

Proportion of low birth weight and related factors in a tertiary care institute of Tripura

Abstract

Introduction: Birth weight is an important indicator of maternal and child health of the country. Various socioeconomic and maternal factors are responsible in determining birth weight. Hence, the present study was conducted to find out the proportion of low birth weight (LBW) among the babies born at Agartala Government Medical College and Govinda Ballabh Pant Hospital and to reveal the relationship between various maternal factors and birth weight. **Materials and Methods:** The present study was conducted during the period from July 1, 2012 to August 31, 2012 among 305 mothers admitted in the postnatal ward selected by concurrent sampling. Descriptive statistics and Chi-square test were applied. $P < 0.05$ was considered to be statistically significant. **Results:** Proportion of LBW was found to be 23.9% and it was significantly higher among rural mothers (28.6%, $P = 0.017$), anemic (28.8%, $P = 0.004$), Venereal Disease Research Laboratory reactive (83.3%, $P = 0.002$) and mothers who delivered vaginally (32.8%, $P = 0.001$). LBW was significantly lower among mothers who received iron and folic acid (IFA) tablets (22.4%, $P = 0.007$) and were immunized against tetanus (22.8%, $P = 0.011$). **Conclusion:** Adequate antenatal checkup, IFA supplementation, screening and treatment for syphilis, etc. are necessary for improving birth weight in this community.

Key words: Anemia, antenatal care, iron and folic acid, low birth weight

**Himadri Bhattacharjya,
Shampa Das,
Debahuti Ghosh**

Department of Community
Medicine, Agartala Government
Medical College, Agartala,
Tripura, India

Address for the Correspondence:

Dr. Himadri Bhattacharjya,
Department of Community
Medicine, Agartala Government
Medical College, Kunjavan,
Agartala - 799 006, Tripura, India.
E-mail: hbhattacharjya@
rediffmailmail.com

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INTRODUCTION

Low birth weight (LBW) is defined as birth weight of a live born infant of less than 2,500 g regardless of gestational age. Birth weight is an important determinant of child survival and the most useful health indicator in perinatal medicine and epidemiology. More than twenty million LBW babies are born every year throughout the world. Half of all perinatal and one-third of all infant deaths are related to LBW.^[1] Babies born with LBW are more likely to have health problems and slower development from immediately after birth to later in life.^[2,3] Lifelong problems attributable to LBW include adult-onset diabetes, coronary heart disease, high blood pressure (BP), intellectual, physical and sensory disabilities, and psychological and emotional distress.^[4] LBW babies usually need special care, and there are a constant concern and uncertainty over his or her future health outcomes. However, little attention is paid to “birth weight” improvement as a means of reducing child mortality.^[5] Maternal malnutrition, anemia, smoking, excess physical labor, age, race, gestational length, infant’s sex, plurality, altitude, education, socioeconomic status, hypertension, urinary tract infection, some viral infections, some metabolic disorders all these may affect birth weight.^[6] National Family Health Survey-III (NFHS-III) has found that in India 21.5% and in Tripura 27.3% babies are born with LBW.^[7] Agartala Government Medical College and Govinda Ballabh Pant Hospital is the largest state referral and tertiary care hospital in Tripura. Every year it is conducting approximately 7,000 deliveries since last three years. However, the proportion of LBW among these babies and its determinants are not known. Hence, the present study was designed to find out the proportion of LBW among the babies born in this institution and to study the relationship between various maternal factors and birth weight.

MATERIALS AND METHODS

A cross-sectional study was conducted in the postnatal ward, Department of Obstetrics and Gynaecology of Agartala Government Medical College during July 1, 2012 to August 31, 2012 among 305 mothers delivering by any mode at Agartala Government Medical College chosen by concurrent

sampling. Minimum sample size requirement for this study was determined to be 305 at 95% confidence and 5% relative error considering proportion of LBW in Tripura as 27.3% according to NFHS-III.^[7] Illiterate mothers were those who did not have formal schooling. Primary educated were those who had schooling of any level between standard I and VIII. Secondary educated were those who had schooling of any level between standard VIII and XII. Graduate & above were those who either got admitted in college or completed normal or technical graduation or above. Families of mothers having per capita monthly income up to Rs. 3000 were categorized as low-income group, more than Rs. 3000-Rs. 5000 as middle income group and above Rs. 5000 as high income group. Those who had at least three antenatal checkups (ANCs) were considered adequate and less than that were considered as having inadequate ANC. Mothers having fasting venous blood glucose level 126 mg/dl or more were considered hyperglycemic. Postnatal mothers were approached and informed written consent was sought for participation in this study. Consenting eligible mothers were interviewed confidentially in presence of the ward sister using a pretested structured interview schedule. It contained data regarding age, community, literacy, income, parity, ANC, JSY registration, BP, etc. Information regarding birth weight and some other relevant variables were obtained from the hospital case records also. Data entry and analysis were performed in computer using SPSS-15. Descriptive statistics and Chi-square test were applied. $P < 0.05$ was considered as statistically significant. Institutional Ethics Committee of Agartala Government Medical College has approved the study.

RESULTS

Proportion of LBW among the babies born at Agartala Government Medical College and Govinda Ballabh Pant Hospital was found to be 23.9%. Majority of the mothers were aged between 20 and 25 years, 94.8% were Hindu, 38.4% belonged to scheduled caste community, 60.7% from rural area, 67.2% from joint families, 61.3% studied up to primary level, 93.8% were moderate workers and 40.7% were from middle income group. Proportion of LBW was highest among mothers, who were consuming alcohol (50.0%), and then tobacco (37.5%) and among mothers who did not have any antenatal checkup. Binary logistic regression analysis has identified age of women (odds ratio [OR] = 1.041, 95% confidence interval [CI] = 0.983-1.101, $p = 0.047$), residence (OR = 2.373, 95% CI = 1.388-4.056, $P = 0.002$), hemoglobin level (OR = 4.331, 95% CI = 3.173-5.417, $P = 0.040$), Venereal Disease Research Laboratory (VDRL) status (OR = 4.998, 95% CI = 3.275-7.627, $P = 0.031$), glycemic status (OR = 3.627, 95% CI = 2.787-3.365, $P = 0.023$) and JSY registration (OR = 4.613, 95% CI = 2.580-8.249, $P = 0.042$) as significant determinants of birth weight in this population.

Table 1 shows that LBW was significantly higher among rural mothers (28.6%, $p = 0.016$). It was also less frequent among mothers aged 25-<30 years (21.6%), scheduled tribe community (18.9%), mothers from nuclear families (19.0%), and mothers having higher income (22.2%) but these were not significant.

Table 2 shows that prevalence of LBW was significantly lower among mothers who took a full course of iron and folic acid (IFA) tablets (22.4%, $P = 0.0072$), immunized against tetanus (22.8%, $P = 0.0029$) and registered for JSY. It was also more among mothers who had inadequate ANC and were heavy workers, but these were not significant.

Table 3 shows that prevalence of LBW was significantly higher among anemic mothers (28.8%, $P = 0.0069$) and VDRL positive mothers (83.3%, $P = 0.0004$). It was more among hypertensive (24.5%), mothers having proteinuria (30.8%) and whose glycemic status was not known, but these were not significant.

Table 1: Sociodemographic factors of study mothers and birth weight of their babies

Variables	Subgroups	Birth weight		Significance
		Low number (%)	Normal number (%)	
Age (years)	15-<20 years	12 (25.0)	36 (75.0)	$\chi^2=0.442$ $df=3$ $P=0.9315$
	20-<25 years	35 (24.0)	111 (76.0)	
	25-<30 years	16 (21.6)	58 (78.4)	
	30 years and above	10 (27.0)	27 (73.0)	
Community	General	14 (23.3)	46 (76.7)	$\chi^2=0.713$ $df=3$ $P=0.8701$
	SC	30 (25.6)	87 (74.4)	
	ST	7 (18.9)	30 (81.1)	
	OBC	22 (24.2)	69 (75.8)	
Residence	Urban	20 (16.7)	100 (83.3)	$\chi^2=5.740$ $P=0.0166$
	Rural	53 (28.6)	132 (71.4)	
Family type	Joint	54 (26.3)	151 (73.7)	$\chi^2=1.990$ $P=0.1584$
	Nuclear	19 (19.0)	81 (81.0)	
Literacy	Illiterate	3 (23.1)	10 (76.9)	$\chi^2=0.832$ $df=3$ $P=0.8419$
	Primary	48 (25.7)	139 (74.3)	
	Secondary	16 (20.8)	61 (79.2)	
	Graduate and above	6 (21.4)	22 (78.6)	
Income	Low income	27 (24.8)	82 (75.2)	$\chi^2=0.162$ $df=2$ $P=0.9220$
	Intermediate	30 (24.2)	94 (75.8)	
	High income	16 (22.2)	56 (77.8)	

Table 2: Various antenatal factors and birth weight

Variables	Subgroups	Birth weight		Significance
		Low number (%)	Normal number (%)	
Nature of work	Sedentary	2 (40.0)	3 (60.0)	$\chi^2=3.691$ $df=2$ $P=0.1579$
	Moderate	65 (22.7)	221 (77.3)	
	Heavy	6 (42.9)	8 (57.1)	
JSY	Registered	16 (21.1)	60 (78.9)	$\chi^2=58.407$ $P=0.000$
	Not registered	57 (25.1)	170 (74.9)	
Antenatal checkup	Inadequate	4 (44.4)	5 (55.6)	$\chi^2=2.143$ $P=0.1432$
	Adequate	69 (23.3)	227 (76.7)	
Tetanus immunization	Immunized	68 (22.8)	230 (77.2)	$\chi^2=8.877$ $P=0.0029$
	Non immunized	5 (71.4)	2 (28.6)	
Iron and folic acid intake	Not received	7 (63.6)	4 (36.4)	$\chi^2=9.880$ $df=2$ $P=0.0072$
	Partially	18 (22.5)	62 (77.5)	
	Full course	48 (22.4)	166 (77.6)	

Table 4 shows that the prevalence of LBW was significantly higher among mothers who delivered vaginally (32.8%, $P = 0.001$). It was more among multipara (26.2%), birth order of 2 or more (25.2%) and male births (24.3%) though these were not significant.

DISCUSSION

Present study has detected the prevalence of LBW to be 23.9% among deliveries happening at Agartala Government Medical College. As per NFHS-III prevalence of LBW in Tripura was 27.3%,^[7] which may be due to the fact that NFHS-III was conducted 8 years ago and the actual scenario might have improved by now. Idris *et al.*, 2000,^[8] Kaushal *et al.*, 2012^[9] and Agarwal *et al.*, 2011^[10] have found it to be 32.2%, 38% and 40% respectively, which reflect the institutional LBW rate of Uttar Pradesh. Whereas Singh *et al.*, 2010^[11] have found it to be 11.07%, which may be attributable to the ethnicity of the participant mothers there. We have found prevalence of LBW to be 25% among teenaged mothers and 27.0% among mothers aged 30 years or more that was higher than the other age group mothers, and it was not significant. Similarly Kaushal *et al.*, 2012^[9] have observed higher LBW rate among the teenaged and older

mothers. Vijayalaxmi and Urooj, 2009^[12] have also found higher LBW rate among higher age group mothers, which was not significant. We have found LBW rate to be higher (28.6%) among Muslim mothers, which is similar with the observations of Kaushal *et al.*, 2012^[9] and Agarwal *et al.*, 2011.^[10] This may be due to poor literacy and health awareness of these groups of mothers. We observed higher (25.6%) LBW among the mothers from scheduled caste community. This may be associated with their low socio-economic status and nutrition. In our study, LBW was more (28.6%) among mothers from rural areas. This may be due to poor awareness and accessibility to healthcare in rural areas. In our study birth of LBW babies was higher (26.3%) among mothers from joint families. This may be due to ignored and impaired nutritional status of mothers in joint families. We have found a higher percentage (25.7%) of LBW among mothers with low literacy. Similarly Agarwal *et al.*, 2011^[10] also have found higher (65.5%) prevalence of LBW among low educated mothers. Present study detected LBW rate of 42.9% among mothers engaged in heavy works. It was similar (47.5%) to the observation of Idris *et al.*, 2000.^[8] More number of LBW cases was seen among mothers who were not registered for “Janani Suraksha Yojana.” This is probably due to their lesser exposure to nutrition education, IFA supplementation and checkups. In the present study mothers having some sort of addictions gave birth to a higher number of LBW babies. Similarly Agarwal *et al.*, 2011^[10] also have found higher (58.5%) prevalence of LBW among addicted mothers. We saw higher percentage (32.8%) of LBWs among mothers who delivered normally. Similarly, Kaushal *et al.*, 2012^[9] have also observed higher percentage (41.89%) of LBW among mothers who delivered normally. We have observed 75.0% prevalence of LBW among mothers who did not have any ANC. Similarly, Kaushal *et al.*, 2012^[9] have also observed higher LBWs among mothers, who had either no or inadequate ANCs. In our study rate of LBW was higher (63.6%) among mothers who did not receive IFA supplementation during pregnancy, which strengthens the need of IFA supplementation during pregnancy. In our study, mothers who had high BP and proteinuria gave birth to more number of LBW babies, and this is plausible to the fact that toxemia of pregnancy impairs placental circulation thereby reducing the fetal weight gain. We detected higher percentage (24.3%) of LBWs among the male babies whereas on the contrary, Singh *et al.*, 2010^[11] have observed that 58.9 % of the LBWs were females, and 41.1 % of the LBWs were male babies. We have found more LBWs (25.2%) among the birth orders of 2 or more, Kaushal *et al.*, 2012^[9] also had similar findings. We have found higher (26.2%) LBWs among multipara mothers and Kaushal *et al.*, 2012^[9] also had similar findings. Higher (28.8%) LBWs were observed among anemic mothers. Similar observation was also made by Idris *et al.*, 2000,^[8] Agarwal *et al.*, 2011^[10] and Singh *et al.*, 2010.^[11]

Table 3: Various maternal health parameters and birth weight

Variables	Subgroups	Birth weight		Significance
		Low number (%)	Normal number (%)	
VDRL test	Reactive	5 (83.3)	1 (16.7)	$\chi^2=15.738$ $df=2$ $P=0.0004$
	Nonreactive	65 (22.1)	229 (77.9)	
	Unknown	3 (60.0)	2 (40.0)	
Glycemic status	Euglycemic	63 (22.4)	218 (77.6)	$\chi^2=4.813$ $df=2$ $P=0.0901$
	Hyperglycemic	6 (46.2)	7 (53.8)	
	Unknown	4 (36.4)	7 (63.6)	
Proteinuria	Present	4 (30.8)	9 (69.2)	$\chi^2=4.027$ $df=2$ $P=0.1335$
	Absent	40 (20.3)	157 (79.7)	
	Not-known	29 (30.5)	66 (69.5)	
Blood pressure	Normotensive	58 (23.8)	186 (76.2)	$\chi^2=0.019$ $df=2$ $P=0.9906$
	Hypertensive	13 (24.5)	40 (75.5)	
	BP not-measured	2 (25.0)	6 (75.0)	
Hemoglobin	Normal	16 (15.0)	91 (85.0)	$\chi^2=7.303$ $P=0.0069$
	Anemic	57 (28.8)	141 (71.2)	

VDRL = Venereal Disease Research Laboratory, BP = Blood pressure

Table 4: Feto-maternal factors and birth weight

Variables	Subgroups	Birth weight		Significance
		Low number (%)	Normal number (%)	
Parity	Primi para	46 (22.8)	156 (77.2)	$\chi^2=0.444$ $P=0.5053$
	Multi para	27 (26.2)	76 (73.8)	
Mode of delivery	Vaginal	43 (32.8)	88 (67.2)	$\chi^2=9.968$ $P=0.0016$
	Caesarean	30 (17.2)	144 (82.8)	
Birth order	1 st order	44 (23.2)	146 (76.8)	$\chi^2=0.167$ $P=0.6829$
	≥2 nd order	29 (25.2)	86 (74.8)	
Gender of the baby	Male	41 (24.3)	128 (75.7)	$\chi^2=0.022$ $P=0.8818$
	Female	32 (23.5)	104 (76.5)	

CONCLUSION

Improved female literacy and registration under “Janani Suraksha Yojana” will ensure adequate ANC, Iron and Folic Acid supplementation, and screening for toxemia of pregnancy and other risk factors. All these in turn will help to reduce LBW in this community.

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