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

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

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. Babies born with LBW are more likely to have health problems and slower development from immediately after birth to later in life. 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. 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. 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. National Family Health Survey-III (NFHS-III) has found that in India 21.5% and in Tripura 27.3% babies are born with LBW. 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.
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.[11] 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. 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. Mothers having fasting venous blood glucose level 126 mg/dl or more were considered hyperglycemic. Postnatal care was inadequate ANC. Mothers having fasting venous blood glucose level between standard I and VIII. Secondary educated were those who had schooling of any level between standard I and VIII. 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 care was inadequate ANC.

**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, 23.9% were Hindu, 38.4% belonged to scheduled caste community, 23.9% were aged between 20 and 25 years, 94.8% were Hindu, 38.4% belonged to scheduled caste community, 23.9% were aged between 20 and 25 years, 94.8% were Hindu, 38.4% belonged to scheduled caste community, 23.9% were aged between 20 and 25 years, 94.8% were Hindu, 38.4% belonged to scheduled caste community, 23.9% were aged between 20 and 25 years, 94.8% were Hindu, 38.4% belonged to scheduled caste community, 23.9% were aged between 20 and 25 years. It was less frequent among mothers who had inadequate ANC and were heavy workers, but these were not significant.

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

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

### Table 2: Various antenatal factors and birth weight

<table>
<thead>
<tr>
<th>Variables</th>
<th>Subgroups</th>
<th>Birth weight</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Low number (%)</td>
<td>Normal number (%)</td>
</tr>
<tr>
<td>Nature of work</td>
<td>Sedentary</td>
<td>2 (40.0)</td>
<td>3 (60.0)</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>65 (22.7)</td>
<td>221 (77.3)</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>6 (42.9)</td>
<td>8 (57.1)</td>
</tr>
<tr>
<td>JSY</td>
<td>Registered</td>
<td>16 (21.1)</td>
<td>60 (78.9)</td>
</tr>
<tr>
<td></td>
<td>Not registered</td>
<td>57 (25.1)</td>
<td>170 (74.9)</td>
</tr>
<tr>
<td>Antenatal checkup</td>
<td>Inadequate</td>
<td>4 (44.4)</td>
<td>5 (55.6)</td>
</tr>
<tr>
<td></td>
<td>Adequate</td>
<td>69 (23.3)</td>
<td>227 (76.7)</td>
</tr>
<tr>
<td></td>
<td>4 (9.4)</td>
<td>55 (90.6)</td>
<td>( P = 0.1432 )</td>
</tr>
<tr>
<td>Tetanus immunization</td>
<td>Non immunized</td>
<td>68 (22.8)</td>
<td>230 (77.2)</td>
</tr>
<tr>
<td></td>
<td>5 (71.4)</td>
<td>2 (28.6)</td>
<td>( P = 0.0029 )</td>
</tr>
<tr>
<td>Iron and folic acid intake</td>
<td>Not received</td>
<td>7 (63.6)</td>
<td>4 (36.4)</td>
</tr>
<tr>
<td></td>
<td>Partially</td>
<td>18 (22.5)</td>
<td>62 (77.5)</td>
</tr>
<tr>
<td></td>
<td>Full course</td>
<td>48 (22.4)</td>
<td>166 (77.6)</td>
</tr>
</tbody>
</table>
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 Unooj, 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[11]. 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[13] 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[13] 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 multipartara 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[13] and Singh et al., 2010[11]

**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.
ACKNOWLEDGMENTS

We sincerely acknowledge Indian Council of Medical Research for approving “Short Term Studentship — 2012” award for this study.

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How to cite this article: Bhattacharjya H, Das S, Ghosh D. Proportion of low birth weight and related factors in a tertiary care institute of Tripura. Int J Med Public Health 2015;5:10-3.

Source of Support: Nil, Conflict of Interest: None declared.