RESEARCH ARTICLE

HIGH PREVALENCE OF STUNTING AMONG RURAL ADOLESCENTS IN BANKURA DISTRICT OF WEST BENGAL

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ARTICLE INFO

ABSTRACT

The objective of the study was to determine the prevalence of stunting among rural adolescents in Bankura district of West Bengal. Total 2,130 students aged 10-16 years were included in the present study. Anthropometric measurements including weight and height were measured by standard procedures. Stunting was defined as height-for-age z-score (HAZ) of <-2 standard deviation (SD) of the 2007 World Health Organization (WHO) growth reference. Severe stunting was defined as HAZ of <-3 SD. The results showed that overall prevalence of stunting was 44.03%. Of the stunted children, 143 (6.71%) were severely stunted. The rate of stunting was higher among boys (52.46%) than girls (35.13%). The prevalence of stunting was more in mid adolescents (14-16 years) than early adolescents (10-13 years) stage. According to the WHO classification for assessing severity of malnutrition, the rates of stunting were very high in both sexes.

INTRODUCTION

Stunting (i.e. linear growth faltering) is an important public health problem for children living in environments with poverty, poor nutrition and high prevalence of infectious diseases such as found in developing countries (Adair and Guilkey, 1997). It is defined as height-for-age z-score (HAZ) of equal to or less than minus two standard deviation (-2 SD) below the mean of a reference standard (WHO, 1995). Stunting is a well-established child-health indicator of chronic malnutrition which reliably gives a picture of the past nutritional history and the prevailing environmental and socio-economic circumstances (WHO, 1996). It is highly prevalent in environments that are characterized by a high prevalence of infectious diseases (de Onis and Blossner 2003). On the other hand, stunting impairs host immunity, thereby increasing the incidence, severity, and duration of many infectious diseases (Verhoef *et al.*, 2002). The long-term consequences of stunting include short stature, reduced capacity of work, and increased risk of poor reproductive performance (WHO, 1995, Lancet, 2009). It associated with increased risk of mortality during childhood (Lancet, 2009; WHO, 2009).

It is commonly believed that stunting is mainly a problem of young children, but, although there may be some potential for catch-up growth during adolescence, recent studies suggest that children will not catch up during middle childhood if they remain in the deprived environment that caused them to become stunted in the first place. Thus, children who have become stunted are likely to remain stunted into adulthood (Friedman *et al.*, 2005 Adair and Guilkey, 1997). Height has been shown to be related to productivity, and a 1% loss in adult height as a result of childhood stunting is associated with a 1.4% loss in productivity (Al-Saffar, 2009).

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The adolescent period is a very important phase in the life span of an individual. It is defined as the period of transition between childhood and adulthood and is characterized by an exceptionally rapid rate of growth (Tanner, 1978). About, 20 percent of the population of the South-East-Asia consists of adolescents and according to 2001 census of India, 22.9 per cent of the Indian population is adolescent, constituting $1/3^{rd}$ of the total world adolescent population (Vashist *et al.*, 2009).

The present study was therefore undertaken in order to determine the prevalence of stunting among rural adolescents in Bankura, West Bengal of India.

MATERIALS AND METHODS

Subjects

Data for the present study were collected from five higher secondary schools, situated in rural area within the Bankura Block-I under Bankura district of West Bengal. Subjects were randomly selected from these schools. The sample size consisted of 2130 (boys = 1094; girls = 1036) children aged 10-16 years. The age of the children was recorded from the school records.

Anthropometric measurements

Height and weight of the subjects were recorded using the standard techniques and procedure (Lohman *et al.*, 1988). Height was taken with the help of an anthropometer to the nearest 0.1 cm. The weight was recorded to the nearest 0.5 kg using portable weighing machine and wearing minimum clothing.

Stunting

The World Health Organization recommends the United States' National Center for Health Statistics percentiles as a reference for international use. Following conventional cut-off points of Z-scores,

malnutrition in its various forms is defined as follows:
Stunting= height-for-age Z-score (HAZ) below the median by more than minus two standard deviations (-2SD).

We followed the WHO (1995) classification for assessing severity of malnutrition by percentage prevalence ranges of these two indicators among children.

The classification is:

Indicators	Low (%)	Medium (%)	High (%)	Very High (%)
Stunting	< 20	20 – 29	30 – 39	≥ 40

Ethical clearance

The teachers, children and parents were well-informed of the scope and extent of the survey, and verbal consents of the parents and pupils were also obtained prior the commencement of study.

RESULTS

A total of 2,130 adolescent students of 11 to 16 years age group were participated in the present study. Among them 1094 were boys and '1036 were girls'.

higher percentage of stunting (46.6%) was reported by Mondal and Sen (2010) among rural adolescent of Darjeeling district of West Bengal. A high prevalence of stunting (52.5%) has also been documented from West Bengal by Das *et al.* (2007). Malhotra and Passi (2007) reported the prevalence of stunting to be 29.7% among rural adolescent girls from in North India. The finding of the higher prevalence of stunting is a common occurrence among adolescent in low and middle-income countries (Senbanjo *et al.*, 2011).

The results of the present study clearly indicated that, based on WHO classification of severity malnutrition, the (age and sex combined) prevalence of stunting was very high (≥40%). The very high level of stunting among these subjects may be due to prolonged food deprivation. The basic reason behind stunting indicates the long term cumulative inadequacies of health and nutrition and an insufficient intake of nutrients during the early stage of childhood. It had been opined earlier by Measham and Chatterjee (1999) that one of the key causes of undernutrition among Indian communities was the lack of access to insufficient foods and resource amenities. Socio-economic status such as the mother's education and occupation, household income and health expenditure may influence stunting levels indirectly (Mamabolo *et al.*, 2005). In conclusion, stunting is a common problem among adolescent in rural areas of Bankura district of West Bengal.

Table 1. Age wise distribution of participants

Age (yrs)	Boys (N)	Girls (N)
10	188	189
11	141	145
12	169	155
13	150	176
14	148	155
15	167	112
16	131	104
Total	1094	1036

Table 2. Prevalence of stunting among rural adolescent of Bankura

Age (yrs)	Boys (%)				Girls (%)			
	Severe	Moderate	Overall	Normal	Severe	Moderate	Overall	Normal
10	9(4.78)	78(41.48)	87(42.27)	101(53.72)	4(2.36)	71(42.01)	75(39.68)	114(67.45)
11	3(2.12)	28(19.58)	31(21.98)	110(78.04)	3(2.06)	40(27.58)	43(29.65)	102(70.34)
12	7(4.14)	51(30.17)	58(34.31)	111(65.68)	5(3.22)	12(7.74)	17(10.96)	138(89.03)
13	16(10.66)	64(42.66)	80(53.33)	70(46.66)	5(2.84)	42(23.86)	47(26.7)	129(73.29)
14	50(33.78)	61(41.21)	111(75.0)	37(25.0)	19(12.25)	83(53.54)	102(65.8)	53(34.19)
15	18(10.77)	114(68.26)	132(79.04)	35(20.95)	0(0)	34(30.35)	43(30.35)	78(69.64)
16	4(3.05)	71(54.19)	75(57.25)	56(42.74)	0(0)	46(44.23)	46(44.23)	58(55.76)
Total	107(9.78)	467(42.68)	574(52.46)	520(47.53)	36(3.47)	328(31.66)	373(36.0)	672(64.86)

The frequency of stunting is presented in Table 2. Using the cutoff value of -2 Z-scores of height-for-age, the overall (age and sex combined) prevalence of stunting was 44.03%. The overall rates of stunting was higher among boys (52.46%) compared with girls (35.13 %). Age specific prevalence rate of stunting was higher among mid adolescent stage than early adolescent stage in both sexes. Boys aged 15 years had higher prevalence rate of stunting (79.04 %) compared to girls (44.23 %) at 16 years age. In both boys and girls, moderately stunted was higher proportion than severely stunted. Based on World Health Organization classification of severity of malnutrition, the overall prevalence of stunting was very high (≥ 40). Results also showed that the only 47.53% of boys and 64.86% of girls were in normal category.

DISCUSSION

The study highlights the extent of stunting among rural adolescent students of Bankura, West Bengal. This study documents noteworthy levels of stunting (44.03%) among the participants. The major findings of this study were that more than half of the boys were stunted (52.46%) where only 35.13% girls were stunted. Similarly, a

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