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Nutritional Status of Adolescent Girls in a Rural Area of Nellore District, Andhra Pradesh

Authors
Dr. Sreelatha N[1], Dr. Kumar Chinta[2], Dr. Chandrasekhar.V[3]
[1]Medical Officer, Police Welfare Hospital, Tirupati
[2]Professor, Narayana Medical College, Nellore
Professor, Narayana Medical College, Nellore
Corresponding Author
Dr. Kumar Chinta
Professor, Department of Community Medicine, Narayana Medical College, Nellore
Email: *chintakumar1974@gmail.com*

Abstract

Background: *Adolescence is a period of peak growth for boys and girls. Food and nutrition needs are proportionately higher during the growth spurt. Various surveys revealed that the nutritional status of adolescent girls is sub-optimal.*

Objective: *To assess the nutritional status of adolescent girls in a rural area.*

Materials and methods: *A cross-sectional community based study was carried out in 625 adolescent girls in the field practice area of rural health training centre, Narayana Medical College, Nellore. Data was collected by pre designed pre tested schedule.*

Results: *Out of 625 girls under study, 233 (37.3%) were in age group of 10-13 years, 187 (29.9%) in 14-15 years, 205(32.8%) in 16-19years. The mean age was 14.4 years. The median weight of the girls ranged from 30±6.0 Kgs to 45±8.6 Kgs. The mean weight of adolescent girls in the present study in all age groups is lower than NCHS median weights. The median height of the girls ranged from 136 ± 5.8 cm to 154 ± 6.7 cm. The median height of study population in all the age groups is lower than NCHS standards. Out of 625 adolescent girls 32.3% had under weight. The prevalence of underweight was high in Christians (46.8%), Scheduled tribes (46.5%). Adolescent girls of illiterate mothers had high prevalence of underweight (35.8%). Majority (58.3%) of underweight adolescent girls were belong to class VI socioeconomic status.*

Conclusion: *From the present study it is concluded that the heights and weights of adolescent girls in all age groups in the study area were lower than NCHS standards. The prevalence of underweight was high*

Key words: *Adolescent girls, Underweight and NCHS standards.*

Introduction

The word Adolescence comes from the Latin word Adolescence meaning "To grow up." [1] Adolescence has been defined by WHO as the period of life spanning between 10-19 years. [2]Adolescents account for nearly one-fifth of the world's population.   Adolescents constitute 22.8% of the total population in India.[3]

In Andhra Pradesh, this segment constitutes approximately 5.03% of the population.   The importance of this target group lies in the fact that they are going to be the mothers of tomorrow, whose well being is critically important for improving the nutritional, health and educational status of women in the State. Various base line surveys also revealed that the health, nutritional and educational status of adolescent girls are at sub-optimal level.[4]

Adolescent population is expected to increase 6 million by the year 2011 and to almost 7 million in 2021. Being a rapid dynamic transition period from childhood to adulthood, adolescents are physically, psychologically and socially vulnerable because of the changing needs and demands of the body and mind which are quite different from that of children and adults. Adolescents are more vulnerable because they require more nutrition for growth and maturing. Hence, lack of adequate foods leads to malnutrition and makes it very difficult to remain physically fit.[5]

Adolescence is a period of peak growth for boys and girls.   Food and nutrition needs are proportionately higher during the growth spurt. Prevalence of anaemia is high in adolescent girls from low socio-economic status families and joint families, due to inadequate intake of diet by adolescent girls. Prevalence of anaemia depends upon the literacy status of mother and is more common in adolescent girls having illiterate mothers.[6]

In a study conducted by Institute of Health and Family Welfare in Andhra Pradesh, (2001-2002) in rural adolescent girls between 10 and 15 years of age, heights and weights of study subjects at any given point of age were far below the NCHS standards.[7] In this background the present study was under taken to assess the nutritional status of adolescent girls by anthropometry.

Material and methods

This cross-sectional community based observational study was conducted among rural adolescent girls (aged10-19 years) residing in the field practice area of rural health training centre, Narayana Medical College, Nellore. The sample size is calculated as 600 using the formula 4PQ/L2 after assuming the prevalence of under nutrition as 40% and allowing an error of 10%. As the total number of adolescent girls in the study area was 638, we decided to include all the girls in the study, but we could not contact 13 girls even after revisit. Thus the sample size came as 625.The data was collected from the study subjects by house to house visit using pre-designed and pre-tested interview and examination schedule after taking informed consent from their parents or guardians.

Weight was measured on a standardized bathroom weighing scale after adjusting to zero error with

adolescent girl standing erect and looking straight ahead without wearing foot wear. It was recorded in the kilograms, adjusted to the nearest 0.1 kilogram. The values are compared with NCHS standards.

Stadiometer (measuring rod) capable of measuring to an accuracy of 0.1cm was used to assess height of the subjects. The subject was made to stand without foot wear with the feet parallel and with heels, buttocks, shoulders, and occiput touching the measuring rod, hands hanging by the sides. The head was held comfortably upright with the top the making firm contact with the horizontal head piece. The values are compared with NCHS standards

BMI was calculated using the formula: weight in kg/ height in m². Nutritional status of adolescent girls was assessed by body mass index (BMI), BMI–for-age–Percentiles of girls, 5-19 years WHO reference values of 2007 were used. The percentiles are categorized as follows,

- ➢ BMI <5th percentile: Underweight;
- ➢ BMI 5th to 84th percentile: Healthy Weight;
- ➢ BMI 85th to 94th percentile: Over Weight;
- ➢ BMI >95th percentile: Obese

The collected data was entered in Microsoft Office Excel sheet and analyzed by using SPSS soft ware version 16.0.

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Results

Out of 625 girls under study, 233 (37.3%) were in age group of 10-13 years, 187 (29.9%) in 14-15 years, 205(32.8%) in 16-19years. The mean age was 14.4 years.

Among 625 adolescent girls, 508 (81.3%) were Hindus, 55 (8.8%) were Muslims and 62 (9.9%) were Christians. Out of 625 girls under study, 386 (61.8%) were BCs, 145 (23.2%) were SCs, 75 (11.4%) were STs and 23 (3.7%) were OCs.

Majority of adolescent girls were literates i.e., 607 (97.1%) and only 18 (2.9%) were Illiterates.Among literates 30 (4.8%) had Primary education, 145 (23.2%) Middle school, 267 (42.7%) had High school education 119 (19.0%) had Intermediate education, followed by 46 (7.4%) had college education.

Majority i.e., 464 (74.2%) of adolescent girls belong to nuclear families, 87 (13.9%) belong to joint families, and 74 (11.8%) belong to three generation families.

Out of 625 adolescent girls, 490 (78.4%) were in Class-V (poor), followed by 83 (13.3%) in Class-IV (lower middle), 16 (5.8%) in Class-VI i.e. BPL and only 12 (2.6%) belong to Class-III (upper middle).This shows that majority of them belonged to poor socio-economic status as per modified B.G Prasad classification.

Among 625 girls, 568 (90.9%) were students, remaining 48 (7.7%) were helping in house hold activity, and 9 (1.4%) were working as semi-skilled & un-skilled workers i.e. tailors, laborers, and servant maids etc.

Only 5 (11.1%) girls below 18yrs of age were married, Remaining 40 (88.9%) girls were married above 18 yrs of age. Mean age of marriage was 18.15 years.

Table 1 compares the median weights of study subjects with NCHS standards. The median weight of the girls ranged from 30±6.0 Kgs to 45±8.6 Kgs. The mean weight of adolescent girls in the present study in all age groups is lower than NCHS median weights.

Table 2 compares the median heights of study population with the NCHS standards. The median height of the girls ranged from 136 ± 5.8 cm to 154 ± 6.7 cm.The median height of study population in all the age groups is lower than NCHS standards.

Table 3 shows the nutritional status of adolescent girls by BMI. Out of 625 adolescent girls, 399 (63.8%) had normal weight, 201(32.3%) had under weight, 19 (3.0%) had overweight, and only 5 (0.8%) were obese as per 2007 WHO reference values. As age increases under weight and obesity were seen to decrease and the difference was statistically highly significant between age of the adolescent girls and BMI.

Table 4 compares the health status with selected socio demographic factors. The prevalence of underweight was high in Christians (46.8%), Scheduled tribes (46.5%). Adolescent girls of illiterate mothers had high prevalence of underweight (35.8%). Majority (58.3%) of underweight adolescent girls were belong to class VI socioeconomic status.

Discussion

In the present study the median weight of the girls ranged from 30±6.0 Kgs to 45±8.6 Kgs. The mean weight of adolescent girls in the present study in all age groups is lower than NCHS median

weights. The median height of the girls ranged from 136 ± 5.8 cm to 154 ± 6.7 cm. The median height of study population in all the age groups is lower than NCHS standards.

Studies by Geetha, et al,(1997) [8] in rural south India, Raheena Begum, et al, (2011)[9] done in Thiruvanathapuram, Kerala, reported heights and weights less than NCHS standards, whereas Singh, et al, (2006) in Lucknow, in their study reported less than ICMR standards.[10]

In a study by Banerjee, et al, (2001) in school children, in air force station, in Pune, the heights and weights were below NCHS.[11]

In a study conducted by Institute of Health and Family Welfare in Andhra Pradesh, (2001-2002) in rural adolescent girls between 10 and 15 years of age, heights and weights of study subjects at any given point of age were far below the NCHS standards.[7]

In the study conducted by Srinivasan, et al, (2006) in social welfare hostels in Tirupati in 6-17years age group, the mean weights and heights of both boys and girls were below NCHS standards.[12]

In a study by Varsha Zanvar, et al, (2007) of Marathwada region, weights, heights and BMI were below the NCHS standards.[13]

In our study out of 625 adolescent girls, 399 (63.8%) had normal weight, 201(32.3%) had under weight, 19 (3.0%) had overweight, and only 5 (0.8%) were obese as per 2007 WHO reference values

This is similar to study by Amruta Swati, et al, [14](2011) in urban community of Gulbarga, who reported that, 27.6% were under weight, 72.4%

were having normal weight, as per CDC growth charts for 2-20years.

In a study by Deshmukh, et al, (2006) in rural Wardha, observed that 53.8% were thin, 44% were normal, and 2.2% were overweight.[15]

In study by Patil S N, et al, (2009) in Maharashtra (according to WHO Asian Pacific BMI criteria), 67.8% were under weight.[16]

In a study by Medhi, et al, (2007) in adolescents of tea garden workers of Dibrugarh District of Assam, prevalence of thinness in girls was 41.32%. Mean BMI values of both boys and girls were far below the NCHS median. Over weight was present in only 0.33%.[17]

Vinod Wasnik, et al (2012) in a study of the health status of early adolescent girls Vizianagaram district of Andhra Pradesh State, reported that, according to WHO reference standards 56.4 % girls were under-nourished (BMI <18.5 kg/m^2). Girls suffering from chronic energy deficiency grade I, II and III were 25.2%, 15.2% and 16 % respectively. 2.9% was found to be overweight and none of the girls was found to be obese.[18]

Conclusion

From the present study it is concluded that the heights and weights of adolescent girls in all age groups in the study area were lower than NCHS standards. The prevalence of underweight was high in Christians and scheduled tribes. Illiteracy of mothers and socioeconomic status were found to be associated with underweight.

Table 1: Distribution of adolescent girls according to Median weight compared with NCHS standards (n=625)

Age (Yrs)	No. of Adolescent Girls	Median wt ± S.D (kgs)	NCHS (50th percentile) Wt (kgs)
10	14	30 ± 6.0	32.5
11	57	29 ± 5.2	37
12	80	33 ± 9.0	42
13	86	36 ± 9.4	46
14	123	39 ± 6.3	49
15	56	41 ± 5.1	52
16	82	43 ± 5.7	54
17	48	46 ± 5.8	55.3
18	37	42 ± 6.9	56.2
19	42	45 ± 8.6	57.2

Table 2: Distribution of adolescent girls according to Median height compared with NCHS standards (n=625)

Age (Yrs)	No. of Adolescent Girls	Median Ht (cms)	NCHS (50th percentile) Ht (cms)
10	14	136 ± 5.8	137
11	57	140 ±7.3	144
12	80	143 ± 6.9	151
13	86	151± 6.6	157.5
14	123	151± 6.2	161
15	56	153 ± 5.1	162
16	82	154 ± 5.0	162.5
17	48	156 ± 5.5	163
18	37	152 ±5.0	163.2
19	42	154 ±6.7	163.5

Table 3: Age wise distribution of adolescent girls as per BMI

Age Group (years)	Body Mass Index				Total	
	Under Wt	Normal Wt	Over Wt	Obesity		
	No %	No %	No %	No %	No %	
10-13yrs	91 (39.1)	127 (54.5)	10 (4.3)	5 (2.1)	233 (37.3)	
14-15yrs	56 (29.9)	128 (68.4)	3 (1.6)	0	187 (29.9)	
16-19yrs	55 (26.8)	144 (70.2)	6 (2.9)	0	205 (32.8)	
Total	202 (32.3)	399 (63.8)	19 (3.0)	5 (0.8)	625 (100)	

$\chi 2=21.517$, df =6, P <0.001 [S.S]

Table 4: Nutritional status by religion, caste, education of mother and socioeconomic class

Nutritional state according to BMI		Under Wt No %	Normal Wt No %	Over Wt No %	Obesity No %	Total No %	
Religion	Hindu	168 (33.1)	320 (63.0)	17 (3.3)	03 (0.6)	508 (81.3)	χ2=28.068, df =6, P <0.0001 [S.S]
	Muslim	5 (9.1)	48 (87.3)	0 0	2 (3.6)	55 (8.8)	
	Christian	29 (46.8)	31 (50.0)	2 (3.2)	0 0	62 (9.9)	
	Total	202 (32.3)	399 (63.8)	19 (3.0)	5 (0.8)	625 (100)	
Caste	OC	2 (8.7)	19 (82.6)	0 0	2 (8.7)	23 (3.7)	χ2=39.264, df =9, P <0.0001 [S.S]
	BC	113 (29.3)	260 (67.4)	10 (2.6)	3 (0.8)	386 (61.8)	
	SC	54 (37.2)	83 (57.2)	8 (5.5)	0 0	145 (23.2)	
	ST	33 (46.5)	37 (52.1)	1 (1.4)	0 0	71 (11.4)	
	Total	202 (32.3)	399 (63.8)	19 (3.0)	5 (0.8)	625 (100)	
Education of mother	Illiterate	107 (35.8)	180 (60.2)	11 (3.7)	01 (0.3)	299 (47.8)	χ2=33.968, df =9, P <0.0001 [S.S]
	Primary	53 (28)	132 (69.8)	01 (0.5)	03 (1.6)	189 (30.2)	
	High school	41 (31.1)	85 (64.4)	05 (3.8)	01 (0.8)	132 (21.1)	
	Degree	01 (20)	02 (40)	02 (40)	0 0	5 (0.8)	
	Total	202 (32.3)	399 (63.8)	19 (3.0)	5 (0.8)	625 (100)	
Socioeconomic Class	Class III	2 (12.5)	14 (87.5)	0 0	0 0	16 (2.6)	χ2=19.368, df =9, P <0.022 [S.S]
	Class IV	22 (26.5)	56 (67.5)	3 (3.6)	2 (2.4)	83 (13.3)	
	Class V	157 (32)	315 (64.3)	15 (3.1)	3 (0.6)	490 (78.4)	
	Class VI	21 (58.3)	14 (38.9)	1 (2.8)	0 0	36 (5.8)	
	Total	202 (32.3)	399 (63.8)	19 (3.0)	5 (0.8)	625 (100)	

Conflict of interest: NONE

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