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Descriptive Study of Birth weight of Infants born in a Tertiary Hospital, Mumbai

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Abstract

Background: The prevalence of low birth weight (LBW) in India is found to be 26%. WHO estimates 25 million LBW babies are born each year, nearly 95% of them in developing countries. LBW is a major determinant of neonatal mortality and morbidity. In addition, the number of stillbirths and the incidence of LBW babies were found to increase with decreasing maternal haemoglobin level. **Aims & Objectives**: Aim of the study was to assess the average birth weight amongst children born in a tertiary hospital and study the factors influencing the birth weight of the child. **Methodology**: A descriptive study based on secondary data collected from the hospital records of women delivering in the hospital from January to December. Data included mother's age, mother's haemoglobin levels, term of delivery, type of delivery, outcome of delivery, sex of the child and birth weight of the child. **Results**: The ratio of female to male child is 0.93. Approximately 83% (1559) mothers delivered at term while 17% (329) delivered prematurely. Of the 1850 single live births, 347(19%) were underweight. 22% of the female children were underweight as compared to 16% male children. This difference in birth weight between male and female children was statistically significant. The percentage of women with haemoglobin less than 10 gms% delivering a low birth weight baby was 23% as compared to 17% of those with haemoglobin levels 10 gms% or above. **Conclusions**: The average birth weight of female child is lesser than the male child, which was found to be statistically significant. Women with lower Haemoglobin levels tend to deliver prematurely and therefore give birth to LBW babies. Though there appears to be biological difference between male and female child, focusing on improving the haemoglobin levels especially of those below 10 gms% is likely to increase birth weight of babies.

Key words

Low Birth Weight, Maternal Haemoglobin.

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Introduction

The birth weight of a baby is strongly influenced by the mothers nutritional and health status. It indicates the health status of the baby. A child who is undernourished as indicated by the birth weight is at increased risk of diseases and death in the early years of life. Those children who do survive tend to remain undernourished, have increased susceptibility to repeated infection and also score low on the intelligence scale thereby affecting the academic performance.

World Health Organization (WHO) has defined Low birth weight (LBW) as weight at birth of less than 2.5 kg.[1] The global prevalence of LBW is 15.5%, which amounts to about 20 million LBW infants born each year, 96.5% of them are in developing countries.[2] South Asia has the highest incidence of low birth weight, with one in four newborns weighing less than 2,500 grams.[3] More than half of the world's low-birth weight babies live in just 10 countries; India alone accounts for one third of them.[3] LBW can be a consequence of preterm birth, small size for gestational age or a combination of both. Preterm birth and being small for gestational age (SGA), are causes of neonatal deaths. LBW contributes to 60% to 80% of all neonatal deaths.[2]

In India, the magnitude of low birth weight and the subsequent consequences on the health of the child, i.e. neonatal mortality is very high. Several factors are known to influence the birth weight of the child, some of which are easy to correct, so as to prevent low birth weight. Thus identifying the factors affecting the birth weight of the child, and developing strategies to correct these factors can help to bring down the problem of low birth weight.

Aims and Objectives

The aim of the study was to assess the average birth weight amongst the children born in a tertiary hospital in a metropolitan city and study the factors influencing the birth weight of the child.

Materials and Methods

K. J. Somaiya hospital is a tertiary teaching care institute attached to the Medical College. It is a 550-bedded hospital situated in the F/N ward of Mumbai, catering to the low socio-economic group. Approximately 2000 deliveries take place every year in the hospital. The findings of the study are based on women delivering in the hospital for a period of one year from January to December 2011.

Study design: Descriptive study based on secondary data collection

Study setting: A 550 bedded tertiary teaching hospital attached to the Medical college situated in the F/N ward of Mumbai, catering to the low socio-economic group.

Sampling method: Non-probability, convenience sampling. All the pregnant women admitted in the Obstetrics ward of the hospital for delivery.

Sample size: Over a period of one year, 1888 mothers delivered in the hospital

Data collection tools: A structured tool was prepared to extract the requisite information from the available records. Data collected about the mother included her age, haemoglobin levels, term of delivery, type of delivery, outcome of delivery etc. The sex of the child and birth weight of the child was also collected from the records.

Data analysis: averages, percentages, chisquare etc.

Results

During the period of January to December, 1932 women were admitted in the obstetric ward. Of these 1932 women, 19 women were admitted for spontaneous abortion; 16 had check curettage done; and 7 underwent medical termination of pregnancy. Information about two women was incomplete.

A total of 1888 mothers delivered in the hospital. The 1888 mothers delivering in the hospital gave birth to 1896 children (8 mothers gave birth to twins). The proportion of female children is 48.3% (916) and male is 51.7% (980). The ratio of female to male child is 0.93:1.0 which is comparable to national average. Of the 1888 mothers, 1857 mothers gave birth to 1864 live births (7 were twin pregnancies). The number of pregnancies not terminating into live births is 31 (One twin pregnancy). Percentage of mothers delivering at term was 82.6% (1559) mothers while 17.4% (329) mothers delivered prematurely.

Amongst the 1888 mothers, 71.6% (1351) delivered vaginally while 27.2% (514) had a caesarian section. Twenty-three mothers (1.2%) had assisted vaginal delivery (1 breach, 5 forceps and 17 vacuum).

Majority of the mothers belonged to the age group of 21-25 years (50.9%). Mothers in the age group of 26-30 years constituted 26.7%. Only 8.6% mothers were above 30 years of age. A substantial proportion of the mothers i.e. 13.8% were less than 20 years.

Majority of the mothers, 48.4% (914) were Hindus followed by Muslims (22.7%). Another 27.3% mothers followed other religions like Christian, Buddhism, and Sikhism etc. Religious status of mothers was not known in case of 30 women (1.6%).

The data on Haemoglobin (Hb) levels of 1829 women was available. 43.2% had normal Hb levels. Of the 56.8% mothers who were anaemic, only 11 mothers had very severe anaemia. The remaining women were equally distributed in the category of mild and moderate anaemia.

To get more accurate understanding of the factors influencing birth weight, the data of twins and IUFD was deleted. The data thus available was of 1850 mothers and babies.

Of the 1850 children born, 347(18.76%) were underweight. Number of underweight children was 198 females and 149 males. Remaining 1503 (81.24%) children had birth weight of 2.5 kg or above (609 were girls and 805 were boys). Analysis of birth weight according to the sex of the child showed that 22.1% of the female children were underweight as compared to 15.6% male children. This difference in birth weight between male and female children was statistically significant (X^2=12.309; df=1, p<=0.001). The average birth weight of female child is 2.7219 Kg (SD=0.45576, Range 0.75 Kg to 4.4 Kg). The average birth weight of male child is 2.8103 Kg (SD=0.44973, Range 0.60 Kg to 4.6 Kg)

The proportion of women who delivered low birth weight babies was 18.1% in mothers between the age group of 21-30 years. The percentage was slightly higher in women less than 20 years (21.3%) and women above 30 years (20.8%). This difference observed in the different age groups was not statistically significant (X^2=2.65; df=4, p =0.61). The proportion of Hindu mothers delivering low birth weight babies was

19.6% as compared to 16.8% Muslim mothers (X^2=1.517; df=2,p=0.4683).

Using a cut off value of 11 gms% for defining anaemia, there was no association found between the birth weight and haemoglobin level. However a cut off level of 10 gms% was significantly associated with birth weight (X^2=7.793; df=1; p<=0.01). The percentage of women with haemoglobin less than 10 gms% delivering a low birth weight baby was 22.6% as compared to 16.8% of those with haemoglobin levels 10 gms% or above. Of the 508 women with Hb level below 10 gms%, 22.4% delivered prematurely as compared to 13.8% amongst women with Hb levels above 10 gms% (X2=19.419, df=1, p<0.001)

Proportion of low birth weight amongst the pre-term babies was 47.1% as compared to 13.1% in the full term babies. Of the 306 preterm babies, 159(52%) were females and 147(48%) were males. The average birth weight of the pre-term female child is 2.3645 kg (SD=0.53981, Range 0.75 to 3.8 Kg) as compared to 2.3929 kg (SD=0.48592, Range 0.60 to 3.5 Kg) in a pre-term male child. The difference in weight observed in the male and female preterm child is not statistically significant. Average birth weight of full term female child is 2.7990 (SD=0.39558, Range 1.23 kg to 4.4 kg) as compared to 2.8864 (SD=0.39850, Range 1.75 kg to 4.6 kg) in a full term male child. The difference observed in full term male and female child is statistically significant (X^2=9.649; p<=0.005).

Discussion:

The ratio of female: male child is 0.93:1.0 which is comparable to national average. The sex difference observed could be possibly due to sex selection, which is probably happening despite a very stringent PNDT act. This is definitely a cause for concern, and requires a wide community campaign to sensitize the people to stop gender discrimination.

The proportion of low birth weight (<2.5kg) amongst the 1850 children born was 18.8%. The number of underweight female children (22.1%) was more as compared to male children (15.6%). This difference in birth weight between male and female children was statistically significant. A longitudinal study by Boratne et al in rural Maharashtra found a similar prevalence of low birth weight.[4] The prevalence of low birth weight was more among females (20.8%) than in male babies (17.6%).[4] Analysis of the NFHS 3 data by Bharati et al found that the prevalence of LBW was 20% in India, with higher proportion of male children having LBW as compared to females.[5]

The average birth weight of a female child was found to be 88 gms lesser than the male child. Similar observations was made by Mathai in their study in South India, where they found that female child was on average less than 113 gms than the male child.[6]

Age of the mother at the time of delivery seems to influence the birth weight of the baby. In the present study, it was observed that delivery of low birth weight babies was slightly higher in women less than 20 years (21.3%) and women above 30 years (20.8%) as compared to mothers between the age group of 21-30 years (18.1%). This difference observed in the different age groups was not statistically significant in the present study. However a study conducted by Hirve et al found that the relative risk of

having a low birth weight baby was more than one for a women less than 20 years of age.[7]

Women with severe and moderate anaemia tend to give birth weight to an underweight child more as compared to women with mild anaemia or normal Hb levels. When the cut off value for defining anaemia was used as 11 gms%, there was no association. However a cut off level of 10 gms% was significantly associated with birth weight. The percentage of women with haemoglobin less than 10 gms% delivering a low birth weight baby was 22.6% as compared to 16.8% of those with haemoglobin levels 10 gms% or above. Other studies also have found that the haemoglobin level of the mother significantly influences the birth weight of the child.[7,8]

Thus preventing and correcting anaemia in adolescents and young women before they attain motherhood through various measures like regular haemoglobin assessments, weekly iron folic acid supplementation, regular deworming, treating anaemic females with therapeutic doses coupled with nutritional education could be helpful.

Proportion of low birth weight amongst the pre-term babies was 47.1% as compared to 13.1% in the full term babies, which is substantially high. Low Haemoglobin levels also predispose to premature delivery as seen in the present study and therefore correcting haemoglobin levels would be helpful to reduce prematurity.

Difference in birth weight was observed in full term male and female child that was found to be statistically significant. No such difference was observed in male and female pre-term children. Gestational age thus seems to be an important determinant of the birth weight. Study conducted by Anitha et al, Mathai et al and Akoijam et al revealed that parity and gestational age influences the birth weight. [9,6,10] The fact that there was a significant difference in the birth weight of the male and female full term baby could imply a genetic pre-disposition to a slightly lower birth weight amongst females as compared to males.

Conclusions:

A statistically significant difference was observed between the average birth weight of female and male child. The weight of the female children was lower than that of the male children. The haemoglobin levels of the mother, and the term of pregnancy are associated with the birth weight of the child. Women with lower haemoglobin levels tend to deliver prematurely and therefore give birth to low birth weight babies. There was no statistically significant difference in the birth weight of the pre term male and female child. However there was statistically significant difference in birth weight of full term male and female child. There appears to be biological difference between male and female child.

Focusing on improving the haemoglobin levels especially of women with haemoglobin <10 gms% is likely to increase birth weight of babies. There should be extensive community and school based programmes that focus on improving the haemoglobin levels in the adolescent girls much before they enters the stage of motherhood. These efforts would definitely contribute to reducing the prevalence of low birth weight in the community.

Limitations

The data was obtained from the existing hospital records. Certain information required like haemoglobin status was not available for all the women delivering in the hospital. We also did not have haemoglobin levels of the women at the time of registration. Most women do consume iron folic acid as a part of the Reproductive and Child Health Programme. So the haemoglobin levels assessed at the time of delivery could have been an improvement over the base line levels.

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