

NUTRITIONAL STATUS OF ADOLESCENT GIRLS FROM A COMMUNITY IN MAHARASHTRA – A CROSS SECTIONAL STUDY

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ABSTRACT

Background: Adolescent girls are future mothers. Nutritional status is important determinant of their physical growth and development, which in turn determines the reproductive outcome. Health education and nutritional supplementation is important in this regard. Action is required to improve the same.

Aims & Objective: To assess the nutritional status of adolescent girls from the community adopted under Urban Health Training Centre.

Materials and Methods: This was cross sectional survey conducted in community adopted under Urban Health Training Centre, Department of Community Medicine, KIMSU, Karad. Out of total 254 adolescent girls between the ages of 10 and 19 years, 200 adolescent girls were interviewed during the study period.

Results: Anthropometric measurements from 200 adolescent girls were collected. Age wise 50th percentile of height and weight of these adolescent girls, for each completed year was compared with 50th percentile of height and weight of ICMR study. It was observed that height of adolescent girls between 10 and 15 years of age and weight of the girls between 10 and 12 years was more when compared with ICMR study.

Conclusion: In the present study, nutritional status of adolescent girls appeared to be better than that of ICMR study; this may be because of overall development that has occurred over the decade. Although there was no significantly higher nutritional status in Karad, the trend appears to be higher.

Key Words: Nutritional Status; Adolescent Girls; Community; ICMR Study

Introduction

The origin of the word Adolescence is from Greek Latin word, 'Adolescere' which means to grow or to grow to maturity.^[1] Adolescence has been defined by World Health Organization as the period of life spanning the ages between 10-19 years.^[2] Today approximately 1/5th of world's population is constituted by adolescents out of which 4/5th are residing in developing countries.^[3] Adolescents represent 22.8% of population in India.^[4] Adolescent growth spurt results in 50% increase in calcium requirement and 15% increase in iron requirement.^[4] With profound physical growth, comes increased demand for nutrients. Adolescent growth spurt provides "second opportunity" for development of full genetic potential for growth and development, an opportunity to overcome adverse effects of early childhood malnutrition.^[5] Amongst adolescents, girls are doubly vulnerable, have lower priority, relatively neglected in family, should be given more attention as they are future mothers.^[4] Since majority of adolescent girls especially represent underprivileged section of the society and are undernourished with maladies like preference for male child, incidence of early marriages and high rates of maternal mortality.^[6]

This study was undertaken with the objective of assessing the nutritional status of adolescent girls from the community adopted under Urban Health Training Centre of a medical college using anthropometric measurements and comparing with ICMR study.

Materials and Methods

Study Area: Community adopted under Urban Health Training Centre, Department of Community medicine, Krishna Institute of Medical Sciences University, Karad, having a population of 2700.

Study Participants: Adolescent girls in the age group 10 to 19 years. Informed consent of parent/guardian in case of minor and of adolescent girl in case of major was taken.

Inclusion Criteria: All the adolescent girl residents of the community were covered by house to house survey.

Exclusion Criteria: The adolescent girls who were not contacted even after three consecutive visits were excluded. Those adolescent girls who were guests in the family at the time of interview were excluded. The

number of adolescent girls in the community was 254, out of whom 200 could be contacted during the study period.

Study Duration: 1st November 2007 to 31st October 2009.

Study Design: Community based cross sectional study. House to house survey was carried out.

Study Instruments: Measuring tape, weighing machine.

Measurements: (i) *Height:* Total standing height was measured with the help of measuring tape. Respondent was asked to stand straight without footwear on a flat floor with parallel feet; while heels, buttocks and shoulders and back of the head touching the wall. The head was held comfortable erect with lower border of the orbit in the same plane as that of the external auditory meatus. Hands were hanging by the sides. A wooden scale was gently applied crushing hair-making contact with the top of the head and height was recorded to nearest 0.1 cm. (ii) *Weight:* Adolescent girls were weighed bare foot. Weight was recorded by using portable weighing machine. These girls were asked to stand in the centre of the machine, with body weight evenly distributed between both feet. Weight was recorded to nearest 0.5kg.

Results

Data was collected from total 200 adolescent girls in the age group 10-19 years. Profile of study population is given in Table 1. Among the 200 adolescent girls, 110 (55%) belonged to early adolescence (10-14 years) and 90 (45%) to late adolescence (15-19 years) age group. Distribution of Adolescent girls according to religion showed that the majority of them were Hindus 120 (60%), 69 (34.5%) were Muslims and 11 (5.5%) were Sikhs or Buddhist. Majority of Adolescent girls 162 (81%) belonged to nuclear family. Out of 200 Adolescent girls majority, 103 (51.5%) of them were involved in household work, 61 (30.5%) were students.

Height and weight of adolescent girls was recorded. The table below shows age wise distribution of mean and SD of height (cm) and weight (kg) of the adolescent girls. The mean and standard deviations of anthropometric characteristics such as height, weight, were calculated age wise. The mean height and weight was found to increase as age increases, however maximum difference of 8.7 cm and 5 kg was seen between 12 and 13 years. This could be due to growth spurt (Table1).

Table-1: Profile of adolescent girls

Characteristics	N	%
	Age Groups (Years)	
Early Adolescent (10 -14)	110	55.0
Late Adolescent (15 - 19)	90	45.0
Marital Status		
Unmarried	169	84.0
Married	31	16.0
Education		
Illiterate	45	22.5
1-4 (Primary)	49	24.5
5-10 (Secondary)	98	49.0
11-12 (Higher Secondary)	8	4.0
Religion		
Hindu	120	60.0
Muslim	69	34.5
Others	11	5.5
Type of Family		
Nuclear	162	81.0
Joint	26	13.0
Broken	9	4.5
Three generation	3	1.5
Major Daily Activity		
Student	61	30.5
Household work	103	51.5
Housewife	30	15.0
others	6	3.0

Table-2: Age wise mean and S.D. of Height (cm) and Weight (kg) of adolescent girls

Age (years)	N	Height (cm)		Weight (kg)	
		Mean	S.D.	Mean	S.D.
10	35	132.5	3.99	25.17	3.14
11	28	136.3	5.19	28.4	4.00
12	15	140.5	5.69	32.6	7.23
13	16	149.2	7.46	37.9	8.41
14	16	150.3	5.47	38.3	5.82
15	12	151.3	5.86	42.5	7.30
16	19	154.8	3.29	44.7	7.92
17	14	155.2	3.86	42.5	6.84
18	35	154.1	4.52	42.9	6.21
19	10	157.4	2.27	47.3	6.05
Total	200	-	-	-	-

Table-3: Comparison of 50th percentile of present study with ICMR

Age (years)	50 th percentile of Height (cm)	
	Present study	ICMR study
10	134	128
11	135	133.5
12	140	139.9
13	151	145.4
14	151	149
15*	152	151.8

* For purpose of comparison only age groups of 10-15 years are available in ICMR study.

Table-4: Comparison of heights

Group	Average height (cm)	Variance	F-critical	F	df	p
ICMR study	141.23	80.60				

Table-5: Unpaired t-test for comparison of height (cm)

Age (years)	Present Study		ICMR Study		df	t calculated	t table	p		
	N	Mean	SD	N					Mean	SD
10	35	132.5	3.99	505	128.2	7.1	538	3.58	3.29	<0.001
11	28	136.3	5.19	825	134.0	7.7	851	1.64	1.96	NS
12	15	140.5	5.69	929	139.8	7.7	942	0.35	1.96	NS
13	16	149.2	7.46	845	145.1	7.2	859	2.27	1.96	<0.05
14	16	150.3	5.47	535	148.6	6.4	549	1.06	1.96	NS
15	12	151.3	5.86	243	151.7	6.2	253	-0.22	1.96	NS

The 50th percentile of Heights of Adolescent girls of present study was greater than ICMR study in urban areas at all ages; however maximum difference of 5.6

cms was seen at the age 13 years. ANOVA test was applied to test whether the difference observed in the mean weights at different age categories across the two groups were different.

Age wise comparison of weights of adolescent girls of present study with ICMR study showed that the observed difference was significantly higher at 10 and 13 years of present study.

The 50th percentile of Weights of Adolescent girls of present study was greater than ICMR study in urban areas, for the age groups 10-12 years.

Age wise comparison of weights of adolescent girls of present study with ICMR study showed that the observed difference was significantly higher at 10 and 13 years of present study. ANOVA test was applied to test whether the difference observed in the mean weights at different age categories across the two groups were different.

No significant difference was seen compared to ICMR study. The prevalence of anemia in the present study was 97% with mild anemia being 68.0%, moderate anemia being 29.0% and no girl with severe anemia.

Table-6: Comparison of 50th percentile of present study with ICMR

Age (years)	50 th percentile of Weight (kg)	
	Present study	ICMR study
10	25	22.7
11	28	25.5
12	30	29.2
13	35	35.2
14	38	38.3
15*	41	41.2

* For purpose of comparison only age groups of 10-15 years are available in ICMR study.

Table-7: Unpaired t-test for comparison of weight (kg)

Age (years)	Present Study		ICMR Study		df	t calculated	t table	p
	N	Mean SD	N	Mean SD				
10	35	25.17 3.14	505	23.4 3.9	538	2.68	2.57	<0.01
11	28	28.4 4.0	825	26.4 5.1	851	2.08	1.96	NS
12	15	32.6 7.23	929	30.0 6.2	942	1.6	1.96	NS
13	16	37.9 8.41	845	34.2 6.9	859	2.17	1.96	<0.05
14	16	38.3 5.82	535	37.5 6.9	549	0.47	1.96	NS
15	12	42.5 7.3	243	40.5 6.8	253	1.01	1.96	NS

Table-4: Comparison of weights

Group	Average Weight (kg)	Variance	F-critical	F	df	p
Present study	32.83	38.17	4.96	0.04	10	>0.05
ICMR study	32.01	54.23				

Discussion

In the present study, the increase in mean height has been from 132.5 cm \pm 3.99 at 10 years of age to 157.4 cm \pm 2.27 at 19 years of age, except at the of 18 years.

Weight also has shown similar trend except at the ages 17 and 18 years. The mean Height as well as the mean weight of adolescent girls has shown maximum difference of 8.7 cm in height and of 5.3 Kg between 12 and 13 years of age. This was due to growth spurt. The girls as they grow, they are exposed to carrying out domestic work; there is neglect on the part of the adolescent girl as well as parents towards parents towards their nutrition. Some of the girls in this age group were newly married. In addition girls in the late adolescent age group (15-19years) tend to use mesheri (smokeless tobacco) to kill hunger, thereby adversely affecting their own nutrition. The decrease in weight observed in 17-18 years age group may be the result of above factors.

In a study carried out by Geetha et al, heights of adolescents have been varying from 140 to 151 cm and weights from 31 to 43 kg.^[7] Pubertal spurt has been seen between 13-14 years.^[7] Other studies have also reported the occurrence of growth spurt between 12 and 15 years of age.^[8,9] In the present study the mean heights and weights of adolescent girls were found to be higher as compared to ICMR study carried out earlier in 1996-97. However, when ANOVA test was applied, no significant difference existed when compared with ICMR study.

Hitendra G et al have found that the median heights have been slightly higher in 10 to 12 years of age, but thereafter, it has been less than the ICMR standards.^[10] J Singh et al found that mean height and weight of adolescent girls in all age groups have been less than ICMR standards.^[8]

The prevalence of anaemia in the present study has been 97% with mild anaemia being 68.0%, moderate anaemia being 29.0% and no girl with severe anaemia. NFHS-3 has reported prevalence of anaemia in the 15 to 19 year age group to be as follows, mild anaemia (10-11.9) = 39.1%, moderate anaemia (7-9.9) = 14.9%, severe anaemia (<7) = 1.7% and any anaemia (<12) = 55.8%.^[11] Jolly R et al observed the prevalence of anaemia has been 44.8% with severe anaemia being 2.1%, moderate 6.3% and mild anaemia 36.5%.^[12] Sen A et al observed that considering severity of anaemia, 32.6% girls to be mildly anaemic (11-11.9), 34.7% girls moderately anaemic (7.1-10.9). No severely anaemic girls.^[13]

A very high proportion of anaemia has been noted in the present study. Population covered under UHTC belongs to low socio economic status. Majority of the residents of

the population of slum area walk barefooted and exposed to the risk of hookworm disease. One of the slum is being occupied on the funeral ground reserved for Muslim population having no facilities for safe disposal of excreta and safe water supply, open field defecation is common practice and personal hygiene of the population is very poor. Hence worm infestation including hookworm disease is very common.

The other slum area in which Hindu residents are more are very poor and consume strayed food given by neighbouring population. They reheat and consume it for making it safe for consumption destroying important nutrients in the process.

In adolescent girls the short stature that persists in to adulthood is associated with increased risks of adverse reproductive outcomes. Risk of low birth weight, cephalopelvic disproportion, dystocia, caesarean section increase with short stature of the mother.

Conclusion

In the present study, nutritional status of adolescent girls appeared to be better than that of ICMR study; this may be because of overall development that has occurred over the decade. Although there was no significantly higher nutritional status in Karad, the trend appears to be higher. Therefore immediate action is indicated to correct nutrition of this growing population to reduce the morbidity and improve survival of mother and baby by solutions like, advice of eating more of whatever cooked at home (one more meal for adolescents and these girls are supposed to attend supplementary feed,

take-home-supplements like that for pregnant and lactating mothers may improve their nutritional status) and health education about nutrition.

References

1. Sathyavathi K, Agarwal KN. Review on adolescent growth studies. Part A. Physiological aspects and environmental factors. *Indian Pediatr* 1979;16:197-205.
2. The reproductive health of adolescents : a strategy for action / a joint WHO/UNFPA/UNICEF statement. World Health Organization/United Nations Population Fund/UNICEF. 1989. Available from: URL: <http://apps.who.int/iris/handle/10665/39306#sthash.mhz1mA> Ph.dpuf
3. Programming for adolescent health and development. Technical Report Series; WHO.1984. No.854. p. 263-311.
4. Ghai OP, Gupta P, Paul VK. *Essential pediatrics*, 6th edi. New Delhi: CBS Publishers & Distributors; 2004.
5. Editorial: Adolescent growth in girls -Indian Perspective. *Indian Pediatrics* 1990;16:1249-55.
6. Patnekar PN, Bhavne S; Bombay branch of Indian Academy of Paediatrics. *The girl child in India: Issues and perspectives*, 1st edi. Bombay: M K Offset; 1990.
7. Joseph GA, Bhattacharji S, Joseph A, Rao PS. General and reproductive health of adolescent girls in Rural south India . *Indian Pediatr* 1997;34:242-5.
8. Singh J, Singh JV, Shrivastava AK. Health status of adolescent girls in slums of Lucknow. *Indian Journal of community Medicine* 2006;31:102-3.
9. Das DK, Biswas R. Nutritional status of adolescent girls in a rural area of North 24 Parganas district, West Bengal. *Indian J Public Health* 2005;49:18-21.
10. Thakor HG, Kumar P, Desai VK, Srivastava RK. Physical growth standards for urban adolescents (10-15years)from south Gujarat. *Indian Journal of Community Medicine* 2000;25:86-92.
11. National Family Health Survey (NFHS-3), 2005-06. International Institute of Population Sciences, Mumbai, India. Available from: URL: <http://www.rchiips.org/nfhs/nfhs3.shtml>
12. Rajaratnam J, Abel R, Asokan JS, Jonathan P. Prevalence of anemia among adolescent girls of rural Tamilnadu. *Indian Pediatr* 2000;37:532-6.
13. Sen A, Kanani SJ. Deleterious functional impact of anemia on young adolescent school girls. *Indian Pediatrics* 2006;43:219-26.

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