Under-nutrition among slum children aged 3-6 years in Midnapore town, India

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Citation

Abstract

To evaluate the prevalence of under-nutrition among slum children aged 3-6 years of Midnapore, West Bengal, India. A total of 113 children were studied. Standard anthropometric techniques were utilized. The NCHS reference standards were used to determine undernutrition. The overall prevalence of underweight, stunting and wasting were 63.7%, 47.8 % and 32.7%, respectively. According to the WHO classification of severity of malnutrition, the overall prevalence of underweight, stunting and wasting were very high (≥ 30 %, ≥ 40.0 % and ≥ 15%). The rates of wasting were higher than those reported from other national and international studies on slum children. The children were under severe nutritional stress. Urgent nutritional intervention programs are required.

INTRODUCTION

As in other developing nations, undernourishment is a burden on considerable percentage of population, the most vulnerable being the youngest of this country [1] . India accounts for about 40% of undernourished children in the world, which contribute to high morbidity and mortality in the country [2] . Most of these undernourished children are underprivileged and many reside in slums. Slums are those areas which are characterized by insecure residual status, poor structural quality of house, overcrowding, inadequate access to safe water and sanitation [3] . Therefore, slum dwellers are more vulnerable to infections which results in deterioration of their nutritional status. Hitherto, data are lacking on undernutrition [4] , as assessed by WHO recommended Z-score method, of urban slum children of West Bengal. Thus, the present study was undertaken to ascertain the level of underweight, stunting and wasting among urban slum children of Midnapore town in West Bengal, India.

METHODS

This cross-sectional study was conducted in a slum area in Midnapore town of West Bengal, India, during November - December, 2005. Midnapore is located approximately 130 kms from Kolkata, the provincial capital of West Bengal State. All information was collected by a trained investigator (SD). Parents were informed about the objectives of the study and their written consent was obtained. The study protocol was approved by the institutional ethical committee. Information on age, sex, weight and height were recorded with the help of questionnaire. Children's age were recorded as reported by mothers and verified further with other senior members of the household. The estimated number of study subjects was calculated to be 96 by the formula: $n = (z^2 \times p \times q)/d^2$. Where, z =1.96, p is the prevalence of undernutrition (50%), q = 1 - p and d is the desire precession (10%). Therefore, a total of 113 children were selected following random sampling method.

Weight and height measurements were made following standard technique [5] using weighing scale and anthropometer rod to the precession of 0.5 kg and 0.1cm, respectively. Underweight, stunting and wasting were defined as weight-for-age (WAZ), height-for-age (HAZ) and weight-for-height (WHZ) Z-score below -2 standard deviation from the National Center for Health Statistics (NCHS) reference populations [6] using EPI Info version 6.0 Software. The WHO [7] classification was followed for assessing severity of malnutrition by percentage prevalence ranges of these three indicators among children.

RESULTS

The data from the present study comprised of 113 children aged 3-6 years, of these 56 were boys and 57 were girls. Table 1 shows the age and sex distribution of the subjects. It also presents the means (standard deviations) of their anthropometric characteristics. It was observed that there

was consistent increasing age trend in mean weight and height in both sexes. Girls were heavier and taller than boys at all ages.

Figure 1

Table 1: Anthropometric characteristics of slum children.

Age (year)	n		Weight (kg)		Height (cm)	
	Boys	Girls	Boys	Girls	Boys	Girls
3	17	11	10.9 (2.0)	11.4 (2.2)	85.9 (8.5)	89.5 (5.6)
4	13	14	11.8 (1.5)	12.0 (2.3)	91.3 (5.7)	93.4 (5.4)
5	18	19	12.9 (1.8)	14.2 (2.6)	99.4 (5.7)	103.2 (5.9)
6	8	13	14.8 (1.1)	14.9 (1.8)	102.3 (5.9)	105.3 (5.8)

Values are mean (sd).

The overall (age-sex combined) prevalence of underweight, stunting and wasting were 63.7%, 47.8 % and 32.7%, respectively (Table 2). Overall (age combined) prevalence of underweight (boys = 67.9, girls = 59.6%), stunting (boys = 53.6%, girls = 42.1%) and wasting (boys = 35.7%, girls = 29.8%) was higher in boys compared to girls. It was observed that there was an increasing trend in the prevalence of stunting in boys with advancement of age. Moreover, according to the WHO [7] classification of severity of malnutrition, the overall prevalence of underweight, stunting and wasting were very high (≥ 30 %, ≥ 40.0 % and ≥ 15%).

Figure 2

Table 2: Prevalence of underweight, stunting and wasting of slum children

Age (years)	n		Underweight (%)		Stunting (%)		Wasting (%)	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
3	17	11	47.1	54.5	29.4	36.4	41.2	36.4
4	13	14	69.2	78.5	53.8	64.3	30.8	42.9
5	18	19	83.3	52.6*	66.7	26.3*	44.4	21.1
6	8	13	75.0	53.8	75.0	46.2	12.5	23.1
Total	56	57	67.9	59.6	53.6	42.1	35.7	29.8

Sex combined prevalence: Underweight = 63.7 %, Stunting = 47.8 %, Wasting = 32.7 %
* Sex differences p < 0.05.

DISCUSSION

Childhood undernutrition remains a major health problem in India [8,9] especially in slums [4,10] . Several recent investigations from slums of Africa [11,12] and Asia [13,14] have studied the problem of childhood undernutrition. However, although studies have been conducted in Indian slums [15,16,17] , there is no data available on the level of undernutrition, as determined using the WHO [7] standards, among slum children of Midnapore town.

The present study reported very high rates of underweight, stunting and wasting among the slum children. According to the WHO [7] classification, the severity of undernutrition was very high indicating a critical situation. These results implied that there children were under critical nutritional stress. Most studies worldwide (Table 3) have also reported high to very high rates of undernutrition among slum children. The results of the present study are in concordance with these findings.

Figure 3

Table 3: Prevalence (%) of undernutrition among slum children: A global comparison

Town	Sample	age (year)	Underweight	Stunting	Wasting	Year	Reference
Abroad							
Nairobi	363	0.5-2.0	58.4	86.2	1.9	1996	11
Mushin	365	1 - 4	39.2	34.5	21.9	2001	12
Bangkok	232	1 - 5	25.4	18.1	6.9	2002	13
Dhaka	392	<5.0	73.2	68.4	31.2	2004	14
India							
Calcutta	601	<5.0	.	81.0	9.0	1988	15
Jabalpur	870	<5.0	.	84.0	29.0	1988	15
Lucknow	1061	1.5 - 3.5	67.6	62.8	26.5	1997	16
Delhi	630	<6.0	58.0	53.0	23.0	1997	17
Delhi	545	0.8 -3.0	75.0	74.0	19.0	2005	10
Midnapore	113	3.0 - 6.0	63.7	47.8	32.7	Present study	

In general, undernutrition was more prevalent (Table 3) among slum children in South Asia (Bangladesh and India) as compared to those of Africa (Nairobi and Mushin) and South East Asia (Bangkok). These observations are in also agreement with the earlier well documented report [7] that the level of undernutrition among children (not necessarily slum dwelling) in South Asia (Bangladesh, India, and other adjoining countries) are among the highest in the world. A noteworthy finding was that compared to other studies, the prevalence of wasting (32.7%) among the slum children of Midnapore was the highest.

It is well established that undernutrition continues to be a primary cause of ill-health and premature mortality among children in developing countries [8] and chronic undernutrition in childhood is linked with slower cognitive development and serious health impairments of later in life that reduce the quality of people [18]. Therefore, immediate appropriate nutritional intervention programmes are required to be implemented among slum children of Midnapore. Since undernutrition among children is prevalent in almost all the states in India [19], similar studies should be conducted among slum-dwelling children of various ethnicity residing in different towns of India to determine whether there are any ethnic and regional variations in the prevalence of undernutrition. These studies should help in the formulation of health intervention and promotion programmes to reduce the prevalence of undernutrition. Lastly, we suggest that future investigations of nutritional status of slum-dwelling children also incorporate information on morbidity and mortality to better understand the relationship of undernutrition and health outcome.

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