

ORIGINAL RESEARCH ARTICLE

BIRTH WEIGHT AND ITS ASSOCIATED FACTORS AMONG LIVE BIRTHS AT CHITWAN MEDICAL COLLEGE, NEPAL

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ABSTRACT

Background: Birth weight or size at birth is an essential indicator of the child's vulnerability to the risk of childhood illnesses and diseases. Birth weight also predicts a child's future health, growth, psychosocial development, and chances of survival. This study aimed to assess birth weight among live births in Chitwan Medical College Teaching Hospital.

Methods: A Hospital-based cross-sectional study was conducted using face-to-face interviews in the Obstetrics and Gynecology Department of Chitwan Medical College Teaching Hospital. A total of 153 women giving live births were considered as a sample. The data was collected from 14 August to 13 September. We used the Pearson's Chi-square test and binary logistic regression analysis to assess the factors influencing birth weight among women giving live births in Chitwan Medical College

Results: Among 153 women giving live births, birth weight of newborn among live births 119(77.8%) had normal birth weight, 31(20.3%) low birth weight, 3(2%) very low birth weight. Result shows that birth weight among live births differ significantly with [ethnicity (OR=1.94;CI(0.7-5.39))], [family income (OR=1.72(0.20-14.81))], [weeks of pregnancy (OR=2.01;(0.99-8.46))], [birth interval(OR=2.45(0.39-15.34))], [planned pregnancy (OR=1.26(0.33-4.73))], [any chronic disease(OR=1.72(0.97-4.58))], [diet in pregnancy (OR=2.11(0.20-15.07))], [ANC check-up(OR=6.75(2.44-18.64))].

Conclusions: Almost one-fourth of live births had low birth weight. Multiple arrays of factors were associated with birth weight, which must be addressed. Adequate antenatal care visits integrated with nutritional supplementation and family planning services should be a focus to reduce low birth weight among live births.

INTRODUCTION

Birthweight and gestational age are critical markers to foresee newborns' long-term well-being and survival.¹ Birth weight predicts the child's overall development and chances of survival.²

World Health Organization (WHO) defines low birth weight (LBW) as the weight of newborns less than 2500 grams irrespective of their gestational age.³ LBW can be further subcategorized as very low birth weight (VLBW), which is under 1500 grams, and extremely low birth weight (ELBW), which is under 1000 grams.⁴ Low birth weight infants are more likely to have birth and development complications and congenital abnormalities than normal-weight infants. It is the significant predictor of infant mortality and morbidity.⁵ Multiple factors are responsible for low birth weight, which can either be fetal, maternal, or environmental. Studies suggest low-socio-economic status, reproductive history, medical condition, and lifestyle of the mother and healthcare utilization attributed to the higher prevalence of low-birth-weight infants.⁶⁻⁸

The prevalence of low birth weight is a significant public health problem in Nepal. Even with maternal and child health being the priority of our health strategy, there hasn't been a significant reduction in the number of low-birth-weight babies.⁹ The prevalence of low-birth-weight in the fiscal year 2075/76 was 11.2%, which is only slightly less than the previous year's prevalence of 11.9%.^{10,11} At the center of this issue are the factors associated with mother's socio-demographic characteristics, pregnancy related factors and the healthcare utilization.¹²⁻¹⁴

Many studies performed in Nepal has revealed conflicting result as to which factors are significantly associated with the higher risk of low birthweight. This study was aimed at identifying maternal risk factors and their association with birth weight that will help as a base for other researchers, health care providers, and policymakers for further designing of the strategic plan and intervening accordingly.

METHODS

A hospital-based cross-sectional study was conducted from 14

August to 13 September 2021 using face-to-face interviews. The study was carried out in the Obstetrics and Gynecology Department of Chitwan Medical College Teaching Hospital. The sample size was calculated with the prevalence of low birth weight 11.2% as per annual health report¹⁰ with a 5% margin of error and using Cochran formula z^2pq/e^2 .¹⁵ The sample was 153. The self-designed semi-structured questionnaire was used to collect the data. Pretesting was done in a study area with similarities. The ethical clearance was obtained from CMC-IRC(Ref: CMC-IRC/078/079-029). The data was collected from the obstetrics and gynecology department of Chitwan Medical College, Teaching hospital. Birth weight was obtained using standardized weighing machine. Consecutive sampling method was used. Women who gave live births were considered as study population. The total duration of data collection was one month. The collected data were manually checked and entered in epi data 3.1 and exported to IBM SPSS 20.0 version software for further analysis. Birth weight among live births was assessed by descriptive analysis of collected information. The significant factors associated with birth weight were identified using chi-square test, Fisher exact test and binary logistic regression model. Crude odds ratio was calculated.

RESULTS

As per figure 1, normal birth weight was (77.80%), low birth weight (20.30%) and very low birth weight (2%)

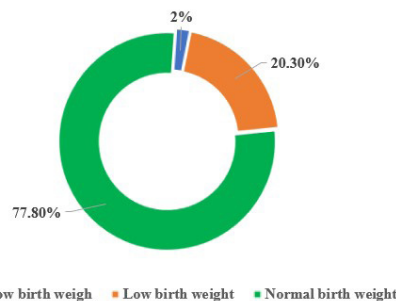


Figure 1: Birth weight of newborn among women giving live births in Chitwan Medical College (n=153)

Table 1 depicted that parameters age of mother, age at marriage, birth weight (gm) of newborn did not follow the normality.

Table 1: Descriptive analysis of numerical parameters among women giving live births in Chitwan Medical College (n=153)

Parameters	Median (IQR)	Min/Max	Normality test
Age of mother	26(6)	18/37	Not normal
Age at marriage	21(6)	15/32	Not normal
Birth weight (gm) of newborn	2900(850)	500/4250	Not normal

Normality test was done through Shapiro-Wilk test at 5% level of significance. IQR denotes interquartile range.

Table 2 showed that birth weight of newborn were significantly associated with [ethnicity (OR=1.94; CI(0.7-5.39)), [family income (OR=1.72(0.20-14.81)), [weeks of pregnancy (OR=2.01;(0.99-8.46)), [birth interval (OR=2.45(0.39-15.34)), [planned pregnancy (OR=1.26(0.33-4.73)), [any chronic disease (OR=1.72(0.97-4.58)), [diet in pregnancy (OR=2.11(0.20-15.07)), [ANC check-up (OR=6.75(2.44-18.64)).

DISCUSSION

This study was conducted in the in-patient wards of Gynecology and Obstetrics department of Chitwan Medical College. The study population consisted of live births of women visiting the institution to explore maternal risk factors associated with low birth weight.

The overall prevalence of low birth weight in the present study was 22.3%, which is consistent with a study conducted by Bansal et al. with the prevalence of 23.6%.¹⁶ This is also in line with a study conducted in Ethiopia, where the prevalence of low birth weight was 24%.² Meanwhile, other studies showed lower prevalence of LBW, 9.7%¹⁷, 12.9%¹⁸, and 11.9%¹⁹ respectively.

The current study shows that ethnicity has a persistent significance in determining the newborn's birthweight. Children born to mothers of ethnicity other than Brahmin/Chhetri or Janajati were of significantly lower birth weight ($p = 0.05$).

These ethnicities mainly include dalit and madhesi and social disparities play a vital role in these women delivering low birthweight babies. There is also lack of healthcare utilization by ethnicities other than Brahmin, Chhetri or Janajati. This disparity was also reported in a study conducted by Ratnasiri et al. where women of African-American heritage had 2.4-fold greater prevalence of having an LBW infant compared with Caucasian women.²⁰

Positive association was observed between low birth weight and lower gestational age. Children born before 37 weeks of gestation had significantly lower birth weight. Out of all the live births, low birthweight babies who were born at ≤ 37 weeks gestational age were 35.8% whereas only 15% were born at > 37 weeks of gestation. This association was statistically significant with $p=0.003$ (AOR: 2.01 95% CI: 0.99-8.46). Evidence suggests reduction in body of the baby due to prematurity in gestational age below 37 weeks. This pattern was examined by Shrestha et al. where LBW babies born before the gestational age of < 37 years were 29.5% and those born after 37 weeks were 8.1%. The odds of delivering LBW baby increased significantly with decrease in gestational age (AOR 2.51, CI 1.15–5.48).¹³

Antenatal checkup had the most significant association with low birth weight in the present study ($p < 0.001$). A study conducted in Assam has also emphasized on the need to strengthen antenatal care for better delivery outcomes.²¹ In another study conducted in Bangladesh, it was revealed that

Table 2: Bivariate analysis between Birth weight (BW) and some explanatory variables among women giving live births in Chitwan Medical College (n=153)

Variables	N (%)	Birth weight status		COR (95% of CI)	p-value
		Normal (%)	Low (%)		
Age (years)					
18-24	54(35.3)	37(68.5)	17(31.5)	2.18(0.63-7.40)	0.125
25-30	77(50.3)	64(83.1)	13(16.9)	0.95(0.27-3.25)	
Above 30	22(14.4)	18(81.8)	4(18.2)	Ref	
Ethnicity					
Brahmin/Chhetri	78(51)	59(75.6)	19(24.4)	Ref	0.05**
Janajati	54(35.3)	47(87)	7(13)	0.46(0.17-1.18)	
Others(dalit ,muslim)	21(13.7)	13(61.9)	8(38.1)	1.94(0.7-5.39)	
Level of education					
Secondary and below	55(36.7)	42(76.4)	13(23.6)	1.46(0.49-4.28)	0.730
Higher secondary	60(40)	46(76.7)	14(23.3)	1.44(0.49-4.16)	
Bachelor and above	35(23.3)	29(82.9)	6(17.1)	Ref	
Occupation					
Agriculture/housewife	104(68)	77(74)	27(26)	2.05(0.82-5.10)	0.105
Others(service, business)	49(32)	42(85.7)	7(14.3)	Ref	
Family income					
insufficient	6(3.9)	5(83.3)	1(16.7)	Ref	0.73##
Sufficient	147(96.1)	114(77.6)	33(22.4)	1.72(0.20-14.81)	
Age at marriage					
Teenage	59(38.6)	43(72.9)	16(27.1)	1.61(0.74-3.48)	0.248
Above teenage	94(61.4)	76(80.9)	18(19.1)	Ref	
Pregnancy(weeks)					
<=37	53(34.6)	34(64.2)	19(35.8)	2.01(0.99-8.46)	0.003**
>37	100(65.4)	85(85)	15(15)	Ref	
Birth interval(month)					
<24	5(3.3)	3(60)	2(40)	2.45(0.39-15.34)	0.308##
Above 24	148(96.7)	116(78.4)	32(21.6)	Ref	
Planned pregnancy					
Yes	136(88.9)	105(77.2)	31(22.8)	1.26(0.33-4.73)	0.630##
No	17(11.10)	14(82.4)	3(17.6)	Ref	
Complication during pregnancy					
Yes	36(23.5)	28(77.8)	8(22.2)	1(0.40-2.45)	1.00
No	117(76.5)	91(77.8)	26(22.2)	Ref	
Any chronic disease					
Yes	7(4.6)	6(85.7)	1(14.3)	Ref	0.60##
No	146(95.4)	113(77.4)	33(22.6)	1.72(0.20-15.07)	
Diet in pregnancy					
More than regular	86(56.2)	72(83.7)	14(16.3)	Ref	0.04**
Others (same as previous, less than regular)	67(43.8)	47(70.1)	20(29.9)	2.11(0.97-4.58)	
Physical activity in pregnancy					
Less than regular	75(49)	60(80)	15(20)	Ref	0.517
others (rest most of the time, more than regular)	78(51)	59(75.6)	19(24.4)	1.28(0.59-2.77)	
ANC checkup					
<4	19(12.4)	8(42.1)	11(57.9)	6.75(2.44-18.64)	<0.001**
>=4	134(87.6)	111(82.8)	23(17.2)	Ref	

denotes Fisher exact test.

** denotes statistically significant Association (by applying Pearson chi-square test at 5% level of significance)

mothers who received four or more antenatal care services had a 37% less possibility of having LBW babies compared to mothers who did not receive any antenatal care services or who received the services 1-3 times during the pregnancy.²²

Furthermore, this study observed mother's nutritional status have severe effect on the birthweight of newborns. Inadequate diet results in anemia and micronutrient deficiency during pregnancy have serious implications on the development of fetus.²³

Finally, this study has the limitation of being conducted in only one tertiary healthcare facility within a shorter period. Still, it can have a significant implication for prevention of low birthweight and emphasis should be given to gestational age, proper diet during pregnancy, increase in healthcare utilization

by increasing the number of ANC visits.

CONCLUSION

Almost one-fourth of live births had low birth weight. Multiple arrays of factors were associated with birth weight which needs to be addressed. Low birth weight can be reduced down by providing quality and effective services because most of the factors that affect the birth weight of newborns are preventable. Adequate antenatal care visits integrated with nutritional supplementation and family planning services should be a focus to reduce low birth weight among live births

CONFLICT OF INTEREST: None

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