Socio Economic and Maternal Reproductive factors affecting Low Birth Weight Babies in Central Nepal

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Abstract

Introduction: Low Birth weight is one of the most sensitive and reliable predictors of health and also an essential determinant of mortality, morbidity and disability in infancy and childhood. Globally, about one sixth of all newborns are low birth weight (LBW <2500 grams), which is the single most important underlying risk factors for neonatal deaths. It is estimated that 18 million babies are born with Low Birth Weight and half of them are born in south Asia.Over three – quarters of newborns death in Nepal occur in LBW babies.The estimates of prevalence of LBW in Nepal have ranged from 14% in community based studies to 32% in hospital based ones, overall being 27%.Objectives were to study the various socioeconomic and maternal reproductive factors related to low birth weight babies in Central regional part of Nepal.**Material and Methods:** Cross-sectional and observational study was undertaken from October 2012 to September 2014 comprising of 350 singleton live born baby admitted in NICU of Tertiary Care Teaching Hospital, Chitwan. **Results:** The common risks factors for LBW were significantly associated with low socio- economic status, maternal age, maternal education, occupation of mother, maternal smoking, maternal alcohol intake, number of ANC visit with significant *p*-value of <0.05. **Conclusion:** LBW mostly associated with maternal factors can be addressed directly by improving the socioeconomic factors (maternal age, educational level and economic status) and health status of pregnant women by supplementations, family planning services and female education.

Key words: Low Birth Weight, Neonate, Maternal, Socio-economic.

Introduction

Birth weight is the first weight of the newborn obtained after birth. Birth weight should preferably be measured within the first hour of life for live births, before significant postnatal weight loss has occurred. In 1976, the 29th World Health Assembly agreed on the following definition of low birth weight that "Low birth weight is a weight at birth of less than 2500gms (up to and including 2499) irrespective of gestational age". This replaced the earlier definition of 2500gms or less[1,2,3,4,5].

Birth weight is an important indicator of child survival. Appropriate and timely care of a new born especially if he/she is born with low birth weight is important but this is difficult in developing countries since most of the deliveries are conducted at home where adequate facilities to weigh a newborn do not exist. Although these low birth weight babies account for 14% of the children born, they account for 60-80% of neonatal deaths[6,7,8,9].

Low birth weight has been used as an important public health indicator. The mortality rate rapidly increases as the birth weight decrease and most of infants weighing 1000 grams or less[10].The high prevalence of LBW contributes to the high perinatal, neonatal and infant mortality and is a common feature of many developing countries, especially in South Asia where the incidence ranges from 20-30%. The estimates of prevalence of LBW in Nepal have ranged from 14% in community based studies to 32% in hospital based ones, overall being 27%[11]. However, recent reports show that the percentage of children with low birth weight varies from 11 percent in the mountains to 13 percent in the hills and 16 percent in Terai, highest being in Far western region and particularly in far western Terai- sub region (28%) [12,13,14,15]. In developing countries, there are more babies with poorer growth having the risk of more diabetic, hypertensive and coronary heart disease patients in later life. Moreover, with demographic transition through increased life expectancy at birth, these countries are going to face more burdens of chronic diseases [16,17,18,19].

The biological processes that affect the fetus in utero are related to the mother's physiology, including her nutrition (mother's weight before pregnancy and history of having newborns with LBW), exercise, infection and consumption of alcohol, tobacco, teenage pregnancy, poor antenatal care, education other drugs[20,21,22,23]. Four antenatal visits have been recommended byWHO technical group committee for women with normal pregnancy. The socio-economic factors associated with LBW are income, level of education in the mother and other family members, occupation of the mother, household leadership and gender differences related to roles within the family [24,25,26,27,28,29,30].

This study was undertaken with an aim to find out the risks factors of LBW babies, so that in future the mortality, morbidity and the burden of chronic disease can be reduced from the developing countries like ours.

Objective: To study the socioeconomic and maternal reproductive factors related to Low Birth Weight (LBW) of babies delivered in central regional part of Nepal.

Material and Methods

This study was hospital based, cross-sectional and observational study conducted in a central regional tertiary care Teaching hospital of Nepal. Data were collected prospectively from October 2012 to September 2014 for a period of two years. Consent were taken from every mother before interview and the weight of the newborn was taken within the 24 hours of delivery and each questionnaire was completed. Record review format was used for reviewing antenatal care cards. By taking confidence interval of 95% and permissible error of 0.05 and "*p*" as 0.28 the number of sample size was 350.

Mothers along with single live newborn delivered in hospital were included in the study. Mothers who had given multiple births or still birth baby and mother having disease during pregnancy and refusing to give consent were excluded from the study.

Data was compiled in Statistical Package for Social Sciences (SPSS) software version 20.0 and analyzed. Simple descriptive analysis, chi-square test was used to determine the risk factors. Logistic regression analysis was used to assess relationship between LBW and maternal risk factors. Logistic regression results were reported as odds ratio and 95% confidence interval along with *p*-value.

Permission from the Institutional Review Board was taken to do the study.

Results

A total of 1206 birth occurred during the study period, of which 350 met the inclusion criteria. Out of which 116 were LBW and 234 were normal birth weight(NBW). Hence, the prevalence of LBW in this present study was found to be 33.1 %. Overall mean birth weight was found to be 2.65+_ 0.536kg. Out of total, 33.1 % newborns were weighting less than 2500gms and mean birth weight was 1.96+ 0.412 (Table no. 1).

Table 2 and 3 depicts the results of univariate analysis of maternal factors associated with LBW. The factors associated with LBW included age, education, family members, gravida, antenatal care smoking and alcohol. The following variables were found insignificant: religion, residence, occupation, family type, birth to conception interval, still birth, abortion, death of previous children, and gestational age at 1stANC visit. LBW was mostly seen (37%) in mother of age group<20 and ≥ 35yr verses 14% LBW in babies delivered from mother of 20- 30 years age group as depicted in figure 1.

Multivariate analysis (multiple logistic regression) revealed that significant factors were age of the mother and education of mother and antenatal care and taking LBW as 0, NBW as 1. The study showed correlation of LBW with the occupation of the mother (Fig. 2)

81 % of babies born to illiterate mothers and 52.5 % of babies born to housewives mothershad most of the LBW babies in comparison to mothers who had either government 7.7% or private job 12.8%. Association between family members and birth weight was found to be significant. Proportion of LBW was maximum 94 % in mothers who didn't receive any antenatal care or less than 02 ANC before birth, followed by those who received antenatal care, in whom LBW proportion was 26.80%.Out of 161 births, birth interval in relation to previous birth ≤24 months was found to be in 66.1% and 14.3 % found in mothers who had birth interval ≥ 24 months. Mothers who were smokers had 72.7% of LBW babies as compared with non-smokers who had 30.5% LBW babies. Mothers consuming alcohol had significantly higher no. of LBW babies (88.95%) as compared to 31.7% in those who were non-alcoholic.

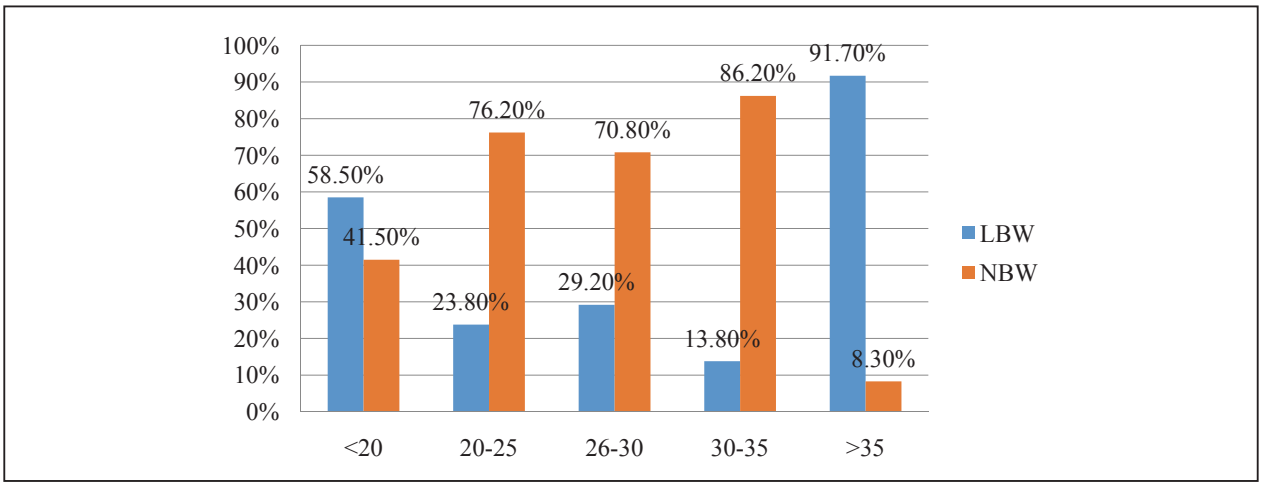

Fig 1: Showing comparison of birth weight with the age of mother

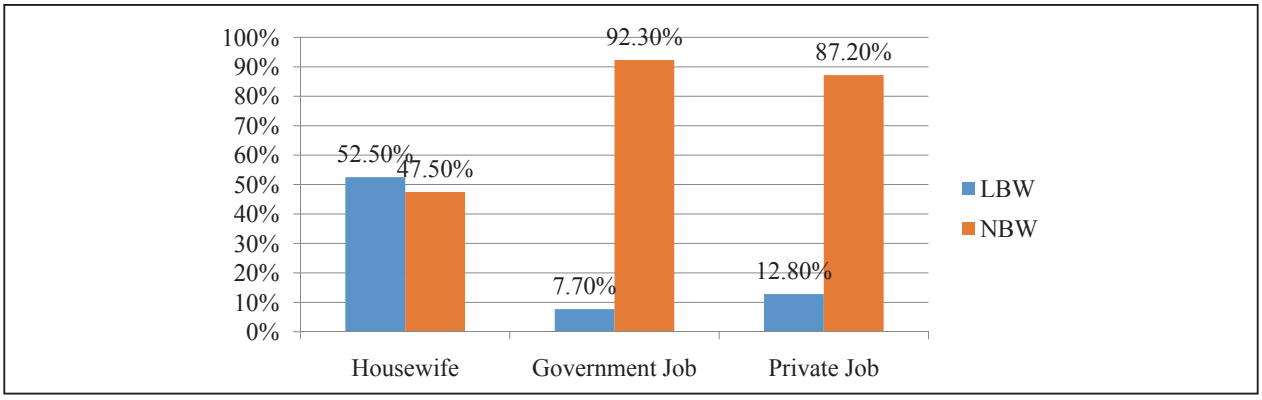

Fig 2: Showing The Comparison of Birth Weight with the Occupation of Mother

Table 1: No. of Newborns by their Birth Weight

S. No	Birth weight of newborns in grams	No. of Newborns
1.	<1000	02
2.	1000- 1499	15
3.	1500-1999	56
4.	2000- 2499	277

Table 2: Effects of Maternal Factors on Birth Weight of Newborn

Variables	LBW(N=116)	NBW N=234)	New Born Babies (350)	*p*-value
Maternal age				
< 20 years	48 (58.5%)	34(41.5%)	82	
20- 25 years	34 (23.8%)	11 (91.7%)	143	
26- 30 years	14 (29.2 %)	34 (70.8%)	48	<0.05
30– 35 years	9 (13.8%)	56(86.2%)	65	
>35 years	11 (91.7%)	1(8.3%)	12	
Sex of child				
Male	61(30.5%)	139(69.5%)	200	NS
Female	55(36.7%)	95(63.3%)	150	
BMI of mother				
<18.5	35(92.15%)	3 (7.9%)	38	
18.5-24.99	74(30.8%)	166(69.2%)	240	<0.01
> 25	7(9.7%)	65(90.3%)	72	
Gravida				
1st	62(33.5%)	123(6.5%)	185	
2-3	41(28.7%)	102(71.3%)	143	<0.01
>4	13(61.9%)	9(38.1%)	21	
Birth to Conception Interval				
> 24 Months	15(14.3%)	90(85.7%)	105	NS
< 24 Months	39(66.1%)	20(33.9%)	59	
Death of Previous Children				
Yes	15(60%)	10(40%)	25	NS
No	101(31.1%)	224(68.9%)	325	
Previous Abortion				
Yes	13(65%)	7(35%)	20	NS
No	103(31.2%)	227(68.8%)	330	
Previous Still Birth				
Yes	5 (38.5%)	8(61.5%)	13	NS
No	111(32.9%)	226(67.1%)	337	
Total ANC Visits				
<2	33(94.3%)	2(5.7%)	35	
3-4	64(26.8%)	175(73.2%)	239	<0.05
>4	19(25%)	57(75%)	76	
Diet				
Vegetarian	19(52.8%)	17(47.2%)	36	
Non Vegetarian	97(30.9%)	217(69.1%)	313	NS
Folic acid and Iron tablets				
Yes	85(26.8%)	232(73.2%)	317	NS
No	31(93.9%)	2(6.1%)	33	
Gestational Age at 1st ANC Visits				
1st Trimester	40(17.2%)	192(82.8%)	232	
2nd Trimester	57(57.6%)	42(42.4%)	99	NS
3rd Trimester	19(100%)	0	19	
Smoking				
Smoker	16(72.7%)	6(27.3%)	22	<0.05
Non Smoker	100(30.5%)	228(69.5%)	323	
Alcohol				
Alcoholic	8 (88.9%)	1(11.1%)	9	<0.05
Non alcoholic	108(31.7%)	233(68.3%)	341	

* ***NS***= *Not Significant,* ***'p'value<0.05***= Significant

Table 3: Effects of Socioeconomic Factors on Birth Weight of Newborn

Variables	Lbw (N=116)	Nbw N=234)	New Born Babies (350)	*p*-value
Religion				
Hindu	107(34.2%)	206(65.8%)	313	NS
Muslim	1(20.0%)	4 (80%)	5	
Buddhist	2(10.5%)	17(89.5%)	19	
Others	6(46.2%)	7(53.8%)	13	
Education				
No	18(81.8%)	4(18.2%)	22	<0.05
Primary	64(78 %)	18(22.0%)	82	
Secondary	22(28.6%)	55(71.4%)	77	
Higher	12(7.1%)	157(92.9%)	169	
Occupation of mother				
Housewife	96(52.5%)	87(47.5%)	183	<0.05
Government Job	2(7.7%)	24(92.3%)	26	
Private Job	18(12.8%)	123(87.2%)	141	
Economic Status				
Upper	1 (3.8%)	25(96.2%)	26	<0.05
Middle upper	15(8.2%)	167(1.8%)	182	
Lower upper lower	35(49.3%)	36(50.7%)	71	
Lower Middle	58(90.6%)	6(9.4%)	64	
Lower	7(100%)	0	7	
Residence				
Urban	75(33.2%)		226	NS
Rural	41(31.1%)	83(66.9%)	124	
Family Type				
Nuclear	48(23.6%)	155(76.4%)	203	NS
Joint	68(46.3%)	79(53.7%)	147	
Gravida				
1st	62(33.5%)	123(6.5%)	185	<0.01
2-3	42(28.7%)	102(71.3%)	143	
>4	13(61.9%)	9(38.1%)	21	
Death of Previous Children				
Yes	15(60%)	10(40%)	25	NS
No	101(31.1%)	224(68.9%)	325	

* ***NS***= *Not Significant, '**p**'***value**<0.05*= Significant

Discussion

Birth weight, the weight of a neonate taken soon after birth, is the single most important indicator of neonatal outcome as well as overall health status later in life. In most of the third world countries including developing country like ours the incidence of low birth weight is high. The problem of low birth weight needs to be addressed on priority basis as children are the future of the country. Low birth weight neonates need special care since they have increased risk of mortality and long term morbidity.Globally, about one sixth of all newborns are low birth weight, which is the single most important underlying risk factors for neonatal deaths[6]. It is estimated that 18 million babies are born with LBW and half of them are born in south Asia.Over three – quarters of newborns death in Nepal occur in LBW[7].The high prevalence of LBW contributes to the high perinatal, neonatal and infant mortality and is a common feature of many developing countries, especially in South Asia where the incidence ranges from 20-30%[11]. However, recent reports show that the percentage of children with low birth weight varies from 11 percent in the mountains to 13 percent in the hills and 16 percent in Terai, highest being in Far western region and particularly in far western Terai- sub region (28%) of the country[12].

The study conducted to analyse various parameter causing and affecting low birth weight determined that preterm birth was the most important determinant of the LBW. According to the results, 33.1% of the babies born were small for gestational age whereas appropriate for gestational agewere 66.9%. LBW frequency decreases with the increase in the maternal education. 18% of LBW babies mother were uneducated. 12 % were educated and were less likely to deliver LBW infants. Further it was found that as the level of education of mother increases, the occurrence of the LBW successively decreases i.e. 64 % were educated up to primary, 22% were qualified up to secondary, 12 % were qualified to Higher Level of education. The above statistics could be due to the reason that uneducated mother is uninformed about the prenatal care, nutritional requirements during pregnancy, essential diet, and about the effects of maternal behavior on fetus. Mal-nutrition during pregnancy leads to the occurrence of LBW babies. It was evident from analysis that mothers from lower economic status were more likely to have LBW newborn than those who came from higher social class. The mother with low economic status were 49.3 % and were at higher risk of delivering LBW baby (Table 3). As the socioeconomic level increases the occurrence of the LBW decreases. These statistics could be due to the reason that mother in higher socioeconomic class were having healthy surroundings and had healthy diet to produce heavier babies whereas the mothers in deprived socioeconomic level i.e. unhygienic environment and improper diet were at higher risk of having a low birth weight baby which was similar to the study done by Karim et al. (1997)[30].

The study showed that age of mother was directly proportionate to deliveries associated with LBW.Most of the mother of LBW babies in this study belonged to the age <20 and ≥35 yrs(*p*- value<0.05) which was similar to study done by Khatun et al. (2008) [26].The incidence of LBW was higher among smoker mother as compared to non-smoker mothers (72.75% vs 30.5% respectively). Maternal alcohol intake during or prior to the pregnancy and its association with LBW was also studied and was significantly associated with LBW. This finding was similar to study done by Dickute et al. (2002)[29].

Our study also showed that regular antenatal visit is very important in reducing various complications during pregnancy including the birth weight of a neonate. It showed the positive effect on number of antenatal care visit on birth weight. Those mothers who received 4 or more antenatal care gave birth to higher birth weight in comparison to mothers who received 2 or less antenatal care visit (25.0% vs 94.3% respectively) with *p*-value <0.05.

Conclusion

The present study shows that Birth weight is a major determinant of health as well as morbidity, mortality and disability in neonates, childhood and also later life. This study suggests several factors interplay determining the birth weight of a newborn.Socio-demographic factors (maternal age, educational level and economic status) and antenatal care are more important.Hence, it is prudent to identify the risk factors causing LBW in neonates and manage them promptly and also knowledge about the socio-economicdeterminants of LBW could lead to a better evidence based interventions at reducing neonatal mortality in Nepal.

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