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Assessment of nutritional status of selected rural adolescent girls

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Abstract

Nutritional status of 250 rural adolescent girls in the 10-18 year age group was assessed by Anthropometric measurements. Height, body weight, MUAC and TSF thickness were recorded using standardized techniques. The study revealed that height of the subjects was well comparable with reference standards. Body weight was only comparable in the age group of 10-12 years. MUAC and TSF thickness was lower than reference standards in all the age groups. BMI was calculated for assessment of nutritional status. BMI classification revealed that only 3.80, 10.91 and 16.39 percent were in normal category in the age group of 10-12, 13-15 and 16-18 years, respectively.

Introduction

Adolescence marks an important phase in the development of an individual in the sense that it comprises nearly half of the growing period. Significant increases in the physical dimensions are observed during this phase.(Sathyavathi and Agarwal,1979) During this period 35 percent of the adult weight and 11-18 percent of adult height is acquired (Rao, 1985). It has been recommended that Body Mass Index (BMI) may be used as an indicator of nutritional status in adolescence (Shetty, 1996). Mid upper arm circumference and triceps skinfold thickness are commonly used in assessment of nutritional status. Mid upper arm circumference at or below 10th percentile indicates significant underdevelopment or wasting of muscle and that a triceps skinfold at or above the 90th percentile indicates obesity (Passmore and Eastwood, 1986). Intake plays very important role in the growth of children especially during adolescence as nutritional requirements in relation to body size are known to be increased (Rao, 1985). Thus the process of normal growth and development is dependent upon an adequate and timely supply of nutrients (Devi and Geervani, 1998). The main objective of the present study was to determine the nutritional anthropometry of Kashmiri rural adolescent girls aged 10-18 years.

Material and Methods

1. Selection of subjects and schools: The study population consisted of 250 schools going adolescent girls in the age group of 10-18 years randomly selected from various government schools. All the six districts of Kashmir valley viz. Anantnag, Baramullah, Budgam, Kupwara, Pulwama and Srinagar were chosen for the study in order to obtain a representative sample. In these districts Govt. schools were identified and on that basis 10 percent of the schools were selected from each district.

2. Collection of data: Information was elicited using interview-cum-questionnaire technique. The data for each of the selected subjects included information regarding age, religion, type of family, educational status, occupation of parents and total family income. Information regarding the actual age of the subjects was confirmed from the official records of the school.

3. Measurements: Anthropometric measurements viz body weight, height, mid upper arm circumference (MUAC) and triceps skinfold thickness (TSF) were obtained as per methodsuggested by Jelliffee (1966).

Height: Height of the subjects was measured with a vertical measuring rod. Wooden piece of the measuring vertical rod was gently lowered with the crown of the head and the reading was taken to the nearest of 0.5cm

Weight: Weight of the subjects was recorded with a personal weighing machine which was tested periodically for its accuracy with known standard weights. Zero error of the scale was checked before taking the weight. The reading was taken to the nearest of 0.1 kg.

Mid upper arm circumference: MUAC was recorded at the mid point of the upper left arm folded at right angles at elbow keeping close to the body. The reading was recorded to the nearest of 0.1cm.

Triceps skinfold thickness: TSF thickness was measured by Harpenden caliper. The

measurement was made with the arm hanging relaxed at the sides of the body. Reading was taken thrice to the nearest of 0.1 mm and average of these three measurements was calculated. Body mass index was calculated by the expression figure suggested by Garrow (1981) and subjects were classified into different classes of Chronic Energy.
Deficiency (CED).

$$BMI = \frac{\text{Weight (kg)}}{\text{Height}^2\text{ (m)}}$$

The mean, standard deviation and the percentage was calculated for various measurements.

Results and Discussion

It was observed that among the total samples under study majority (99.20%) were Muslims. Most of the subjects (66.40%) belonged to nuclear families. 30.40 per cent of the fathers were illiterate whereas 2.00, 3.60, 38.80 and 25.20 had education upto postgraduate, graduate, matric and elementary level respectively. Regarding the education of mothers 78.40 per cent were illiterate followed by elementary (14.40%) matriculate (6.40%) and graduates (0.80%). 50 per cent of the parents in this studied sample were engaged in doing farming followed by service men (20.00%) businessmen (16.40%) and artisans (13.60%). Most (88.80%) of the mothers were housewives. Maximum number (38.40%) of subjects were having their monthly income above Rs 5000/- whereas 26.00 and 35.60 per cent belonged to the income groups of Rs 3000-4999 and Rs 1000-2999 respectively. Age wise distribution of the subjects is tabulated in table 1. It is evident that 31.60, 44.00 and 24.40 per cent belonged to the age groups of 10-12, 13-15 and 16-18, years respectively.

Table 1. Distribution of rural adolescent girls according to age group (n=250)

Age group (Years)	Number	Per cent
10-12	79	31.60
13-15	110	44.00
16-18	61	24.40

The data in table 2 revealed that the mean recorded values of height were 145.42±10.66 cm, 156.06±7.80 cm and 161.52±50.44 cm for the age groups of 10-12, 13-15 and 16-18 years respectively. The mean body weight was 35.13±7.84 kg in the age group of 10-12 years, 43.11±6.64 kg in the age group of 13-15 years and 48.57±6.49 kg in the age group of 16-18 years. As evident from table 3 the mean MUAC was 15.54±2.41 cm, 19.53± 2.12 cm and 22.30±1.66 cm in the age group of 10-12, 13-15 and 16-18 years respectively. The TSF thickness for the age groups of 10-12, 13-15 and 16-18 years was 8.37±2.60mm, 10.85±2.72mm and 13.41±2.53mm, respectively. These measurments were compared with NCHS standards (1987). It was observed that in the age group of 10-12 years the height of the girls was comparable with NCHS standards. However, in the age group of 13-15 and 16-18 years it was 98.58 and 99.09 percent of NCHS standards respectively which seems to be normal. Normal height has also been reported among tribal adolescent girls of Dhar district of Madhya Pradesh (Bafana and Taneja 1998). Mean body weight was comparable in the age group of 10-12 years whereas it was slightly lower in the other two age groups. Chawla (1992) in her study on school girls of Ludhiana also revealed that mean weight was comparable with NCHS standards. Progressive increase in height and weight was observed which is in conformity with the study of Rao *et al.* (1989). MUAC and TSF thickness was lower than NCHS standards in all the age groups. A similarity has been reported in adolescent girls of rural Rajasthan by Chaturvedi *et al.* (1994). MUAC and TSF increased as the age progressed.

Table 2. Average height and weight of rural adolescent girls

Age group (Years)	N	Height (cm)	Per cent of NCHS Standard	Weight (kg)	Per cent of NCHS Standard	NCHS Standard* Height (cm)	Wt (kg)
10-12	79	145.42 ±10.66	101.90	35.13 ±7.84	100.37	142.7	35.0
13-15	110	156.06 ±7.80	98.58	43.11 ±6.64	91.72	158.3	47.0
16-18	61	161.52 ±5.44	99.09	48.57 ±6.49	90.27	163.0	53.8

Values are mean ±SD, *NCHS (1987)

BMI was used to assess the nutritional status of adolescent girls. Adolescents with BMI less than 18.5 were considered to be suffering from chronic energy deficiency (Garrow, 1981). Based on this classification it was found that 22.78, 24.05, 24.05, 24.05, 3.80 and 1.27 per cent were under the category of CED grade III, CED grade

II, CED grade I, low weight, normal and obese grade I respectively in the age group of 10 to 12 years. Similarly in the age group of 13 - 15 years CED grade III, CED grade II, CED grade I, low weight, normal and obese grade I was observed in 16.36, 16.36, 28.18 27.28, 10.91 and 0.91 per cent of subjects, respectively.8.20, 16.39, 21.31, 37.71, 16.39 per cent were under the category of CED grade III, CED grade II, CED grade I, low weight and normal category respectively in the age group of 16-18 years (table 4). Chaturvedi *et al.* (1996) in his study has also reported prevalence of various grades of CED among rural adolescent girls of Rajasthan. Only 6.59 per cent had BMI more than 18.5. In the present study BMI of the subjects increased with the advancement of age. A similar finding has been reported in Indian children (Rana *et al.* 1984)

The present study revealed that though the girls were not shorter but their weight was less than NCHS standards. MUAC and TSF thickness were also lower as compared to the reference standards. Poor nutritional status of adolescent girls has important implications in terms of physical work capacity and adverse reproductive outcomes, hence, there is an urgent need for improving the nutritional status of rural adolescent girls by organizing various community awareness programmes like regular health checkup of children at nearest primary health centers and monitoring their growth, imparting knowledge on health education regarding cleanliness, environmental sanitation, and immunization and creating awareness among masses about locally available nutritious foods by concerned workers, professionals or voluntary who are engaged in educational work in nutrition, public health and allied fields. ICDS scheme should launch mid day meal programme in rural schools as supplementation can help to improve nutritional status than mere nutritional education.

Table 3. Anthropometric measurements of rural adolescent girls

Age Group (Years)	N	MUAC (cm)	Per cent of NCHS Standard	TSFT (mm)	Per cent of NCHS Standard	NCHS Standard* MUAC (cm)	TSFT (mm)
10-12	79	15.54 ±2.41	69.68	8.37 ±2.60	64.38	22.3	13.0
13-15	110	19.53 ±2.12	78.43	10.85 ±2.72	67.81	24.9	16.0
16-18	61	22.30 ±1.66	85.76	13.41 ±2.53	73.27	26.0	18.3

Values are mean ±SD
*Gopaldas and Seshadri (1987)

Table 4. Distribution of rural adolescent girls according to body mass index classification

Age Group (Years)	N	CED Grade III	CED Grade II	CED Grade I	Low Weight	Normal	Obese Grade I
10-12	79	18 (22.78)	19 (24.05)	19 (24.05)	19 (24.05)	3 (3.80)	1 (1.27)
13-15	110	18 (16.36)	18 (16.36)	31 (28.18)	30 (27.28)	12 (10.91)	1 (0.91)
16-18	61	5 (8.20)	10 (16.39)	13 (21.31)	23 (37.71)	10 (16.39)	

Figures in parentheses are percentages

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