Anthropometric Measurements of the Adolescent Girls in Relation to their Nutritional Status

Alpana Singh, Vishakha Bansal* and Purva Dayya

College of Community and Applied Sciences, MPUAT, Udaipur, Rajasthan, India

*Corresponding author : bvishakha29@yahoo.com

ABSTRACT

The objective of the present study was to find out the anthropometric measurements of the adolescent girls in relation to their nutritional status. Present study was conducted in Udaipur district. Total sample of 240 adolescent girls was taken by random purposive sampling. Weight is an important guide to assess the current nutritional status and only 17.5 per cent subjects were normal in which majority were from urban area. As per NCHS standard, 63.7 per cent subjects were found under normal category of height for age Mean height of RY1&UY5 and RY2&UY7 was 2.09 and 2.07 m^2 which was 90.6per cent and 90.1per cent of the standard height respectively. The mean BMI of RY1&UY5 and RY3&UY7 was 19.97 and 17.24 respectively.

Keywords: anthropometric measurement, adolescent, girls and nutritional status.

Human development is an outcome of bone, body, muscles and physique in which blood circulates by enhancing human potential by motivation, therefore the whole gamut of development of human being is charged by surroundings where adjustment is needed. The behavioral parameters get inspiration only through physical energy, which comes by intake and nutritional value of the food, hence it is prime requisite for human development to assess and find out anthropometric measurements of the adolescent girls, which leads to good nutritional status.

METHODOLOGY

The focus of the present study was confined to Udaipur district of south Rajasthan. Total sample of 240 adolescent girls (age group from 13 – 18 yrs) was taken by random purposive sampling. 120 of them were residing in rural and 120 in urban area. In the sample of 120 of each areas (Rural/Urban) 60 were of age group 13 –15 yrs and 60 were of age 16 – 18 yrs.

RESULTS AND DISCUSSION

The state of nutritional health of an individual is determined by body measurements, which include estimation of body fat, muscles, tissues and bone. This may include height and weight. Occurrence of malnutrition among 300 adolescent girls was assessed by weight and height for age and body mass index. It was observed that the prevalence varied from measurements to measurements and by indices. Details are given below.

According to the 3rd step in line diagram, height and weight measurements were taken for 75 adolescent girls distributed in each age group i.e. 13-15 and 16-18 yrs. from both inhabitance i.e. Rural and Urban. The weight and height for age and height for age and body mass index were calculated to assess the nutritional status of the subjects. The results of 300 girls are presented in Table 1.

After analyzing the body measurements of 300 adolescent girls, 240 girls were selected on the basis

Table 1: Percentage distribution of adolescent girls by grades of malnutrition using various body measurements & indices of 300 subjects

Sl. No.	Body measurements	Degree of malnutrition	Rural		Urban		Total
			13-15 n=75	16-18 n=75	13-15 n=75	16-18 n=75	N=300 (%)
1	**Weight for Age (%)**						
	<60	Severe	—	—	—	—	—
	60 – 80	Moderate	49	58 (16+42)*	27 (3+24)	41 (3+38)	175 (58.3%)
	80 – 90	Mild	14	13 (13+0)	23 (16+6)	7 (7+0)	57 (19%)
	90 –110	Normal	12	4 (4+0)	25 (26+1)	27 (27+0)	68 (22.7%)
	110 – 120	Overweight	—	—	—	—	—
	>120	Obese	—	—	—	—	—
2	**Height for Age**						
	<80	Dwarf	—	—	—	—	—
	80 – 90	Short	47 (21+26)	31 (7+24)	26 (13+13)	20 (8+12)	124 (41.3%)
	90 –105	Normal	19 (14+14)	44 (26+18)	49 (31+18)	55 (29+26)	167 (55.7%)
	>105	Giant	—	—	—	—	—
3	**BMI (%) (kg/m²)**						
	<16.0	Severe	—	—	1 (0+1)	1 (0+1)	2 (0.7%)
	16-17	Moderate	30 (0+30)	4 (0+4)	1 (0+1)	2 (0+2)	37 (12.3%)
	17-18.5	Mild	10 (0+10)	36 (0+36)*	30 (0+30)	35 (0+35)	111 (37%)
	18.5-20	Low weight & Normal	29 (29+0)	20 (14+6)	21 (18+3)	10 (10+0)	80 (26.6%)
	20-25	Normal	6 (6+0)	15 (15+0)	22 (22+0)	27 (27+0)	70 (23.3%)
	25-30	Obese I	—	—	—	—	—
	>30	Obese II	—	—	—	—	—

denoted adequate and inadequate subjects respondents.

of their willingness to participate, age group, and convenience. This selection was done for equal distribution of 30 respondents according to their BMI i.e. 18.5 – 25 and below 18.5 for each sub groups. The results of body measurements of 240 girls are presented in table 2.

Weight for age

Weight is an important guide to assess the current nutritional status. Prevalence of malnutrition found by using NCHS weight for adolescent girls and McLaren (1976) classification shows that only 17.5 per cent subjects were normal in which majority were in urban area .63.3 per cent subjects were moderately malnourished out of which were from Rural background. Rests were suffering from mild malnutrition. None of the subject was identified as either severely malnourished or obese. Babitha, B. (2003) also indicated that 59 percent of girls

had weight below the reference values and 53 percent of girls registered dietary nutrient intakes below the RDA. The vitamin A and haemoglobin status showed significant improvements after 25 days of food supplementation.

Height for Age

Height can be used as a criterion to quantify chronic malnutrition. Data in Table 2 show that as per NCHS standard, 63.7 per cent subjects were found under normal category of height for age, whereas 36.3 per cent subjects were short in height. None of them was present in the category of Dwarf and Giant.

Body Mass Index

Body mass index provides an approximate indication of fat and takes into account the fact that height is a linear measurements and weight reflects body

Table 2: Percentage distribution of adolescent girls by grades of malnutrition using various body measurements & indices of 240 selected subjects

Sl. No.	Body measurement	Types of malnutrition	Rural		Urban		Total
1	**Weight for Age (%)**		13-15 n=60	16-18 n=60	13-15 n=60	16-18 n=60	N=240 (%)
	<60	Severe	—	—	—	—	—
	60 – 80	Moderate	49	43 (13+30)	27 (3+24)	33 (3+30)	152 (63.3%)
	80 – 90	Mild	10	13 (13+0)	16 (11+5)	7 (7+0)	46 (19.2%)
	90 –110	Normal	1	4 (4+0)	17 (16+1)	20 (20+0)	42 (17.5%)
	110 – 120	Overweight	—	—	—	—	—
	>120	Obese	—	—	—	—	—
2	**Height for Age (%)**						
	<80	Dwarf	—	—	—	—	—
	80 – 90	Short	42 (21+21)	19 (7+12)	21 (9+12)	5 (1+4)	87 (36.3%)
	90 –105	Normal	18 (9+9)	41 (23+18)	39 (21+18)	55 (29+26)	153 (63.7%)
	>105	Giant	—	—	—	—	—
3	**BMI (%) (kg/m²)**						
	<16.0	Severe	—	—	1 (0+1)	1 (0+1)	2 (0.8%)
	16-17	Moderate	26 (0+26)	2 (0+2)	1 (0+1)	1 (0+1)	30 (12.5%)
	17-18.5	Mild	4 (0+4)	28 (0+28)	28 (0+28)	28 (0+28)	88 (36.7%)
	18.5-20	Low weight & Normal	27 (27+0)	13 (13+0)	14 (14+0)	6 (6+0)	60 (25.0%)
	20-25	Normal	3 (3+0)	17 (17+0)	16 (16+0)	24 (24+0)	60 (25.0%)
	25-30	Obese I	—	—	—	—	—
	>30	Obese II	—	—	—	—	—

denoted adequate and inadequate subjects respondents.

mass or volume (Beal, 1980). Comparing BMI of girls with categories advocated by James *et al.* (1988) and recommended by NIN (1991), it was observed that only 50 per cent subjects were normal and low weight. Whereas, remaining respondents were suffering from different grades of malnutrition. No one was overweight. Only one respondents of each age group of Urban area was found severely malnourished.

On the basis of BMI classification it was found that 50per cent subjects were energy deficient with BMI below 18.5. Remaining 50per cent were normal BMI between 18.5 – 25 kg/m² (Table 3). The results are presented on difference between means with of height, weight and Body mass Index (BMI) (of Above/ between 18.5-25.0 and below 18.5 BMI.).

The Nutritional Status as percentage to standards

The mean values of weight, Height measurements and body mass index are given in table 3 and 4.

Mean Weight

Table 3 shows that mean weight of RY1&UY5 was 41.8 Kg which was 84.8 per cent of NCHS 50th percentile.

Table 3: Difference between two means of weight, Height and BMI of 13-15 yrs. girls

	Weight (Kg) (%)	Height (m²) (%)	BMI kg/m²
RY1&UY5	41.8±1.44 (84.8%) Zcal- 7.2	2.09±0.04 (90.6%) Zcal- 0.69	19.97±0.34 Zcal-13.85
RY3&UY7	35.8±0.83 (71.7%)	2.07±0.03 (90.1%)	17.24±0.19

This and indicate that these subjects were suffering from mild malnutrition. Mean weight of RY2&UY7 was 35.8 Kg which was 71.7 per cent which indicate moderate malnutrition. The calculated values of Z-cal was 7.2 which was highly significant at 5

percent of significance level. The weight was higher in RY1&UY5 than RY2&UY7.

The table 4 shows that observed difference was found between RE2&UE6 and RE4&UE8. The weight was higher in RE2&UE6 (86.2%) than RE4&UE8 (70.5%). The mean weight of RE2&UE6 and RE4&UE8 was 49.35Kg and 39.76 Kg respectively. The calculated value of Z-cal was 11.98 which were highly significant at 5 percent of significance level. The weight was found higher in RE2&UE6 than RE4&UE8.

Mean Height

The data presented for height in table 3 shows that there was no significant difference between height of RY1&UY5 and RY2&UY7. Mean height of RY1&UY5 and RY2&UY7 was 2.09 and 2.07 m^2 which was 90.6 per cent and 90.1per cent of the standard height respectively. The calculated value of Z-cal was 0.69 which was not highly significant at 5 per cent of significance level. The weight was higher in RY!&UY5 than RY2&UY7.

No significant difference was observed between RE2&UE6 and RE4&UE8. Mean height of RE2&UE6 and RE4&UE8 was 2.33 and 2.24 m^2 respectively. This was 93.7 per cent and 91.9per cent of standard height. Not much difference was found both groups. The calculated value of Z-cal was 3.6 which denoted that the weight was higher in RE2&UE6 than RE4&UE8. (Table 4)

Mean BMI

Table 4 shows that highly significant difference in BMI was found in RY1&RY5 and RY3&UY7. The mean BMI of RY1&UY5 and RY3&UY7 was 19.97 and 17.24 respectively. The calculated value of Z-cal was 13.85 which was highly significant at 5 percent of significance level. The weight was higher in RY1&UY5 than RY2&UY7.

The difference between RE2&UE6 and RE4&UE8 was 21.07 and 17.68. BMI was high in RE2&UE6 than RE4&UE8. The calculated values of Z-cal value was 18.8 which denoted that the weight was higher in RE2&UE6 than RE42&UE8 (Table 4).

Table 4: Difference between two means of weight, Height and BMI of 16-18 yrs. Girls

	Weight (Kg) (%)	Height (m^2) (%)	BMI kg/m^2
RE2&UE6	49.35±1.49 (86.2%) Zcal- 11.98	2.33±0.04 (93.7%) Zcal-3.6	21.07±0.35 Zcal- 18.8
RE4&UE8	39.76±0.59 (70.5%)	2.24±0.03 (91.9%)	17.68±0.11

CONCLUSION

It can be concluded that in weight for age only 17.5 per cent subjects were normal in which majority were in urban area and 63.7 per cent subjects were found under normal category of height for age. On the basis of BMI classification 50 per cent subjects were energy deficient.

Mean weight of RY1&UY5 was 41.8 Kg which was 84.8 per cent of NCHS 50th percentile. Mean height of RY1&UY5 and RY2&UY7 was 2.09 and 2.07 m^2 which was 90.6% & and 90.1% of the standard height respectively. The mean BMI of RY1&UY5 and RY3&UY7 was 19.97 and 17.24 respectively.

REFERENCES

Babitha, B. 2003. "Nutritional status of adolescent girls and impact of short food supplementation with special reference to vitamin A and haemoglobin: *Journal of community guidance and research*, **20**(2): 127 – 131.

Beal, A. Virginia 1980. Biochemical iron deficiency and anaemia: Nutrition in the life span: John Willey and Sons. Inc. New York 90.