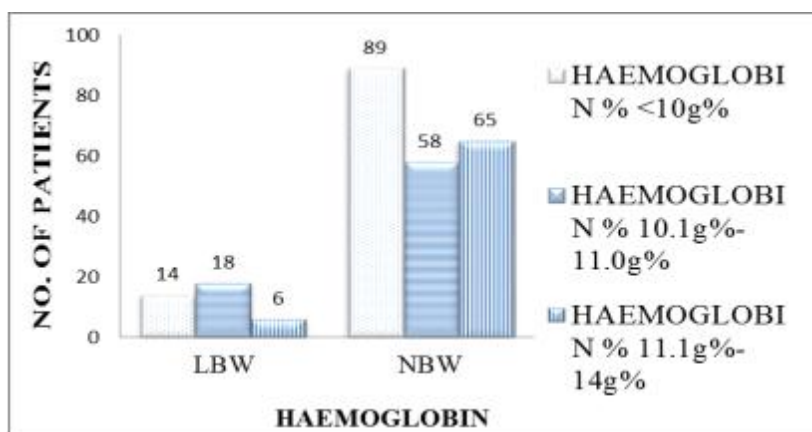


Fig. 12: Incidence of LBW in relation with maternal haemoglobin level.

H/O Previous Abortions: Significant NBW were seen in mothers with no history of abortions (p=0.02*) (Table -3) history of previous Abortions categorized into 0, 1, 2(Fig -13). Abortions of 1- (OR = 2.609, 95% CI = 1.153-5.906), 2-(OR = 2.920, 95% CI = 0.9494-8.979) compared to zero abortions of previous history.

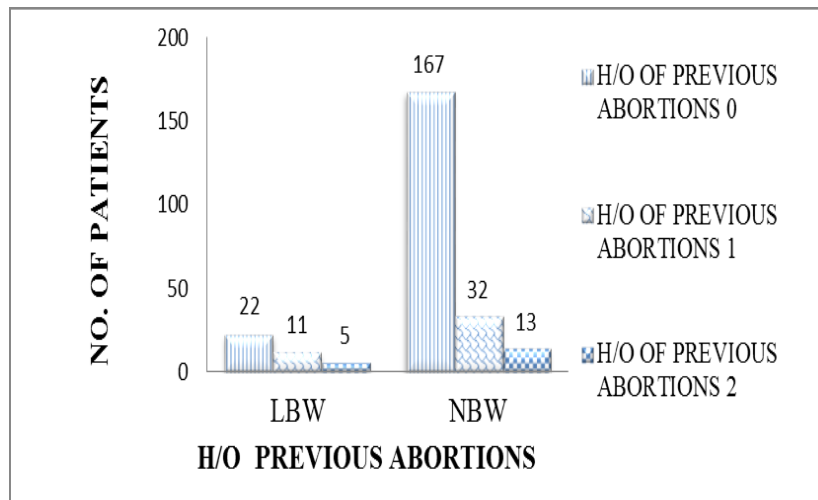


Fig. 13: Incidence of LBW in relation with previous abortions.

H/O Present Illness

It was categorised into PIH/ GDM/ Hyperthyroidism /Hypo thyroidism / UTI/ Anemia /Fever/Vomiting/Typhoid (Fig -14). Among the mothers who have delivered LBW babies had PIH (34.2%), GDM (10.5%), Hypo thyroidism (26.3%), UTI (5.2%), anemia (2.6%), fever (2.6%) (P=0.04*) (Table -3). H/O present illness PIH (OR = 4.28, 95% CI = 1.59-11.49), GDM (OR =5.6, 95% CI = 1.19-26.15), Anemia (OR = 5.6, 95% CI = 0.32-97.10),Fever (OR = 5.6, 95% CI =0.032-97.10), Hyperthyroidism (OR = 1.07, 95% CI =0.04-24.08), UTI (OR =2.24, 95% CI = 0.38-13.19), Vomiting (OR =0.59, 95% CI = 0.02-11.96), Typhoid (OR = 0.76, 95% CI = 0.03-16.01) compared to Hypo thyroidism.

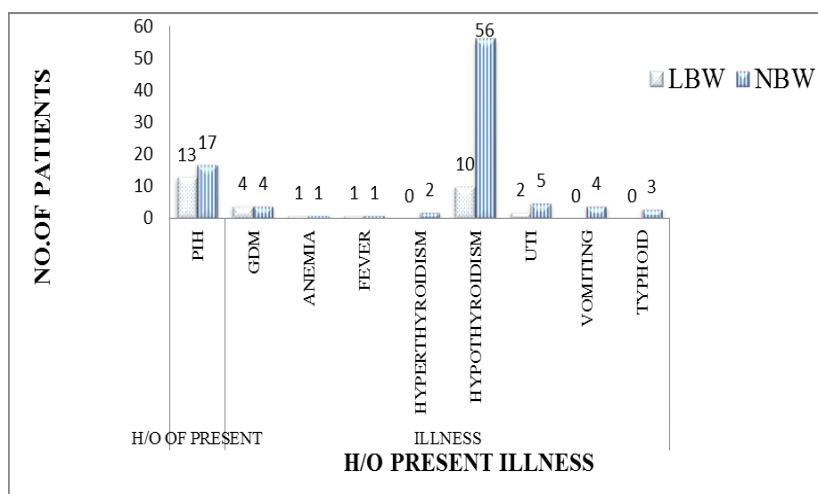


Fig. 14: Incidence of LBW babies among mothers with varied maternal risk factors.

Nutritional Factors

Variables	Sub Groups	Birth Weight		Odds Ratio (95% CI)	Significance
		LBW	NBW		
DIET	Mixed	35(92.1)	189(89.1)	--	$X^2=0.96$ P=0.32
	Vegetarians	3(8.5)	29(13.6)	0.55(0.16-1.93)	
MILK INTAKE	Daily	27(71)	149(70.2)	--	$X^2=3.50$ P=0.47
	Intermittent	1(2.6)	18(8.4)	0.30(0.039-2.39)	
	Irregular	1(2.6)	1(0.4)	5.51(0.33-90.99)	
	Not taken	2(5.2)	10(4.7)	1.10(0.22-5.32)	
	Weekly	7(18.4)	33(15.5)	1.17(0.46-2.91)	
EGG	Daily	24(63.1)	119(56.1)	--	$X^2=3.11$ P=0.52
	Intermittent	4(10.5)	27(12.7)	0.73(0.23-2.29)	
	Irregular	0(0)	3(1.41)	0.69(0.034-13.93)	
	Not taken	1(2.6)	21(9.9)	0.23(0.03-1.84)	
	Weekly	9(23.6)	42(19.8)	1.06(0.45-2.46)	
IRON INTAKE	No	2(5.2)	6(2.8)	1.90(0.37-9.82)	$X^2=0.61$ P=0.43
	Yes	36(94.7)	206(97.1)	--	
CALCIUM INTAKE	No	3(7.8)	14(6.6)	1.21(0.33-4.43)	$X^2=0.08$ P=0.77
	Yes	35(92.1)	198(93.3)	--	

DIET: Diet divided into two categories mixed and vegetarian (Fig-15). In our study, mothers who had mixed diet gave birth to high percentage of NBW neonates (89.1%) (OR =0.55, 95% CI =0.16-1.93p=0.32) (Table -4).

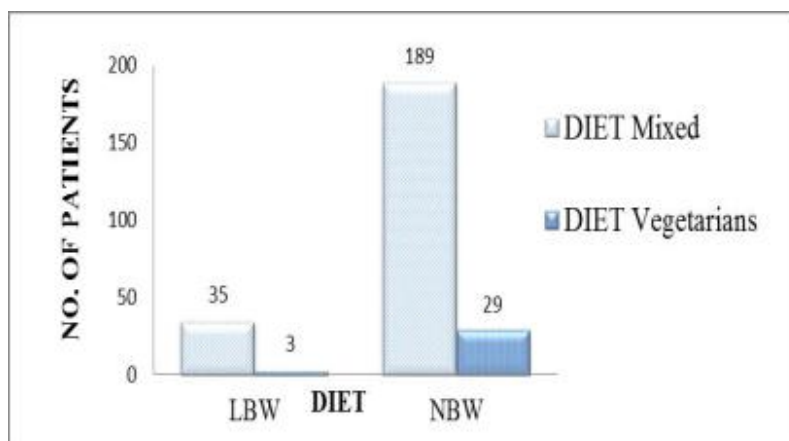


Fig. 15: LBW association with maternal diet.

MILK

It was categorized into

1. Daily
2. Intermittent
3. Irregular
4. Not taken
5. Weekly

Higher incidence of NBW was seen in mothers who had daily milk intake (70.2%) (p=0.47) (Table -4). Milk intake -Intermittent (OR = 0.30,95% CI = 0.039-2.39), Irregular (OR =

5.51,95% CI = 0.33-90.99), Not taken (OR = 1.10,95% CI = 0.22-5.32), Weekly (OR = 1.17,95% CI = 0.46-2.91) compared to daily milk intake.

EGG: It was categorised into

1. Daily 2. Irregular 3. Intermittent 4. Not taken 5. weekly

Weekly Daily egg intake resulted in lower incidence of LBW and increase percentage of NBW (56.1%) (p=0.52) (Table -4). egg intake Intermittent (OR = 0.73,95% CI = 0.23-2.29), Irregular (OR = 0.69,95% CI = 0.034-13.93), Not taken (OR = 0.23,95% CI = 0.03-1.84) Weekly (OR = 1.06,95% CI = 0.45-2.46) compared to daily intake of egg.

Iron Intake: Mothers with regular iron intake gave birth to higher incidence of NBW babies (97.1%) (OR =1.90, 95% CI = 0.37-9.82, p=0.43) (Table-4).

Calcium Intake: High incidence of NBW was observed in mothers taking calcium supplements (93.9%). (OR =1.21, 95% CI = 0.33-4.43 p=0.77) (Table -4).

Mean and Standard Deviation

Table. 6: Association with Birth Weight Factors mean And Standard Deviation.

Variabels	Lbw	Nbw
Mean Hb (g %)	10.32 ±1.06	10.48±1.57
Mean Gestational Weeks	35.63 ±2.66	36.50 ±3.028
Mean Birth Weight	2.02 ±0.304	3.2 ±0.41

Mean Hb% in LBW and NBW was 10.32 ±1.06, 10.48 ± 1.57 respectively. Mean gestational weeks was 35.63 ± 2.66 and 36.50 ± 3.028 in LBW and NBW respectively. Mean birth weight was 2.02 ± 0.304, 3.2 ± 0.41 in LBW and NBW respectively.

DISCUSSION

The present prospective study was undertaken to estimate the incidence and determine the factors responsible for LBW. Incidence of Low birth weight (LBW) in this study was found to be 15%. In this study incidence of LBW with history of maternal abortion was found to be statistically significant (P=0.02**). It is found that Mother's having single history of abortion are having more than two fold risk of delivering a LBW baby than a mother with no history of abortions (OR=2.609, 95% of CI: 1.153-5.906). The results of our study are in contrary to the results obtained by S.Ganesh Kumar et.al^[11], Johnson AR et.al.^[12] and Margaret T. Mandelson et.al where these two studies found no association between history of having abortion and LBW.^[13] Our study found a significant association between LBW and

Haemoglobin (P=0.03*). This result is in accordance with studies conducted by S Ganesh Kumar et.al.^[11] and Bonti Bora et.al.^[14] There is a significant association between maternal risk factors like PIH/ GDM/ Hyperthyroidism /Hypo thyroidism / UTI/ Anemia /Fever and LBW(P=0.04*) value was found to be significant. Similar results were seen in various studies.^[15,16,17]

In our study the mean birth space is 2.66 ± 2.16 years for LBW and for NBW is 4.0 ± 2.73 years. There is no significance association between birth space and LBW. Similar results were observed in the study conducted by Madhur Borah et.al.^[18] Significant association was found between mode of delivery and LBW. Higher NBW neonates were seen among mothers with normal vaginal delivery (92.1%, OR= 0.2706, 95% of CI: 0.079-0.91, p=0.02*). In contrast to study done by Modesta Mitao et.al. Caesarean section delivery (RR 1.4; 95% CI 1.3–1.5) significantly associated with delivery of low birth weight infants.^[19] More than 50% of the low birth weight babies born were female (65.7%) and had significant association between gender of baby and birth weight (P=0.03* OR=2.195, 95% of CI: 1.066-4.521). Two studies concluded that female infant had higher risk of having LBW infant compared with male infant.^[20,21] In contrast a study done by Anshumali Jyotishi et.al. Showed that there is a better correlation among low birth weight males as compared to females and normal weight.^[22]

CONCLUSION

This prospective study was conducted to determine the impact of various maternal and nutritional determinate on the incidence of low birth neonates. There was a remarkable relation between Haemoglobin %, H/O previous abortions and H/O present illness with Low Birth Weight. There is a need for us to educate the pregnant women on importance of compliance of antenatal visits where such medical illness can be treated or controlled. Further both the partners should be educated regarding the care to be taken along the care to be provided to the pregnant women. Hence there is need for strengthen the existing maternal services at the basic level of community health services.

Recommendations

✓ A further study on the large population is needed as to detect in depth association of factors along with multi centric.

- ✓ An adequate knowledge providing programs are to be taken for pregnant women in bringing awareness of the use of medicine, intake of food, going for check-ups regularly, along with the monthly changes of the baby and precautions taken by the mother.
- ✓ Both the partners are counselled on contraceptive methods, birth spacing, and infections at pregnancy along with complications with the care to be provided.
- ✓ Teenage counselling done both to parents along with child regarding marriage age.

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Conflict of Interest: None declared.

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