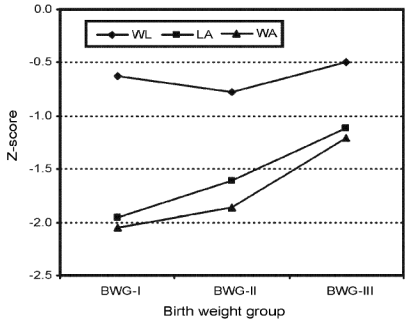
Nutritional status and growth pattern of urban infants in relation to birth weight

Malnutrition continues to be a serious public health problem throughout the developing world, particularly in sub-Saharan Africa and southern Asia, including India[1]. It has been well documented that the survival of infants and their postnatal growth and development are largely dependent on birth weight[2]. An earlier study from Sri Lanka reported that low birth weight (LBW, <2500 g) babies show a higher vulnerability to be malnourished than their counterparts, in the first five years of life[3]. However, there is shortage of studies from India with an in-depth focus on early childhood malnutrition, especially with regard to birth weight. The present study therefore examines the relationship of birth weight status and growth pattern as well as nutritional status among urban infants.

The present study was carried out in a postnatal clinic of a government hospital in South Kolkata, which caters to the needs of the lower socio-economic group of people. The estimated number of study subjects (infants) was calculated to be 92 by the formula: $n = (z^2pq)/d^2$, where $z = 1.96$, p is the prevalence of malnutrition (40%) in infants under the age of one year, $q = 1 - p$ 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 from obstetrics ward and mothers invited to visit the clinic at 9 months. A total of 97 (boys = 50, girls = 47) infants were included in the present study. Mean age of the infants was 8.90 ± 0.40 months. Infant birth weight was further divided into three birth weight groups (BWGs). The corresponding cut-off values for BWG-I, BWG-II and BWG-III were <2000, 2000–2250 and >2250 g respectively. Anthropometric measurements of weight and length for infants were made on each subject following standard techniques[4]. While growth pattern of infants was assessed based on age and sex-specific z-score values from the NCHS reference population[5] using EPI6 software, malnutrition (underweight, stunting and wasting) was measured as z-score <–2 sd of weight-for-age (WA), length-for-age (LA) and weight-for-length (WL).

The mean birth weight, weight and length of infants at 9 months were 2191 ± 173 g, 7.25 ± 0.86 kg and 67.34 ± 2.42 cm respectively. Mean z-score for LA, WA and WL of infants was -1.45 ± 0.89, -1.63 ± 0.86 and -0.63 ± 0.90 respectively. Mean z-score for WA and LA of infants had significantly increasing trends with increasing birth weight (Figure 1). Overall the prevalence of stunting, underweight and wasting were 22.7, 36.1 and 3.1%. It is important to note that the prevalence of malnourished infants was higher in BWG-I. The rates of underweight and stunted infants in BWG-I (underweight = 68.75% and stunted = 50.00%) were significantly higher compared with BWG-II (46.15 and 25.64%) and BWG-III (14.29 and 9.52%). Infants with BWG-I (<2000 g) had 13.20 and 5.14 fold greater risk to be underweight, and 9.50 and 3.28 fold greater risks to be stunted compared with BWG-III and BWG-II respectively. Moreover, the results reveal that birth weight had positive correlation with WA ($r = 0.37$, $P < 0.01$), LA ($r = 0.36$, $P < 0.01$) and WL ($r = 0.14$, $P > 0.05$) z-score respectively.

According to WHO classification of severity in malnutrition[1], the overall prevalence of underweight, stunting and wasting was high (≥30%), medium (20–29%) and low (<5%). Similarly, high prevalence of infant (9 months) underweight (36.3%) was reported from Bangladesh[6]. Since underweight is considered as a composite indicator to reflect both acute and chronic undernutrition[1], it has been suggested that undernutrition is a function of both food deprivation and disease, which are in turn the consequences of poverty[7]. Thus, interventions with a view to increasing birth weight could have a significant role in prevention of malnutrition during infancy. Therefore, respective authorities should take appropriate initiatives for improvement.



Zero indicates median value of the NCHS reference populations

Figure 1. Growth pattern of urban infants by birth weight.

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ACKNOWLEDGEMENT. I thank the guardians for providing their time and cooperation during the study period.

Received 19 May 2008; accepted 24 June 2008

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