

Study on nutritional status of school girls in Rajkot city as determined by anthropometry

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The nutritional status of 142 children in the age group of 10 to 15 years studying in a government school in Rajkot city was determined through anthropometry. Data on weights and heights of girls were collected using standardized techniques. The results revealed that the weights and heights of these children were below than those of their well-to-do Indian counterparts. As regards weight for age criterion, only 28.2 per cent subjects were in the normal category and the percentage of subjects suffering from Grade I (28.2%), Grade II (26.1 %), Grade III (14.8%) and Grade IV (2.8%) malnutrition was quite considerable. With respect to height for age criterion, 63.4 per cent of the subjects could be placed in the normal category, 35.9 per cent had mild retardation and about 1 per cent had poor status.

Key Words : Anthropometry, Nutritional status, Girls, Malnutrition.

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INTRODUCTION

Girls form a deprived section of our society. They suffer from favouritism even at the hands of their mothers. Be it education or food or any other basic necessity, they are given a low priority. They also have to share the burden of household chores, look after younger siblings and participate in income generating activities. Because of this deprivation and added responsibilities in the family, the girls do not achieve their full potential. This becomes all the more marked when girls come from the low socio-economic group. Girls from disadvantaged backgrounds have poor nutritional status. Their weights and heights are lower than the well-to-do Indian counterparts. This study was planned with the objective to determine their nutritional status with the help of anthropometry.

METHODOLOGY

This paper is a part of a bigger intervention case control

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study where biscuits fortified with vitamin A, iron, folic acid, ascorbic acid and iodine were fed to the young girls studying in a government school in Rajkot city for all working days over a period of 4 months. A government school where the number of girls enrolled was high and the school being close to the University for logistical convenience was selected for the study. Girls (n=142) in the age group of 10-15 years studying in classes VI to VIII were included in the study. The weight of the girls was measured using as standardized Libra weighing balance. The bodyweight was recorded when the display of the body weight became stabilised. For measuring standing height, vertical anthropometric rod with a movable head board was used. The height was recorded to the nearest centimeter using a standardized procedure. BMI (body mass index) of the girls was calculated with the help of a formula :

$$\text{BMI (Body mass index) of the girls} = \frac{\text{Weight in kg}}{\text{height in m}^2}$$

The weights and heights of the children were compared with those of the well-to-do Indian girls (Raghavan *et al.*, 1971) and NCHS standards (WHO, 1983). They were categorized as per Indian Academy of Pediatrics classification using wweight for age and Vishveshwara Rao's classification using height for age as indicators (Gopaldas and Seshadri in different grades of malnutrition.)

OBSERVATIONS AND ASSESSMENT

The results of the present study have been discussed and presented under the following heads:

Weights and heights:

It is evident from Table 1 that the mean weights of the girls ranged from 26.6±4.292 to 37.8±5.786 kg between the ages 10 to 15 years. The mean heights of the girls were between 134.0±7.682 and 147.7±4.091 cm in the same ages. The mean weights were 76-79 per cent and the mean heights were 95-97 per cent of those of the well-to-do Indian children for 10- 15 years. At 16 years of age mean weight (87.6%) and height (98.4%) were closer to those of the well-to-do Indian children.

Extent of malnutrition in girls age-wise with respect to NCHS standards:

The percentage of children in the normal category was between 9.1 per cent and 44.0 per cent in the age group of 10 to 15 years for the weight for age anthropometric index (Table 2) with the lowest percentage at 14 years. The rest of the children had varying degrees of malnutrition. Using the height for age index, 54-70 per cent girls in various age groups were in the normal category with the lowest percentage at 15 years.

About 28-46 per cent girls had mild retardation with respect to height for age and only one girl had poor nutritional status. The results of the present study revealed that about 72 per cent of the subjects as per weight for age criterion and 37 per cent of the subjects as per height for age criterion were suffering from various degrees of malnutrition. These percentages of malnourished adolescents are quite alarming and steps need to be taken to improve their nutritional status. Anthropometric data and the extent of malnutrition in the girls had revealed a dismal picture. 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) and Van Stuijvenberg (2005) also.

Singh *et al.* (1996) determined the nutritional status of 1,044 school age children (6-18 years) in various salt manufacturing sites of Rajasthan using anthropometry. Children had shown reduced growth in comparison to NCHS standards and well-to-do Indian children. The prevalence of stunting with severe wasting was 4.5 per cent in the children of salt workers. In another study, nutritional status of 93 married adolescent girls aged 10-18 years belonging to scheduled caste communities in rural Gujarat was assessed. It was found that the values for height, weight and chest circumference of the

Table 1. Mean weight (kg) and height (cm) data of the girls age-wise

Age (years)	Weight (kg)	Well to do Indian children (Weight)	% of well to do Indian children	Height (cm)	Well to do Indian children height (cm)	% of well to do Indian children
10+(n=20)	26.6± 4.292	33.58	79.3	134.0± 7.682	138.90	96.5
11+(n=25)	29.3± 6.104	37.17	78.9	139.7± 9.296	145.00	96.3
12+(n=35)	32.9± 6.143	42.97	76.6	144.3± 8.763	150.98	95.5
13+(n=38)	34.8± 4.909	44.54	78.1	146.2± 5.768	153.44	95.2
14+(n=11)	35.4± 4.061	46.70	75.8	148.2± 6.092	155.04	95.6
15+(n=13)	37.8± 5.786	48.75	77.6	147.7± 4.091	155.98	94.7

Mean ± SD.

Table 2. Extent of malnutrition in girls age-wise with respect to NCHS standards

	10+years (n=20)	11+years (n=25)	12+years (n=35)	13+years (n=38)	14+years (n=11)	15+years (n=13)	Total (n=142)
Weight for age^a							
80% weight for age (Normal)	6(30.0)	11(44.0)	14(40.0)	6(15.8)	1(9.1)	2(15.4)	40(28.2)
71-80% weight for age (Grade I)	4(20.0)	4(16.0)	8(22.9)	20(52.6)	3(27.3)	1(7.7)	40(28.2)
61-71% weight for age (Grade II)	8(40.0)	5(20.0)	5(14.3)	7(18.4)	4(36.4)	8(61.5)	37(26.1)
51-60% weight for age (Grade III)	2(10.0)	4(16.0)	7(20.0)	3(7.9)	3(27.3)	2(15.4)	21(14.8)
50% weight for age (Grade IV)	-	1(4.0)	1(2.9)	2(5.3)	-	-	4(2.8)
Height for Age^b							
91-100% height for age (Normal)	14(70.0)	17(68.0)	23(65.7)	22(57.9)	7(63.6)	7(53.8)	90(63.4)
80-90% height for Age (mild retardation)	6(30.0)	7(28.0)	12(34.3)	16(42.1)	4(36.4)	6(46.2)	51(35.9)
80% height for age (Poor)	-	1(4.0)	-	-	-	-	1(0.7)

a IAP classification b Vishveshwara Rao's classification

adolescent girls were below the well-to-do group study data (Chaturvedi *et al.*, 1994). In the present study, too, the mean weights of girls were 76 to 79 per cent and the mean heights were 95 to 97 per cent of those of the well-to-do Indian girls. Thereby, suggesting that adolescent girls in the communities studied in Gujarat are malnourished to a great extent.

Singh and Mishra (2001) assessed the nutritional status of 70 adolescent girls belonging to the age group 13 to 18 years of a slum community of Varanasi. In all, 70 per cent adolescent girls had BMI <20; 51.4 per cent study subjects were suffering from chronic energy deficiency (CED). Stunting (heights for age 90%) was present in 10 per cent of adolescent girls. Their average weight, height, mid arm circumference (MAC) were 83.4 per cent, 93.1 per cent and 82.1 per cent of the corresponding estimated reference values. In the present study, too, the weights and heights of the girls were below than those of the well-to-do Indian girls.

Nutritional status of 47 rural adolescent girls aged 13-18 years attending a workshop on health and development in Vellore was assessed. It was found that the mean height of all the age groups was below the expected standard for the age group. The growth of 34.7 per cent of the subjects was very poor. The difference in height was much more significant in the younger age group (13-15 years) than in the older age group (16-18 years). Although all the subjects were normal for weight for height, only 51.2 per cent had normal weight for their age group (Jude *et al.*, 1991). The girls of the present study exhibited better height profiles as compared to their weights. Their weights were much below than those of the well-to-do Indian girls.

A community based, cross-sectional study was conducted on 143 adolescent girls (10-19 years) in West Bengal (Das and Biswas, 2005). Overall prevalence of 'thinness' and 'stunting' was found to be 14.7 per cent and 37.8 per cent, respectively. It was found to be much higher in the present study being 72

per cent and 37 per cent for wasting and stunting, respectively.

Venkaiah *et al.* (2002) had reported from their study on 12,124 adolescent boys and girls that about a quarter of the married adolescent girls had short stature and 18.6 per cent were under weight. About 39 per cent of the adolescents were stunted (<median - 2 SD of NCHS height for age) irrespective of sex. In the present study, about 72 per cent of the young girls were malnourished as per weight for age and 37 per cent were short in stature as per height for age.

Girls of the present study and those in the studies cited above suffer from various degrees of malnutrition. This problem is widely prevalent in the poor communities in India and can be addressed by motivating the girls to improve their dietary intake.

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