Growth pattern and prevalence of underweight, stunting and wasting among infants of Kolkata, West Bengal, India

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Citation

Abstract

Childhood undernutrition continues to be an important public health problem throughout the developing world including India. Present study was conducted in a government general hospital in South Kolkata to ascertain the level of undernutrition and growth pattern among urban infants born with LBW. A total of 97 infants, out of 52% boys and 48% girls were included in the present analyses. Underweight, stunting and wasting was defined as z-score below - 2SD of weight-for-age, length-for-age and weight-for-length, respectively. Therefore, girls had 1.25 (Risk ratio (RR): 1.25; 95% CI: 0.73-2.15), 1.65 (CI: 0.76-3.56) and 1.88 (CI: 0.18-20.06) fold lower chance to be an underweight, stunted and wasted compared to boys. Moreover, sex of infants had a significant impact on length-for-age z-score (B = 0.372, P< 0.05). Overall the prevalence of underweight, stunting and wasting was 36.1%, 22.7% and 3.1%, respectively. This study provided evidence that undernutrition is still a leading problem during infancy in developing countries including India.

INTRODUCTION

Physical growth during infancy and early childhood is important to long-term well being and survival. It has been well documented that faltering of physical growth occurs after 4-6 months of life and many found in developing countries. Since, faltering of growth is considered as a composite indicator to reflect both acute and chronic undernutrition. The undernutrition is consequences of both food deprivation and disease, which are in turn due to poverty. Childhood undernutrition continues to be an important public health problem throughout the developing world including India [1]. A recent national survey reported that India has more than 47 million stunted children, near about one third of the global total. Around 30 % of Indian children are born with low birth weight (LBW; birth weight less than 2500g) [2]. It has now been well established that the survival of infants and their postnatal growth and development are largely depend on birth weight [3]. An earlier study from Sri Lanka reported that LBW babies show a higher vulnerability to be malnourished than their counterparts, in the first five years of life [4]. However, there is lack of studies from West Bengal with focus on growth pattern and prevalence of undernutrition during infancy especially among LBW babies. In view of the above, present study was conducted to ascertain the level of undernutrition and growth pattern among urban infants born with LBW.

MATERIALS AND METHODS

Data was collected from a postnatal clinic of a government general hospital in south Kolkata. This hospital serves the need of patients belonging to the lower middle class socio-economic group. Kolkata is a provincial capital of West Bengal. The estimated numbers of study subjects were calculated to be 92 by the formula: $n = (z_2\, p\, q)/d_2$. Where, z =1.96, p is the prevalence of infant underweight (40%), q = 1- p and d is the desire precession (10%). Assuming 10% cases will be lost during follow up, a total of 102 LBW babies were selected consecutively after screening from obstetrics ward of the same hospital. Thereafter, mothers along with baby were invited to attend postnatal clinic at month 9. A total of 97 infants, out of 52% boys and 48% girls were attended at postnatal clinic for follow up, measured and included in the present analysis. Parents were informed about the objectives of the study and their consent was obtained before initiation of study. The study protocol was approved by the institutional ethical committee.

Weight and length measurements for infants were made following the standard techniques [5] using triple beam balance and locally constructed infantometer to the nearest 1g and 1mm, respectively. Infant growth pattern was assessed based on age and sex specific z-score values from the NCHS reference population [6] using EPI INFO (Version -

6.04) software. Underweight, stunting and wasting was defined as z-score less than – 2.00 SD of weight-for-age (WAZ), length-for-age (LAZ) and weight-for-length (WLZ), respectively. Standard statistical tests were implying to test sex difference of growth pattern. Statistical significance was considered as p value less than 0.05.

RESULTS AND DISCUSSION:

Generally, childhood undernutrition is assessed by stunting (low height for age), underweight (low weight for age) or wasting (low weight for height) following different internationally and regionally recommended standards [1] . Table 1 presents the mean anthropometric characteristics and z-scores for the total and by sex of infants. It is important to note that there is no significant sex difference in mean birth weight, length at birth and LAZ at birth (p<0.05). In contrast, mean weight and length at month 9 had significantly higher in boys compared with girls. However, with regard to z-scores, the girls showed better catch up growth than their boys counterparts at the same age. The prevalence of underweight, stunting and wasting was 36.1%, 22.7% and 3.1 %, respectively (Table 2). In general, prevalence of underweight, stunting and wasting was greater in boys (40%, 28%, 4%) than in girls (31.91%, 17.02%, 2.13%). Therefore, boys had 1.25 (Risk ratio (RR): 1.25; 95% Confidence Interval (CI): 0.73 - 2.15) fold, 1.65 (CI: 0.76-3.56) fold and 1.88 (CI: 0.18-20.06) fold higher chance to be underweight, stunted and wasted as compared to girls. Moreover, It was observed that sex (male=0, female=1) of infants had a significant impact on LAZ (B = 0.372, P< 0.05). The amount of variation explained by sex was 3.4%. After controlling for birth weight, infant sex had remained significant effect on LAZ.

An earlier study had reported from Bangladesh [7] , the mean z-score for WAZ, LAZ, WLZ were -1.67, -1.33 and -0.81, respectively, which is comparable to the present findings of -1.63, -1.45 and -0.63. In the present study, 36.1%, 22.7% and 3.1 % infant were found to be underweight, stunted and wasted. Similarly, a high prevalence of underweight (36.3%) was reported among Bangladeshi infants at the same age. However, the reported prevalence of wasting (9.9%) was higher than the present findings. In contrast, the prevalence of stunting was higher in the present study (22.7%) than that reported (18.7 %) by Karim and Mascie-Taylor [7] . While, the prevalence of stunting was lower in the present study than that reported by Ergin et al [8] among LBW infants from Turkey (23.7%).

In the present study, there was no significant sex difference in the prevalence of underweight, stunting and wasting, respectively. A study from India, Mishra et al [9] found that both sexes were about equally likely to be underweight and stunted, but boys were slightly more likely than girls to be wasted. Another study from Gaza Strip, Schoenbaum et al [10] found no consistent evidence of sex differences in feeding or nutritional status among children aged 0 -18 months. A recent review [11] documented most of the surveys showed no significant sex differences exist for any of the three indicators. It is important to note that of those surveys, majority data reveals boys are more affected compared to girls as observed in the present study.

Moreover, based on WHO [1] classification of severity in malnutrition, the overall prevalence of underweight, stunting and wasting were very high (≥30 %), medium (20-29%) and low (<5%). The prevalence of underweight (very high) and wasting (low) in both sexes were under similar category. However, prevalence of stunting was medium (20-29%) in boys compared to low prevalence (<20%) in girls. Indicating that boys are affected more in faltering of linear growth than their girls' counterpart [11] . It has been suggested that the faltering of linear growth or stunting started soon after birth and continued throughout infancy [12] . Since, stunting indicated that, among these infant, there existed a medium level of chronic undernutrition due to prolonged protein energy deprivation. Thus, this study provided evidence that undernutrition is still a leading problem during infancy in developing countries including India. However, further studies are needed among a larger sample of this ethnic group for effective planning of nutritional intervention programmes during infancy in this region.

Figure 1

Table 1: Anthropometric characteristics and growth pattern of urban infants

Indicators	Overall (n=97)	Boys (n=50)	Girls (n=47)
Anthropometry:			
Weight (kg) at birth	2.191 (0.173)	2.184 (0.177)	2.198 (0.170)
Length (cm) at birth	45.75 (1.30)	45.81 (1.33)	45.68 (1.29)
Weight (kg) at month 9	7.25 (0.86)	7.47 (0.92)	7.01 (0.73)*
Length (cm) at month 9	67.34 (2.42)	67.88 (2.54)	66.77 (2.16)*
Z-scores:			
WAZ at birth	-2.40 (0.47)	-2.66 (0.41)	-2.13 (0.37)*
LAZ at birth	-2.01 (0.60)	-2.11 (0.57)	-2.01 (0.62)
WAZ at month 9	-1.63 (0.86)	-1.72 (0.93)	-1.54 (0.78)
LAZ at month 9	-1.45 (0.89)	-1.63 (0.95)	-1.26 (0.80)*
WLZ at month 9	-0.63 (0.90)	-0.65 (1.01)	-0.61 (0.78)

Standard deviations are presented in parentheses.

* Significant sex difference, ($p<0.05$).

Figure 2

Table 2. Prevalence (%) of undernutrition of the study subjects

Indicators	Criteria	Overall (n=97)	Boys (n=50)	Girls (n=47)
Underweight	Low weight-for-age	35 (36.10)	20 (40.00)	15 (31.91)
Stunting	Low height-for-age	22 (22.7)	14 (28.00)	8 (17.02)
Wasting	Low weight-for-length	3 (3.10)	2 (4.00)	1 (2.13)

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