Original Article

ASSESSMENT OF NUTRITIONAL STATUS OF RURAL EARLY ADOLESCENT SCHOOL GIRLS IN DANTAN-II BLOCK, PASCHIM MEDINIPUR DISTRICT, WEST BENGAL

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ABSTRACT

A study was conducted to ascertain the growth and nutritional status of adolescent school girls in rural area. Present study was conducted among adolescent girls studying in 5th to 8th standard (age group of 10 to 14 years) of eighteen government approved school in Dantan-II block, Paschim Medinipur district, West Bengal. Physical growths of total of 3611 girls were assessed through anthropometry. Data on weights and heights of girls were collected using standardized techniques. The extent of malnutrition of adolescent girls was evaluated by well-to-do Indian and NCHS median value. The results revealed that the weights and heights of these girls were below those of standard value. As regards weight for age index, only 28.2% subjects were in the normal category and the percentage of subjects suffering from Grade I (25.7%), Grade II (30.4%), Grade III (13.7%) and Grade IV (1.9%) malnutrition was quite prevalent in present study. With respect to height for age index, 65.2% of the subjects were in the normal category, 32.6% had mild retardation and about 2.2% had poor status. The present study revealed that different grades of malnutrition are widely prevalent among the girls in our study area. All these observations suggest that school going early adolescent girls need better nutrition to combat the problem of under nutrition. Further studies should be made to identify the factors responsible for it.

Key words: Nutritional Status, Anthropometry, Adolescent Girls, Dantan-II block

INTRODUCTION

Adolescence is an important stage of growth and development in the lifespan. Unique changes that occur in an individual during this period are accompanied by progressive achievement of biological maturity.[1] This period is very crucial since these are the formative years in the life of an individual when major physical, psychological and behavioural changes take place.[2] Adolescent may represent a window of opportunity to prepare nutritionally for a healthy adult life.[3]

Adolescent girls, constituting nearly one tenth of Indian population, form a crucial segment of the society.[4] The girls constitute a more vulnerable group especially in the developing countries where they are traditionally married at an early age and are exposed to greater risk of reproductive morbidity and mortality. In general adolescent girls are the worst sufferers of the ravages of various forms of malnutrition because of their increased nutritional needs and low social power.[5] Early adolescence is a period of rapid growth and maturation in human development. The nutritional status of adolescent girls, the future mothers, contributes significantly to the nutritional status of the community.[6] Under-nutrition among adolescent girls is a major public health problem leading on impaired growth.[7] Nutritional deficiencies has far reaching consequences, especially in

adolescent girls. If their nutritional needs are not met, they are likely to give birth to undernourished children, thus transmitting undernutrition to future generations.[8] Previous study showed that girls from disadvantaged backgrounds have poor nutritional status.[5,9] Their weights and heights are lower than the well-to-do Indian counterparts.[10]

This age group needs special attention because of the turmoil of adolescence which they face due to the different stages of development that they undergo, different circumstances that they come across, their different needs and diverse problems. Rural adolescent girls have been considered a low risk group for poor health and nutrition.[2] Despite all these important considerations, adolescent girls did not receive adequate attention in rural areas in our country, and only recently few studies have been carried out in this population group.[2,5,6] It is well established that nutritional status is a major determinant of the health and well-being among adolescent and there is no doubt regarding the importance of the study of nutritional status.[11] Nutritional status was evaluated using anthropometric indicators recommended by WHO Expert Committee.[12]

Keeping in view, the present study has been elucidated to assess the nutritional status of rural school going adolescent girls in Dantan-II block, Paschim Medinipur, West Bengal.

METHODOLOGY

Study Area:

The present study was carried out in Dantan-II block which consist of remote villages situated around 216 km away from Kolkata, the provincial capital of West Bengal and 60 km from district head quarter. In Datan-II block, there were 18 Govt. approved secondary schools among them two are girl schools and rest are co-ed schools. All school girls were included in the present study. The period of the study was 2009-10 academic session. The study was cross-sectional in nature and the subjects were selected through random sampling procedure.

Study Participants:

The study was conducted among adolescent school girl (10-14yrs) of Dantan-II block and girls were living in and around the school. Selected girls were studying in 5th, 6th, 7th and 8th standards formed part of the study. Total 4143

girls were enrolled in 2009-10 academic session and 3611 girls were measured. The participation rate was over 85%.

Age estimation

Assessment of age is most essential for conducting growth studies. The accurate age of the adolescent girls was recorded from the school registration books.

Measurements

Height

Height in centimetres was marked on a wall with the help of a measuring tape. All girls were measured against the wall without foot wear and with heels together and their heads positioned so that the line of vision was perpendicular to the body. A glass scale was brought down to the topmost point on the head. The height was recorded to the nearest 1 cm.

Weight

A bathroom scale was used. It was calibrated against known weights regularly. The zero error was checked for and removed if present, every day. The clothes of the girls were not removed as adequate privacy was not available. Their weight was recorded to the nearest 500 grams.

Statistical Analysis:

The physical growth data obtained from the different age groups of girls were compared with WHO recommended anthropometric indicators and with those of the well-to-do Indian girls.[13] Nutritional status of different age groups of girls were categorized as per Indian Academy of Paediatrics classification using weight for age and Vishveshswara Rao's classification using height for age as indicators.[14] Statistical calculations were performed using standard methods.

Ethical consideration:

Permission for the study was obtained from the school authorities prior to commencement.

RESULTS

Distribution of subjects:

Table 1 focused the age and class wise distribution of the study subjects. Among all the subjects, maximum (26.47%) were studying in 5th standard and minimum (23.62%) in 8th standard.

Table 1: Details age and class wise distribution of the adolescent girls

Characteristics	No. of Girls (n=3611)	Percentage
Age (in year)		
10	817	22.63
11	771	21.35
12	767	21.24
13	878	24.34
14	378	10.47
Standard		
5th	956	26.47
6th	905	25.06
7th	897	24.84
8th	853	23.62

Mean age of girls: 12

Table 2 executes the age wise mean weight which was compared with standard references data. The mean weights of the girls ranged from 24.49 ± 4.48 to 35.73 ± 6.36 kg between the ages 10 to 14 years. But the observed data were much lower than well-to-do Indian children data and median value of NCHS data. The mean weights were 70-76% of those of the well-to-do Indian children and 71-75% of NCHS median for 10-14 years. At 10 years of age mean weight (75.35%) were closer to NCHS median value.

Table 3 presents the comparison of mean height of the subject with standard data. The mean heights of the girls were between 134.0±7.682 and 147.7±4.091 cm. The data on scrutiny revealed progressive body growth pattern of the children with increasing age. But the observed data were much inferior to well-to-do Indian children data and NCHS reference data. The mean height was 92-94% of those of the well-to-do Indian children and 90-94% of NCHS median for 10-14 years. The average height of the subjects was found to be less than the NCHS standard being 90% to 94% for 10 to 14 years girls. Similarly, the mean height of 10 years (94.33%) was closer to NCHS median value.

Table 2: Age-wise mean body weight (kg) of the adolescent girls in comparison to well-to-do Indian children and NCHS data (N=3611)

Age (Years)	N	Weight Mean (kg) ± SD	Well-to-do Indian children weight (kg)	% of well-to-do Indian children	NCHS Standard (Median value)	% of NCHS standard
10	817	24.49 ±4.48	33.58	72.93	32.5	75.35
11	771	27.59 ± 5.33	37.17	74.22	37.0	74.56
12	767	30.25 ± 5.56	42.97	70.39	41.5	72.89
13	878	33.83 ± 5.56	44.45	76.10	46.1	73.38
14	378	35.73 ± 6.36	46.70	76.50	50.3	71.03

Table 3: Age-wise mean height (cm) of the adolescent girls in comparison to well-to-do Indian children and NCHS data (N=3611)

Age (Years)	N	Height Mean (cm) ±SD	Well-to-do Indian children weight (kg)	% of well-to-do Indian children	NCHS Standard (Median value)	% of NCHS standard
10	817	130.47 ± 8.4	138.9	93.93	138.3	94.33
11	771	136.56 ± 8.65	145.0	94.17	144.8	94.30
12	767	139.52 ± 9.14	150.98	92.40	151.5	92.09
13	878	143.66 ± 8.5	153.44	93.62	157.1	91.44
14	378	145.47 ± 6.07	155.04	93.82	160.4	90.69

In order to determine the gradation of nutritional status (Table 4), weight for age index showed that overall normal category was 28.2% where the rest of the children had varying degrees of malnutrition. The percentage of children in the normal category was between 18.5% and 34.2% in the age group of 10 to 14 years. The weight for age anthropometric index showed the lowest percentage (18.5%) of normal at 14 years and height percentage (34.2) at 11 years of age. Overall higher percentages of malnutrition were grade II (30.4%).

Using the height for age index, 48.4-73.2% girls in various age groups were in the normal category with the lowest percentage at 14 years. About 23.6-50.8% of girls had mild retardation and 0.8-3.2% of girl had poor nutritional status

with respect to height for age index. The results of the present study revealed that about 71.8% of the subjects as per weight for age criterion and 34.8% of the subjects as per height for age criterion were suffering from various degrees of malnutrition.

girl at adolescent stage is high throughout the country and also in the state of West Bengal.

Based on the results of the study, it appears that children had shown reduced growth in comparison to NCHS median value and well-to-do Indian children. In the present study, the mean weights of girls were 76 to 79% and the mean heights were 95 to 97% of those of the well-to-do Indian children. The study revealed that the mean weight and height of girls were less as compared to the NCHS standards.

DISCUSSION

Adolescence is an important stage of growth and development that requires increased nutrition and adolescent anthropometry varies significantly worldwide.[12,15] Growth and development is closely linked to the diet they receive during childhood and adolescence.[3] Undernutrition among adolescent girls is a serious public health problem internationally, especially in developing countries.[18] The magnitude the problem of malnutrition amongst

Table 4: Gradation of nutritional status of adolescent girls on the basis of nutritional indices

Nutritional grades	10 yrs (n=817)	11yrs (n=771)	12 yrs (n=767)	13 yrs (n=878)	14 yrs (n=378)	Total (n=3611)
Weight for age [a]						
Normal	259(31.7)	264(34.2)	208(27.11)	218(24.82)	70(18.5)	1019(28.2)
Grade I	208(25.5)	110(14.3)	211(27.5)	299(34.05)	101(26.7)	929(25.7)
Grade II	302(37.0)	282(36.5)	172(22.42)	222(25.28)	121(32.0)	1099(30.4)
Grade III	41(5.0)	110(14.3)	149(19.42)	128(14.57)	68(18.0)	496(13.7)
Grade IV	7(0.8)	5(0.64)	27(3.5)	11(1.25)	18(4.8)	68(1.9)
Height for Age [b]						
Normal	598(73.2)	549(71.2)	493(64.3)	530(60.4)	183(48.4)	2353(65.2)
Mild retardation	193(23.6)	212(27.5)	255(33.2)	326(37.1)	192(50.8)	1178(32.6)
Poor	26(3.2)	10(1.3)	19(2.5)	22(2.5)	3(0.8)	80(2.2)

Figures in parentheses denote percentages.
[a]Indian Academy of Paediatrics Classification. [b]Vishveshwara Rao's Classification.

The results of the present study are in concurrence with the study of Goyel who reported mean weight were 75-79% and height were 95-96% of the well-to-do Indian children of 10-15 years age school girls of Jaipur.[10] Kalhan assessed the nutritional status of adolescent school girls of Haryana.[7] Their average weight, height were 22.3% and 14.9% of the corresponding estimated reference values. In the present study, the weights and heights of the girls were below those of the well-to-do Indian girls. In another study, nutritional status of adolescent girls aged 10-18 years belonging to scheduled caste communities in rural Rajasthan was assessed. It was found that the values for height and weight of the adolescent girls were below the well-to-do group study data[19]. The girls of the present study exhibited better height profiles as compared to their weights in respect to median value of NCHS. Their weights were much below those of the well-to-do Indian girls.

In the present study, the nutritional status of early adolescent girls was evaluated using Indian Academy of Paediatrics and Vishveshwara Rao's classification. Nutritional status of the early adolescent girls were revealed high incidence of under-nutrition. A large percentage of subjects were found to be suffering from different grades of malnutrition. This reflects the both acute and chronic under-nutrition among the subjects. The frequency of grade II malnutrition of girls of the present study was more than those reported in an earlier study on school girls which had reported 26.1%.[10] This may be due to, the present study subject covered rural sectors. However, both studies found similar rates of normal grade and grade III malnutrition.

Prevalence of malnutrition in the present study appeared to be distinctively higher than the earlier studies among adolescent at Kolkata[15] (30.61%) and Bangladeshi girls (16%) studied by

Ahmed et al.[16]. Overall prevalence was more or less same with that of a rural community of Gosaba Block (66%). This could be due to better literacy rate in these two areas. Kapoor & Aneja reported 35.5% of adolescent girls (11-18 years) of Delhi to be undernourished (W/H^2 less than the 5th percentile of reference standard)[17].

Anthropometric data and the extent of malnutrition in the girls of present study had revealed a dismal picture. Girls of the present study suffer from various degrees of malnutrition. This problem is widely prevalent in the rural communities of almost all state of India[2]. This disadvantaged group tend to have high rates of growth retardation and prevalence of chronic under-nutrition during the adolescent period.

These percentages of malnourished adolescent girls are quite alarming and steps need to be taken to improve their nutritional status. Hence, efforts are needed to use the school system favourably for improving the nutritional status of girls. This has earlier been suggested by Gopalan (1974)[20]. In future, studies should be done on adolescent girls in rural sectors for to identify the factors responsible for this problem, which may in turn help to adopt and implement the proper strategies for upliftment of whole community.

RECOMMENDATIONS

The present study findings amply reveal that adolescent girls in rural sectors suffer different grades of malnutrition. Considering the results of this study, it is suggested that a comprehensive strategy should be implemented in disadvantaged groups of our country in order to prevent adolescent girl undernourishment.

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