



INCIDENCE AND ASSOCIATED SOCIODEMOGRAPHIC AND FETOMATERNAL FACTORS OF LOW BIRTH WEIGHT (LBW) AMONG NEWBORN BABIES BORN IN SCCL MAIN HOSPITAL KOTHAGUDEM

*Sam David K, Ramisetty Neeharika, P Srujana, M.Nagaraju

K.L.R Pharmacy college, Palwancha, Bhadradi District, Telangana, India.

ABSTRACT

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. 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. 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, monthly income, occupation, 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 (accounting for 85%) were Normal Birth Weight (NBW), weighing more than >2,500 grams. 38 cases were Low Birth Weight (LBW) accounting for 15%, weighing below <2,500. Male and female neonates percentage was found to be 13(34.2%) and 25 (65.7%) respectively. Mother's Mean age of LBW and NBW babies was found to be 25.72 ± 5.99 and 27.00 ± 4.74 respectively. Mother's mean height among LBW and NBW neonates was 5.15 ± 0.24 and 5.18 ± 0.52 respectively. Mean birth weight was 2.02 ± 0.304 , 3.2 ± 0.41 in LBW and NBW respectively. It was concluded that there is a relationship between maternal height, Gravida, Consanguinity, Mode of delivery, Gender of baby, with Low Birth Weight. In order to reduce LBW there should be better education regarding the care to be taken for pregnant women.

Key Words:- low birth weight, maternal risk factors, illness at pregnancy.

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Corresponding Author

Sam David K

K.L.R Pharmacy college, Palwancha, Bhadradi District, Telangana, India.

Email:- prince.sam1178@gmail.com

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 (UNICEF and WHO, 2004). Low birth weight babies are grouped based on Birth weight, Weeks of gestation, Intrauterine growth retardation (Cut L *et al.*, 2017; Quinn *et al.*, 2016; Norris T *et al.*, 2015). 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 (Bhimwal RK *et al.*, 2012). 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 (Anonyms 1).

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 were all live born babies during study periods and singleton babies. Exclusion criteria included 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, educational level, monthly income ,occupation ,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).

AGE

Maternal age is divided into 3 groups : <20 years, 20-29 years and >30 years. (Fig: 3). Maternal age does not have any significance with Low Birth Weight in

our study ($p=0.76$). (Table: 1) Among LBW neonates, higher frequency was found in mothers aged 21-30 years (81.6%). Incidence of NBW was higher among mothers aged 21-30 followed by age < 20 years (OR=1.548, 95% of CI: 0.48-4.97), 31-40 (OR=1.025, 95% of CI: 0.28-3.70).

HEIGHT

Maternal height is divided into 2 groups Viz. above 5 and below 5 feet. (Fig: 4) In our study height has a significant association with low birth weight ($P<0.001$). (Table: 1) Mothers with height above 5 feet delivered NBW babies that is statistically significant and on other side mothers with height below 5 feet delivered LBW babies which was not found significant (OR=6.242, 95% of CI: 2.55-15.23) (Table-1).

BMI (BODY MASS INDEX):

BMI is divided into 4 groups (Table: 1)

1) <18.5 2) 18.6-25 3) 26-30 4) >30

More NBW were seen in mothers with normal BMI ($P=0.09$) (Table: 1). Mothers with BMI <18.5 (OR= 1.68, 95% CI =0.81-3.45), 26-30 (OR= 0.26, 95% CI =0.03-2.06), > 30 (OR= 0.35, 95% CI = 0.01-6.32) has lower NBW as compared to mothers with BMI 18.6-25.

EDUCATION

Mother's education was classified into primary, secondary and higher education. (Fig: 5). Higher Incidence of NBW was seen in mothers with higher education ($P=0.73$) (Table: 1). Mothers with primary education (OR= 2.06, 95% CI = 0.08-52.09), secondary education (OR= 1.468, 95% CI = 0.71-3.02) had lower incidence of NBW as compared to mothers with higher education.

OCCUPATION

Mothers occupation was divided into employed and housewife (OR=0.81, 95% CI = 0.33-1.97, $P=0.64$) .higher incidence of LBW was found in housewives while compared to employed mothers.

RELIGION

Religion was classified into 4 groups Viz. Hindu, Muslim, Christian and others (Fig – 6). The Incidence of NBW was found greater among Hindu community. However religion did not have any significance in this study ($P=0.27$) (Table: 1). Mothers who are Christians (OR=1.21, 95% CI = 0.54-2.68), Muslim (OR= 2.08, 95% CI = 0.74-5.84), others (OR=6.6, 95% CI = 0.39-109.9) have lower NBW incidence as compared to mothers who are Hindu's.

INCOME

Income was classified into three categories

- Low 5000-20000

- Medium 20000-50000
- High 50000-200000

Incidence of LBW was found more (57.8%) in low income group (5000-20000) (Fig – 7). No significance between income and low birth weight was found in this study P=0.05. Low income (OR=1.76, 95% CI = 0.86-3.61), high income (OR= 0.24, 95% CI = 0.03-1.97) as compared Medium income.

FAMILY TYPE

Family type was divided into two categories- Joint family and Nuclear family (Fig – 8). Incidence of LBW was found greater in Joint families (57.8%) as compared to nuclear families (OR=1.63, 95% CI = 0.81-3.27, P=0.16). Average number of family members in mothers delivering LBW babies is found to be 6.2(±3.15).

FETO- MATERNAL FACTORS AND BIRTH WEIGHT PARITY

Parity was classified into two groups as Primipara and Multipara with sub groups of 1 for primiparous and 2&3 for multipara. Higher incidence of LBW seen in Primipara mothers (P=0.17) (Table: 2) .Multi para -2 (OR = 0.80, 95% CI =0.389-1.65) and 3-(OR = 495%CI=0.86-18.4) as compared to primi parous.

CONSANGUINITY

Women who have consanguineous marriage were more likely to have low birth weight neonates than those who have non consanguineous marriage (OR = 3.538, 95% CI = 1.67-7.48 P=0.0006***) (Table: 2).

SOCIO-DEMOGRAPHIC FACTORS

Table 1. Socio-demographic factors of study mothers and birth weight of their babies

Variabels	Sub groups	Birth weight		Odds Ratio (95% CI)	Significance
		LBW (%) N=38	NBW (%) N=212		
Age(years)	<20	4(10.5)	15(7.1)	1.548 (0.48-4.97)	X ² = 0.54 P=0.76
	21-30	31(81.6)	180(84.9)	--	
	31-40	3(7.8)	17(8.0)	1.025 (0.28-3.70)	
Height(feet)	<5	12(31.5)	11(5.1)	6.242 (2.55- 5.23)	X ² = 26.87 P= <0.0001 ***
	>5	26(68.4)	201(94.8)	--	
BMI	<18.5	16(42.1)	58(27.3)	1.681(0.81-3.457)	X ² =6.29 P=0.09
	18.6-25	21(55.2)	128(60.3)	--	
	26-30	1(2.6)	23(10.8)	0.2650 (0.033-2.06)	
	>30	0(0)	8(3.8)	0.3516 (0.019-6.32)	
Education	PRIMARY	0(0)	1(0.47)	2.061(0.081-52.09)	X ² =0.6273 P=0.73
	SECONDARY	14(36.8)	60(28.3)	1.468 (0.71-3.02)	
	HIGHER EDUCATION	24(63.2)	151(71.2)	--	
Occupation	EMPLOYED	7(18.4)	46(21.6)	0.8149 (0.331-97)	X ² =0.20 P=0.64
	HOUSEWIFE	31(81.5)	166(78.3)	--	
	CHRISTIANS	11(28.9)	60(28.)	1.21 (0.54-2.68)	X ² =3.87

GRAVIDA

Gravida was divided into 2 sub divisions - Primigravida and multigravida (Fig-9). The incidence of LBW was found more in primigravida mothers (34.2%) compared to multigravida mothers (p=0.01**) (Table: 2). Multi gravida -2 (OR = 0.9336, 95% CI = 0.4037-2.159), 3-(OR = 2.597, 95% CI = 1.050-6.425), 4-(OR = 0.51, 95% CI = 0.0271-0.584), 5-(OR = 33.15, 95% CI = 1.507-728.9) compared to primi gravida.

MODE OF DELIVERY

Deliveries were divided into two groups caesarean section and normal vaginal delivery. Significant LBW babies were seen in mothers who had caesarean section delivery (OR =0.2706, 95% CI = 0.079-0.91,P=0.02*)(Table:2).

GENDER OF BABY

Baby gender is divided as male and female (Fig – 11). LBW was found higher among female babies and was found significant (OR = 2.195, 95% CI = 1.066-4.521, P=0.03*) (Table: 2).

Mother’s Mean age of LBW babies was found to be 25.72 ± 5.99 and NBW was 27.00 ±4.74. Mother’s mean height among LBW and NBW neonates was 5.15 ± 0.24 and 5.18 ± 0.52 respectively. Mean income in LBW and NBW was found to be Rs. 30273 ± 24030 and 52080 ± 40548 respectively. 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.

Religion	HINDU	20(52.6)	132(62.2)	--	P=0.27
	MUSLIM	6(15.7)	19(8.9)	2.084 (0.74-5.84)	
	OTHERS	1(2.6)	1(0.4)	6.6(0.39-109.9)	
Income	(Low) 5000-20000	22(57.8)	84(39.6)	1.763(0.86-3.61)	X ² =5.93 P=0.05
	(Medium) 20000-50000	15(39.4)	101(47.6)	--	
	(High) 50000-200000	1(2.6)	27(12.7)	0.24(0.03-1.97)	
Family type	JOINT	22(57.8)	97(45.7)	1.63(0.81-3.27)	X ² =1.90 P=0.16
	NUCLEAR	16(42.1)	115(54.2)	--	

FETO- MATERNAL FACTORS AND BIRTH WEIGHT

Table 2. Feto-Maternal Factors and Birth Weight

Variables	Sub groups	Birth weight		Odds Ratio (95% CI)	Significance
		LBW	NBW		
Parity	Primi para	20(52.6)	107(50.47)	--	X ² =3.53 P=0.17
	Multi para2	15(39.4)	100(47.1)	0.80 (0.389-1.65)	
	3	3(7.89)	5(2.35)	4(0.86-18.4)	
Consanguinity	No	23(60.5)	179(84.4)	--	X ² =11.87 P=0.0006***
	Yes	15(39.4)	33(15.5)	3.538(1.67-7.48)	
Gravida	Primi gravida 1	13(34.2)	89(41.9)	--	X ² =18.20 P=0.001**
	Multi gravida 2	12(31.5)	88(41.5)	0.9336(0.4037-2.159)	
	3	11(28.9)	29(13.6)	2.597(1.050-6.425)	
	4	0(0)	6(2.8)	0.5100(0.0271-0.584)	
	5	2(5.2)	0(0)	33.15(1.507-728.9)	
Mode of delivery	Caesarean	35(92.1)	161(75)	--	X ² =4.97 P=0.02*
	Vaginal	3(7.8)	51(24.0)	0.2706(0.079-0.91)	
Gender of baby	Female	25(65.7)	99(46.6)	--	X ² =4.69 P=0.03*
	Male	13(34.2)	113(53.3)	2.195(1.066-4.521)	
Variables	Sub groups	Birth weight		Odds Ratio (95% CI)	Significance
		LBW	NBW		
Parity	Primi para	20(52.6)	107(50.47)	--	X ² =3.53 P=0.17
	Multi para2	15(39.4)	100(47.1)	0.80 (0.389-1.65)	
	3	3(7.89)	5(2.35)	4(0.86-18.4)	
Consanguinity	No	23(60.5)	179(84.4)	--	X ² =11.87 P=0.0006***
	Yes	15(39.4)	33(15.5)	3.538(1.67-7.48)	
Gravida	Primi gravida 1	13(34.2)	89(41.9)	--	X ² =18.20 P=0.001**
	Multi gravida 2	12(31.5)	88(41.5)	0.9336(0.4037-2.159)	
	3	11(28.9)	29(13.6)	2.597(1.050-6.425)	
	4	0(0)	6(2.8)	0.5100(0.0271-0.584)	
	5	2(5.2)	0(0)	33.15(1.507-728.9)	
Mode of delivery	Caesarean	35(92.1)	161(75)	--	X ² =4.97 P=0.02*
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Gender of baby	Female	25(65.7)	99(46.6)	--	X ² =4.69 P=0.03*
	Male	13(34.2)	113(53.3)	2.195(1.066-4.521)	

Mean and Standard Deviation

Table 6. Association with Birth Weight Factors Mean and Standard Deviation

VARIABLES	LBW	NBW
Mean age	27.00 ±4.74	25.72 ±5.99
Mean no.of family members	6.2 ±3.15	6.44 ±3.64

Mean income	30273 ±24030	52080 ±40548
Mean height	5.15 ±0.24	5.18 ±0.52
Mean birth weight	2.02 ±0.304	3.2 ±0.41

Fig 1. Represents Incidence of LBW

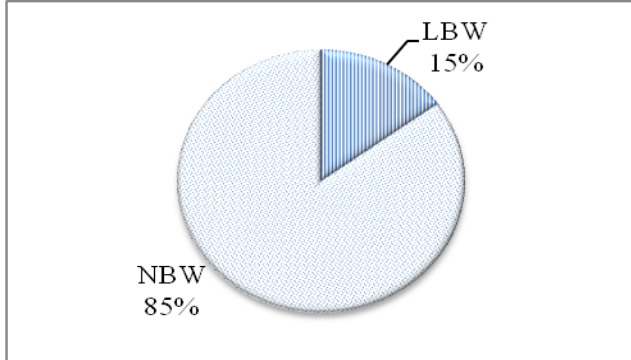


Fig 2 Represents percentage of LBW in male and female neonate

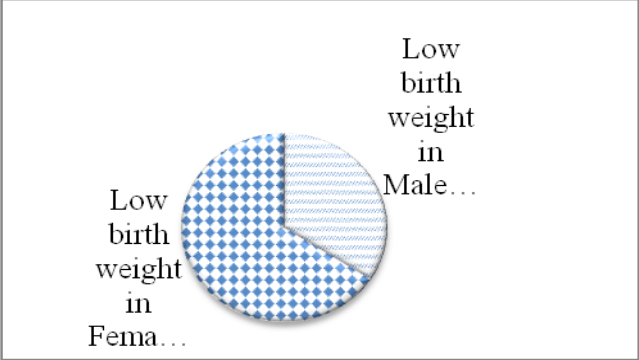


Fig 3. Incidence of LBW among mothers of different age group

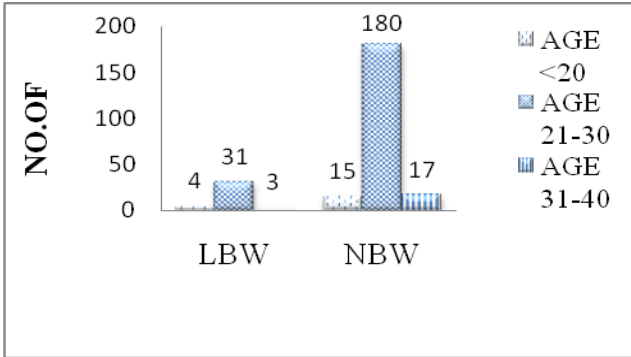


Fig 4. Incidence of LBW among mothers of different height

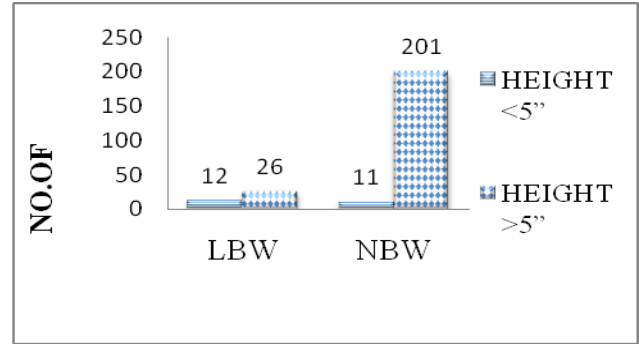


Fig 5. Educational status of mother and its influence on neonatal birth weigh

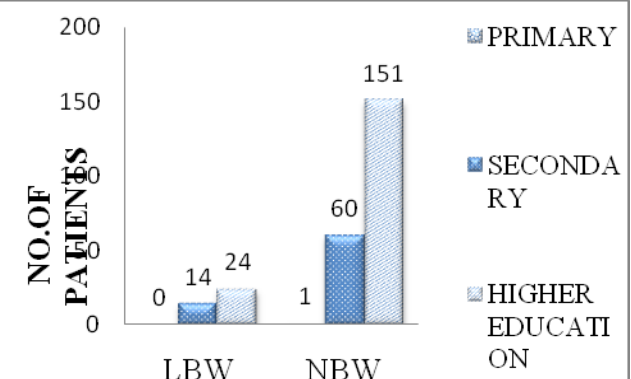
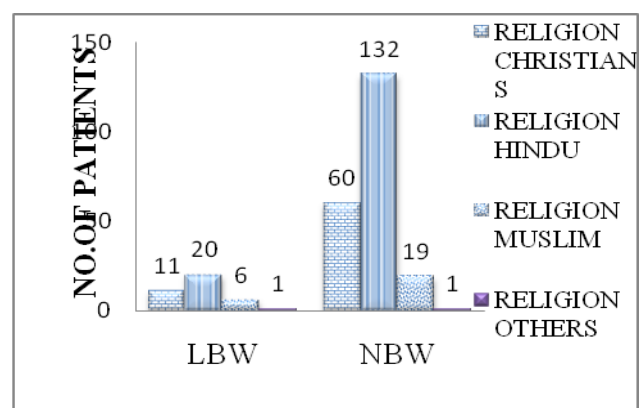
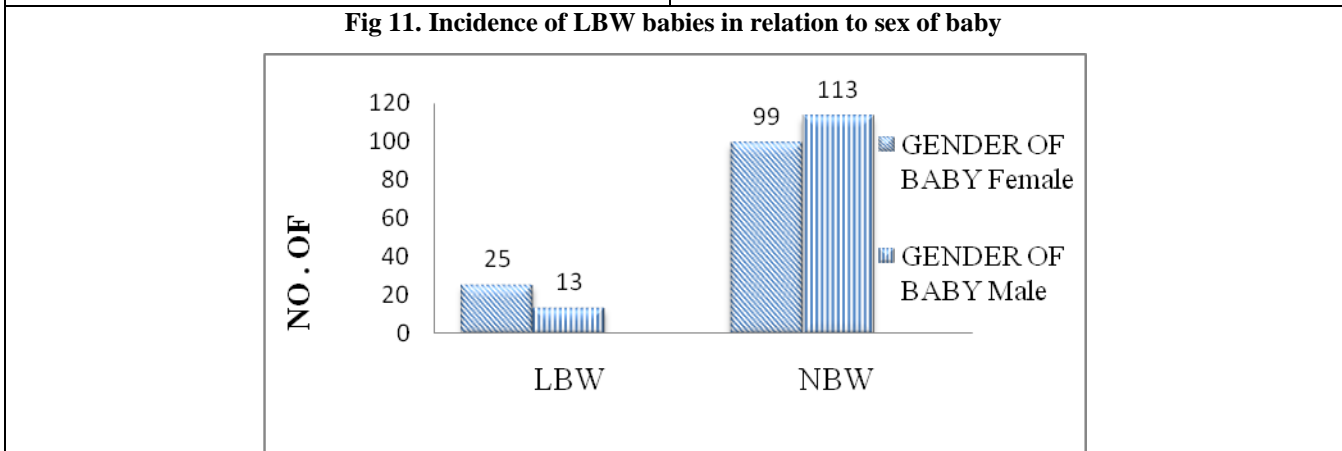
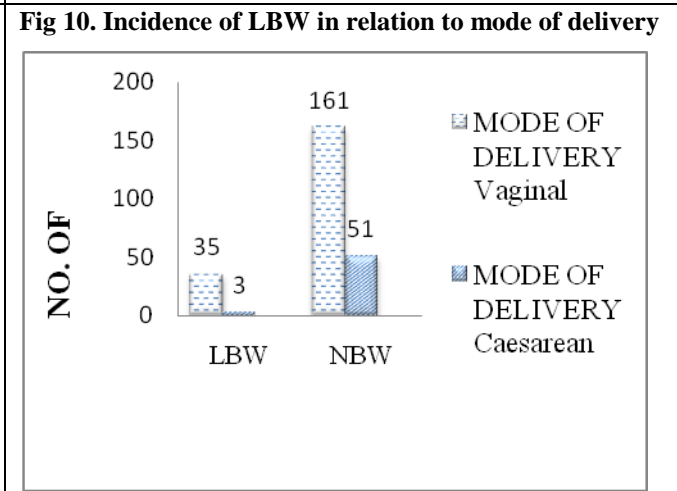
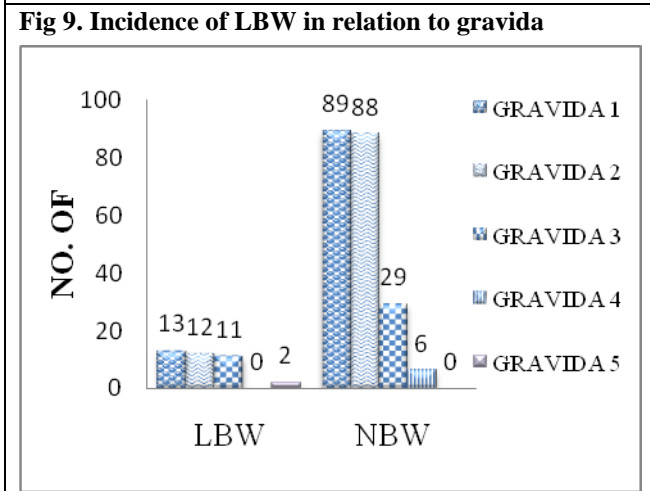
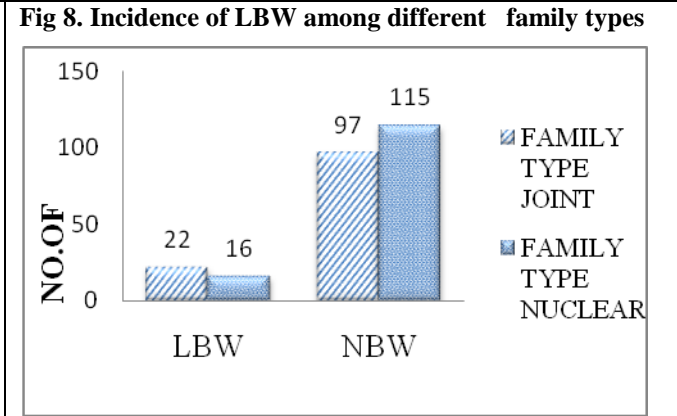
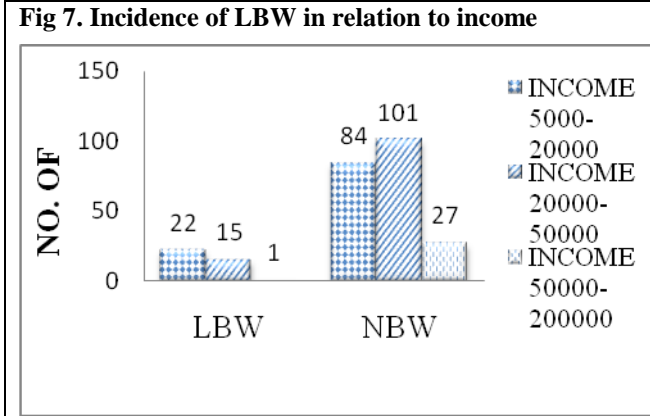


Fig 6. Incidence of LBW in relation to different religion





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%. Maternal age had no significant influence on LBW in the current study. Mother age between 21-30 years gave birth to neonates with LBW. Subgroup analysis showed a higher incidence of LBW neonates among mothers aged between 21-

30(81.6%). This study was similar to a study done by Col MC Kapilashrami *et al.* (2000) 82.14% of the LBWs occurred in the age' group of 20-29 yrs, with only 6.93% of the births being teenage pregnancies. In contrast to a study conducted by Madhur Borah *et al* statistically significant association was found between Low birth weight and younger age of the mother (Madhur B *et al.*).

Maternal height has an influence on neonatal birth weight in our study. These results are in accordance

to a study conducted by Wajihuddin Syed *et al.* that maternal height has a direct effect on the weight of the new born and we propose maternal short stature be identified as an independent risk factor for low birth weight⁹. These results are in contrast with a study conducted by Naziya Noor *et al.*, (2010) maternal height had no significant effect on determining the risk of LBW. In our study the Incidence of LBW was found greater among Hindu community. These results are in accordance to a study conducted by KashifShah Nawaz *et al.* that showed that the greatest number of mothers having LBW newborns were in the Hindus (96.7%) (Dr Kashif S *et al.*, 2014).

Incidence of low birth weight was found greater in Joint families (57.8%) as compared to nuclear families (P=0.16). Average no. of family members in mothers delivering LBW babies is found to be 6.2 ± 3.15 . This result is contradictory with the results of a study conducted by Hashima E Nasreen *et al.* Joint family (OR 0.259, CI 95% 0.36-0.98) (Hashima EN *et al.*, 2010). There is a statistical significance between LBW babies born to consanguineous married women and non-consanguineous married women and are similar to study done by Sareer B *et al.* (2008) Consanguineous effect on low birth weight¹³. We observed significant association between gravida and birth weight.

A primigravida women is likely to have neonates with lower birth weight and was found statistically significant. multiparous women is likely to have neonates with higher birth weight. High incidence LBW in primigravida mothers was observed and it is in accordance with study conducted by Joshi H S *et al.* Where it showed Primigravida mothers has highest prevalence of low birth weight (30.86%, $p < 0.001$) (Joshi HS *et al.*) and in a study conducted by U.N Reddy *et al.* where incidence of LBW in primigravida was 61.2% (Reddy UN *et al.*, 2014). In a study conducted by Anand A *et al.*, (2017) LBW were reduced in multigravida compared with primigravida women.

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 Ganesh Kumar S *et al.*, (2010); Johnson AR *et al.*, (2015) and Margaret TM *et al.*, (1992) where these two

studies found no association between history of having abortion and LBW. 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 M *et al.*, Caesarean section delivery (RR 1.4; 95% CI 1.3–1.5) significantly associated with delivery of low birth weight infants. 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 (Iltaf G *et al.*, 2017; Lelly A *et al.*, 2016). In contrast a study done by Anshumali J *et al.* (2013) Showed that there is better correlation among low birth weight males as compared to females and normal weight.

CONCLUSION

This prospective study was conducted to determine the impact of various maternal and bio social factors on the incidence of low birth neonates. There was a remarkable relation between maternal height, Gravida, Consanguinity, Mode of delivery, Gender of baby with Low Birth Weight. Increasing the awareness and use of the health care services during pregnancy, are important for reducing LBW. 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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