

Anthropometric assessment of nutritional status of Bangladeshi pregnant women and weight of their newborns

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Abstract

Content: Birth weight is a strong predictor of future health and development of the newborn. A baby born with a weight less than 2,500 gm is termed as low birth weight baby. Low birth weight (LBW) is the most significant factor contributing to neonatal mortality and morbidity.

Study type: Cross sectional, descriptive type of study.

Place and period of study: Different hospitals of Dhaka city and rural area of Comilla district from January 2005- December 2006.

Objectives: The study was carried out to find out whether maternal nutritional status such as weight and height affect birth weight.

Materials & Methods: Pregnant mother -newborn pair 100 in number of low socio economic status residing in urban and rural areas were included in the study. They were followed up from mid-pregnancy up to delivery at 37-42 gestational weeks. Anthropometric measurements of the mother and neonates were weighed at delivery by experienced obstetric nurses using calibrated beam scales (Oken, model TD16, Naucalpan, Mexico) read to the nearest 10 grams. Maternal anthropometric measures were collected by trained nurses. Accepted technical errors were 0.5 kg for weight and 0.1 cm for height.

Results: Mean height was a little bit higher among the mothers with low birth weight (152.8 ± 3.9 cm), but the mean difference was not statistically significant ($p > 0.05$). Mean body weight (51.2 ± 3.8 kg) was higher among the mothers with normal babies, but the mean difference was not statistically significant ($p > 0.05$), in both rural and urban areas mother's body weight and their newborns birth weight was found to have positive association.

Conclusion: From this study this can be concluded that well nourished mothers give birth to healthy babies, so, special attention should be paid to the pregnant mothers to avoid hassles of underweight babies.

Key words: Anthropometry, Nutritional status, Birth weight

Introduction:

Low birth weight (LBW) has been defined by the World Health Organization (WHO) as weight at live

birth of less than 2,500 g or 5.5 pounds (WHO, 1992). Birth weight is a great concern worldwide whether developed or developing countries because low birth weight has devastating effects on human life cycle, which begins in the mother's womb and leads to the start of a struggling journey throughout life. LBW infants are at risk of acute respiratory distress, pneumonia or acute lower respiratory tract infections (ALRI) at a rate almost twice that of infants with normal birth weight; and more than three times greater if their weight is less than 2000g¹⁷⁻²⁰. LBW

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is also implicated as a contributor to impaired immune functions which may be sustained throughout childhood.²¹⁻²³

Evidence shows that adults born with LBW face an increased risk of coronary heart disease including high blood pressure; stroke and non-insulin dependent diabetes mellitus. Even they produce under weight babies during their reproductive life. At least 17 million infants are born worldwide every year with low birth weight³, about 16% of all newborns in developing countries, with nearly 80% of all affected newborns with low birth weight at term being born in Asia, mainly South-Central Asia, Bangladesh having the highest incidence rate in the world⁵. Countries with higher percentages of LBW infants generally have a higher percentage of women with low body mass index (BMI) and a higher percentage of underweight children^{13,14}.

LBW is generally associated with increased morbidity and mortality, impaired immune functions, and poor cognitive development for neonates (newborns 1-28 days of age) and infants. Infants born with LBW are at risk to develop acute diarrhoea or to be hospitalized for diarrhoeal episodes at a rate almost two to four times greater than their normal birth weight counterparts¹⁵⁻¹⁸.

It is estimated that in Bangladesh almost half of the infant deaths from pneumonia or ALRI and diarrhoea could be prevented if LBW were eliminated^{5, 29}. Bangladesh is a developing country and has the highest incidence of low birth weight rate in the world. In Bangladesh, the available information on pregnancy outcomes related to anthropometric measurements are not sufficient. The purpose of this study was to investigate the pregnant mother's anthropometric factors affecting birth weight and to provide basic data to promote favorable pregnancy outcomes.

Methods and materials:

Study population: The study population comprised of 100 full term (37-42 completed weeks gestational age.) pregnant women and their newborns from the lower and lower middle class family who attended the Maternity and Child Health Training Institute Azimpur, Maternity unit of Sir Salimullah Medical College and Mitford Hospital Dhaka (Urban area) and from the Maternity unity of Daudkandi Upa-Zilla Health Complex, Comilla (Rural area).

Sampling technique: A total of 50 mother-infant pair samples were collected purposively, 22 pairs from urban area and 28 pairs from the rural area. The study population included full term pregnant women of lower and lower middle class family from two different environmental conditions, one group from urban area and another group from rural area. Inter-relationship of various factors, such as socio-economic factors and maternal status and birth weight of the newborns were investigated.

Development of questionnaire: As per objectives of the study; a questionnaire comprising ten questions were prepared to obtain relevant information of the socio-economic and health related data of the mothers such as age, height, weight, BMI, Hb%, Blood pressure, obstetric history: gestational age, parity, type of delivery and newborns weight and sex were recorded.

Anthropometric data recording:

Body weight of the pregnant mothers: A bathroom scale (Kubota, Japan) was used to record mother's body weight. The balance was standardized every day before use. Body weight was recorded to the nearest 0.5 kg, in bare footed and lightly dressed.

Height of the pregnant mothers: Height of the mothers were measured bare footed in the standing position with a steel plated standardized height scale to the nearest 0.1 cm.

Blood pressure of the mothers: Blood pressure of the mothers were measured by Blood pressure instrument (ALP K-2) mercury column, Japan and stethoscope (Littman. USA).

Birth weight of the newborns: Birth weight of the newborns were recorded to the nearest 10 g. within one hour of delivery without clothes on with beam balance (Jica scale, Japan).

Data analyses: After completion of data collection, all data were comprehended, processed and edited. Finally the data were analyzed and interpreted through appropriate tables, figures and descriptions.

Results:

Anthropometric analyses:

- **Height of the urban and rural mothers and their babies birth weight:**

Mean height was a little bit higher among the mothers with low birth weight (152.8 ± 3.9 cm), but the mean difference was not statistically significant ($p > 0.05$). Table: 1

Table-I
Relationship between mother's anthropometric status and birth weight

Anthropometric status of mother	Birth weight (gm)				p value
	> 2500 gm (n=39)		<2500 gm (n=11)		
	No.	%	No.	%	
Height (cm)					
<150	8	80.0	2	20.0	
150-154	14	73.7	5	26.3	
>155	17	81.0	4	19.0	
Mean ± SD (cm)	152.6±4.1		152.8±3.9		0.884*
(Range)	(140.0-163.0)		(145.0-158.0)		
Weight (kg)					
<48	5	71.4	2	28.6	
48-52	20	80.0	5	20.0	
>53	14	77.8	4	22.2	
Mean ± SD (kg)	51.2±3.8		50.4±3.6		0.538*
(Range)	(42.0-60.0)		(45.0-56.0)		

*p value reached from unpaired student's t test

• **Body weight of urban and rural mothers and their babies birth weight:**

Mean body weight (51.2±3.8 kg) was higher among the mothers with normal babies. But the mean difference was not statistically significant (p>0.05). Table: 1

- **Association between mother's body weight and their babies birth weight:** In both rural and urban areas, mother's body weight and their newborns birth weight was found to have positive association (Fig. 1 and Fig. 2). The fact inferred from the study is low body weight mothers give birth to low birth weight babies.

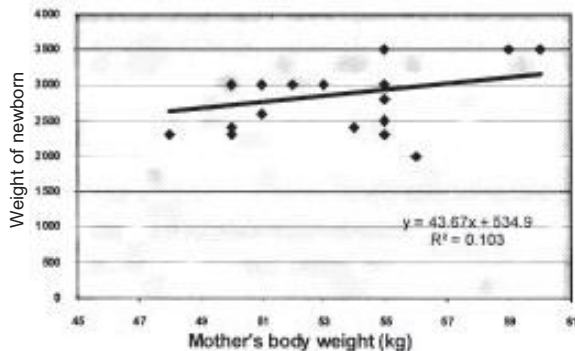


Fig.-1: Association between mother's body weight and weight of their newborns in rural areas (P=0.324)

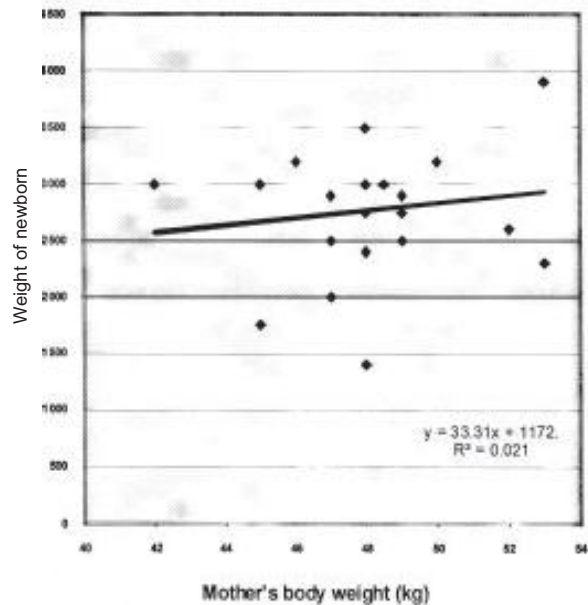


Fig.-2: Association between mother's body weight and weight of their newborns in urban areas (p=0.141)

Discussion:

In this study 50 pregnant women, 18 to 36 years of age, of 3rd trimester (gestational age between 37 to 42 completed weeks and some of them at the time of delivery), 28 from rural and 22 from urban area

(Dhaka city) were studied to correlate mothers anthropometric measurements (Height and weight) with their newborns weight. They were followed up for their delivery outcome, and the birth weights were taken within one hour of delivery.

The urban women had significantly higher body weight than the rural women. Despite these, the birth weight of the babies born to urban women was lower than that of the rural women.

It may be mentioned that bivariate association analysis showed associations, positive or negative, but all were statistically insignificant.

A cross-sectional study was conducted at three different hospitals of Dhaka city in 1992. One hundred and fifty mother child pairs were studied to correlate mother's anthropometric measurements with their newborns weight. Mother's weight, height and mid-arm-circumference were measured. That study showed significant positive correlation between mother's height, weight, mid-arm circumference and newborns weight.¹⁵

Another cross sectional study was conducted at the Maternity Hospital, Thapathali, from 6th December 2004 to 30th January 2005, to determine the relationship of maternal anthropometry with low birth weight at term. It was a prospective, hospital based, comparative study, carried out in 308 women who had delivered singleton live babies at term. The study population was divided into two groups based on baby's weight. During the study period, 154 women, who had delivered term low birth weight (LBW) babies (<2500gm), were taken as cases. For each case, a comparative case (matching in age and parity) who had delivered normal birth weight (NBW) baby (2500gm) was selected and served as control. Maternal anthropometric measurements were compared between the two groups. The variables studied were post-delivery maternal weight, height, body mass index (BMI) and mid upper arm circumference (MAC). In mothers with low body weight (<45.0kg), low birth weight babies were three times more common than in mothers with normal weight (OR 3.5 95% CI 1.82-6.770. In mothers with low height (<145.0cm), LBW babies were higher but could not reach significant level (OR 1.87 95% CI 0.98-3.750. On multiple logistic regression

analysis, only low maternal weight was powerful enough to remain significant (OR 2.84 95% CI 1.34-5.99).¹⁶

Besides these in many other reports, researcher showed significant positive correlations between mothers anthropometric measurements (Height and weight) and their newborns birth weight, but the findings of the present study were not significant possibly because of scattering of the data and small sample size. This is a limitation of the study. Study with larger sample size is therefore desirable in this context.

Conclusion

It is evident from this study that, well nourished mothers give birth to normal weight babies (2,500 g. or above) and malnourished mothers deliver under weight babies (less than 2,500 g.). So, nutritional status of the mother before pregnancy, during pregnancy and through the lactating period, must be kept adequate to get healthy babies.

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