

Anthropometric pattern of school going adolescent girls of Latur district

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Abstract

Introduction: The term “adolescence” has been defined as including those aged between 10 -19 years. True adolescence, however, being the period of physical, psychological and social maturing from childhood to adulthood. **Objective:** To assess anthropometric pattern of school going adolescent girls. **Material and Methods:** present study was a cross-sectional observational study carried out during 2010-2011. Simple random sampling was done and sample size calculated by formula $4pq/L^2$. Calculated sample size was approximately 700. One urban and one rural school were selected randomly. 350 girls each from rural and urban school were selected. Pre-structured and pre-tested proforma incorporating relevant information was used to collect the data. Statistical analysis was done by using appropriate statistical test. **Result:** When the height of urban and rural girls was compared, urban girls were significantly taller than rural girls, at the age of 10 and 11 years. The rural girls were lighter than urban girls up to 11 years of age. No significant difference was found among the overall mean height and mean weight of urban and rural school girls. **Conclusion and Recommendation:** When compared with ICMR standards both urban and rural girls were shorter and lighter. Education of girls and parents about intake of balanced diet should be strengthened.


Keywords: Anthropometric pattern, adolescent girls.

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INTRODUCTION

The term “adolescence” has been defined as including those aged between 10 -19 years. True adolescence, however, being the period of physical, psychological and social maturing from childhood to adulthood¹. Future of a society depends on adolescents and they form a great human resource for society. Nutritional and health needs of adolescent are also more because of more requirements for growth spurt and increase in physical activity. Adolescent need more of all nutrients particularly calcium, iron and iodide. The need for more iron in adolescence is due to growth spurt and onset of

menstruation.² The newer focus on RCH also has been invigorated by the continuing realization of the importance of women’s health; it is now widely accepted that if the health of women is to be improved, the health of adolescents must be given high priority in Indian policy and programme development and implementation.³

MATERIAL AND METHODS

Study population: The adolescent school going girls were selected according to WHO criteria for adolescent’s i.e. 10 to 19 years. Adolescent constitute about 23% of total population². Sample size was calculated by using formula $4pq/L^2$ where $p=23\%$, $q=77\%$ and $L=$ allowable error taken was 10%. Calculated sample size was approximately 700⁴. The study was carried out on girls belonging from 5th to 10th standard, as they belong to adolescent age group. The rural and urban schools having teaching up to 10th standard were included in the study. Schools were selected randomly. Thus 350 girls rural and 350 girls from urban have been included in the present study.

Study period: Present study was carried out in year 2010-2011.

Type of study: The present study was a Cross sectional Observational study.

Method

The study was carried out using a proforma incorporating relevant aspects of the study. A pilot study was undertaken for 50 girls each from urban and rural schools of this region. Proforma was pre-tested on 50 students each from urban and rural area. It was modified with necessary changes.

Measurement of height

Height in centimeter will be marked on the wall with the help of measuring tape. They were asked to remove their foot wear and to stand with heels together and their head positioned so that the line of vision was perpendicular to the body. With the subject standing motionless on the uniform ground, glass scale was brought down to the topmost point on the head. Height was recorded to the nearest 1 cm.

Measurement of body weight

Electronic weighing machine will be used to measure the body weight in kilogram. Zero error was checked for and removed if present, every time. They were asked to remove their footwear and excess clothes. With the subject standing motionless and erect on the weighing machine and with the weight distributed equally on each leg, the body weight was measured to the nearest of 0.5 kg. The data was collected after taking permission from Headmaster of the school. Adolescent girls were explained about purpose of study. Verbal consent was obtained from the girls. Analysis was done using appropriate statistical test.

RESULT

Table 1: Distribution of adolescent school girls according to Age

Age in years	Urban (n=350)		Rural (n=350)		Total(n=700)	
	No.	%	No.	%	No.	%
10	33	9.42	38	10.86	71	10.14
11	61	17.42	55	15.71	116	16.57
12	57	16.28	59	16.86	116	16.57
13	77	22.00	61	17.43	138	19.71
14	65	18.57	48	13.71	113	16.14
15	48	13.71	48	13.71	96	13.71
16	08	02.29	32	9.14	40	05.71
17	-	-	06	01.72	06	00.86
18	01	00.29	03	00.86	04	00.58
Total	350	100	350	100	700	100

Out of 700 adolescent school girls 350 each were from urban and rural area. The distribution of total 700 adolescent girls according to age showed that the maximum number of girls i.e. 138 (19.71%) were of the age 13 years followed by 116 (16.57%) in each 11 and 12 years, 113 (16.14%) of 14 years, 96 (13.71%) of 15 years, 71(10.14%) of 10 years of age, 40 (05.71%) in 16 years, 6 (0.86%) of 17 years and 4 (0.58%) girls were of 18 years of age. The more number of girls of 13 years of age corresponds to 8th standard. Out of 350 urban school girls 77 (22%) were of 13 years of age followed by 65 (18.57%) of 14 years, 61 (17.42%) of 11 years, 57 (16.28%) of 12 years, 48 (13.71%) girls of 15 years, 33 (9.42%) of 10 years, 8 (2.29%) of 16 years and 1 (0.29%) of 18 years of age. Out of 350 rural girls 61(17.43%) girls were of 13 years of age followed by 59 (16.86%) of 12 years, 55 (15.71%) of 11 years, 48 (13.71%) of 14 and 15 years each, 32 (09.14%) girls of 16 years, 6 (1.72%) of 17 years and 3 (0.86%) of 18 years of age.

Table 2: Distribution of adolescent school girls according to Socioeconomic Status

Sr. No.	Socioeconomic Status	Urban		Rural		Total (n= 700)	
		No.	%	No.	%	No.	%
1	Class I	55	15.72	14	4.00	69	9.86
2	Class II	144	41.14	54	15.43	198	28.29
3	Class III	92	26.29	66	18.85	158	22.57
4	Class IV	48	13.71	110	31.43	158	22.57
5	Class V	11	3.14	106	30.29	117	16.71
	Total	350	100	350	100	700	100

Out of 700 study girls, maximum were in socioeconomic class II 198 (28.29%), followed by 158 (22.57%) each in class III and class IV 117 (16.71%) in class V and 69 (9.86%) were in class I. 144 (41.14%) girls were from socioeconomic class II followed by 92 (26.29%) in class III, 55 (15.72%) in class I, 48 (13.71%) in class IV and 11 (3.14%) from class V among 350 urban school girls. Among 350 rural school girls, 110 (31.43%) were from class IV followed by 106 (30.29%) in class V, 66

(18.85%) in class III, 54(15.43%) in class II and only 14 (4.00%) were in class I. 216 (61.72%) rural girls and 59 (16.85) urban girls were from class IV and V socioeconomic status respectively. There were 134 (38.28%) rural girls and 291 (83.14%) urban girls from class I, II and III combined socioeconomic status. This difference was statistically significant (Z=13.71,p<0.01), explaining better socioeconomic status going hand in hand with the better literacy status in urban area.

Table 3: Anthropometric measurements in adolescent school girls

Age in years	Urban			Rural			Z value		ICMR standard	
	No.	Mean Ht (cm)	Mean Wt(kg)	No.	Mean Ht (cm)	Mean Wt (kg)	Ht	Wt	Ht	Wt
10	33	131.84 ± 5.54	26.47 ± 5.77	38	127.28 ± 6.34	22.47 ± 3.86	3.25 S	3.60 S	138.5	33.5
11	61	134.88 ± 7.53	27.53 ± 4.48	55	130.93 ± 8.86	25.47 ± 5.13	2.58 S	2.31 S	144.1	36.5
12	57	138.92 ± 8.11	30.62 ± 7.27	59	139.71 ± 7.45	28.80 ± 4.66	0.52 NS	1.54 NS	150.3	42.6
13	77	142.86 ± 7.81	34.14 ± 7.90	61	141.52 ± 8.21	31.98 ± 7.13	0.97 NS	1.68 NS	153.0	44.4
14	65	147.29 ± 6.71	36.91 ± 8.29	48	147.15 ± 7.90	39.77 ± 7.81	0.11 NS	1.79 NS	155.1	46.7
15	48	148.52 ± 6.00	38.96 ± 6.58	48	150.24 ± 7.77	41.35 ± 7.50	0.37 NS	0.31 NS	155.3	48.2
16	08	152.38 ± 5.88	42.38 ± 5.48	32	150.50 ± 5.96	41.71 ± 5.90	.086 NS	0.31 NS	155.4	49.8
17	-	-	-	06	147.33 ± 11.02	40.83 ± 2.40	-	-	156.4	49.9
18	01	145.00	37	03	147.33 ± 11.02	41.00 ± 7.94	-	-	156.8	50.1
Total	350	141.47 ± 9.17	33.02 ± 8.20	350	140.96 ± 10.78	33.15 ± 9.28	0.65 NS	0.19 NS		

S= significant (p<0.05), NS= not significant (p>0.05)

Assessment of height and weight of urban and rural girls in the present study showed that there was steady increase in height and weight of both urban and rural girls from 10 to 16 years. When the height of urban and rural girls was compared, urban girls were significantly taller than rural girls, at the age of 10 and 11 years. The rural girls equaled urban girls at 12 years of age and no significant difference was observed in height of urban and rural girls after the age of 12 years. So, increase in height in urban girls was 1-2 yrs. earlier than rural girls. When compared with ICMR standards both urban and rural girls were shorter. There was gradual increase in weight of urban and rural girls from 10 to 16 years of age. The rate of increase was more up to 14 years in both urban and rural girls. The rural girls were lighter than urban girls up to 11 years of age. After 12 years of age there was no significant difference in weight of rural and urban girls. When compared with ICMR standard both urban and rural girls were lighter. No significant difference was found among the overall mean height and mean weight of urban and rural school girls.

Table 4: Distribution of adolescent school girls according to BMI

BMI	urban		rural		Total	
	No.	%	No.	%	No.	%
<15	08	02.28	10	02.85	18	02.57
15-18.5	123	35.14	140	39.42	261	37.28
18.5-25	160	45.71	156	44.57	318	45.42
25-30	50	14.28	40	11.42	90	12.85
30-40	09	02.57	04	01.14	13	01.85

>40	00	00	00	00	00	00
Mean	18.3		17.8		18.1	
	±3.5		±2.8		±2.8	
Total	350	100	350	100	700	100

BMI values are age independent and same for both sexes. As the BMI increases risk of comorbidities also increases. According to WHO classification, BMI <18.5 is called underweight, BMI 18.5-25 is normal and BMI > 30 is called overweight/obese. Above table shows that 318 (45.42%) girls were normal while 279 (39.85%) were underweight and 113 (14.70%) were overweight/obese. Mean BMI of girls was 18.1± 2.8. Among 350 urban girls 160 (45.71%) girls were normal while 131 (37.42%) were underweight and 59 (16.85%) were overweight/obese. Mean BMI of urban girls was 18.3± 3.5. Among 350 rural girls 156 (44.57%) girls were normal while 148 (41.27%) were underweight and 44 (12.56%) were overweight/obese. Mean BMI of rural girls was 17.8± 2.8. There was no significant difference in BMI of urban and rural girls.

DISCUSSION

Adolescence is a period of increased nutritional requirements and adolescent anthropometry varies significantly worldwide. Table no. 3 shows anthropometric measurements in adolescent school girls. Present study shows that, the mean height and weight of adolescent girls in all age group was less than ICMR standard. Similar finding was found by Singh J *et al*

(2006)⁵. Table no.4 shows BMI of adolescent girls. Prevalence of underweight found Dhambare DJ *et al* (2010)⁶ (51.7%) and Chaudhary S *et al* (2003)⁷ (68.52%) was higher than the present study (39.85%) so also the prevalence of overweight/obesity in study of Jagdish P Goyal *et al* (2012)⁸ (28.35%) was also higher than the present study (14.70%).

CONCLUSION

Health status of total 700 (350 urban and 350 rural) adolescent school girls were studied. Majority of the urban study girls were of high socioeconomic status (56.86%) and majority of the rural study girls were of low socioeconomic status (61.72%) this difference was statistically significant. Urban adolescent school girls were significantly taller and heavier as compared to rural girls at 10 and 11 yrs. For other ages there was no significant difference in height and weight of urban and rural girls. Both urban and rural girls were shorter and lighter as compared to ICMR standard. Out of total 700 study girls, (39.85%) were underweight and (14.70%) were overweight/obese. Among urban girls (16.85%) were overweight/obese while among rural girls (12.56%) were overweight/obese.

RECOMMENDATIONS

Education of girls and parents about intake of balanced diet should be strengthened. Growth monitoring of school girls at regular interval should be carried out. Attempts to

improve socioeconomic status in rural areas should be continued effectively with programmes like Integrated Rural Development Programme, National Rural Development Programme and Rural Landless Employment Guarantee Programme etc.

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