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Assessment of nutritional status of school going adolescent girls in a rural block of Haryana, India

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ABSTRACT

Background: Good nutrition during adolescence is critical to cover the deficits suffered during childhood and should include nutrients required to meet the demands of physical and cognitive growth and development, provide adequate stores of energy for illnesses and pregnancy and prevent adult onset of nutrition-related diseases. Poorly nourished adolescent mothers are more likely to give birth to low birth weight babies, perpetuating a cycle of health problems which pass from one generation to the next. Therefore, this study was aimed to assess the nutritional status of school going adolescent girls of Agroha block of Haryana.

Methods: Study area was two senior secondary and two high schools (randomly selected) of Agroha block of district Hisar (Haryana). Study design was school based cross-sectional study. Study participants were three hundred and forty-four adolescent girls studying in class 9th, 10th, 11th and 12th. Study tool was pre-designed and pre-tested questionnaire. Percentages and Chi- Square. Statistical Package for Social Sciences (SPSS) software version 20.0 was

Results: Out of total girls, 8.72% were found to be thin followed by severely thin (0.58%). Thirteen (3.78%) girls were found to be overweight followed by obese (0.58%).

Conclusions: Nutritional status of adolescent girls was found to be satisfactory.

Keywords: Adolescent girls, Haryana, Nutritional status, Rural

INTRODUCTION

Adolescence is the period in human growth and development that occurs after childhood and before adulthood, from ages 10 to 19 years. Biological processes drive many aspects of this growth and development with the onset of puberty, marking the passage from childhood to adolescence. Growth during adolescence is faster than at any other time in an individual's life except the first year. Good nutrition during adolescence is critical to cover the deficits suffered during childhood and should include nutrients required to meet the demands of physical and cognitive growth and development, provide adequate stores of energy for illnesses and pregnancy and prevent adult onset of nutrition-related diseases.¹

Adolescent girls are backbone of healthy and progressive family and thus future builders of positive health of community. To attain healthy reproductive outcome and efficient physical activity nutritional status of adolescent girl is valuable.² In girls, poor nutrition can delay puberty and lead to the development of a small pelvis. Malnourished adolescent girls who have babies at a young age are more likely to experience and will be less able to withstand complications because the body has not yet reached maturity.3 In Haryana, the prevalence of total thinness among adolescent girls of age group 15-19 years

was reported as 36.6% and moderate to severe thinness as 15% according to NFHS-4 (2015-16).⁴ Therefore, this study was conducted to have a better insight of the nutritional status of school going adolescent girls in a rural block of Haryana.

Aim and objectives of the study were to assess the nutritional status of school going adolescent girls of Agroha block of Haryana. To find out dietary nature and its association with nutritional status of study subjects.

METHODS

The present cross-sectional study was carried out in four government schools located in the Agroha block of district, Hisar (Haryana) during April 2018 to July 2018. There are ten community development blocks in district Hisar of state Haryana.

Agroha block is one of the rural blocks. Maharaja Agrasen Medical College is situated in village Agroha of block Agroha. Village Agroha is the rural field practice area of the Department of Community Medicine. So, taking operational feasibility into consideration, block Agroha was selected.

A list of all government senior secondary schools and government high schools of block Agroha was obtained from Block Education Office (BEO) of Agroha. There are 10 government senior secondary schools and 13 government high schools in this block. Out of these schools, 4 schools (two senior secondary and two high schools) were randomly selected for the study. Adolescent girls studying in class 9th, 10th, 11th and 12th formed the study population.

Sample size estimation and sampling technique

The prevalence of undernutrition is considered a common health problem in adolescent girls and therefore was used for calculating the sample size. The sample size was calculated by taking the prevalence of thinness among adolescent girls, as reported in a study by Patanwar et al.⁵ Thus, taking the prevalence of 54%; with a permissible error of 10%; the sample for present study came out to be 341.

$$n = \frac{4pq}{L^2}$$
$$= \frac{4 \times 54 \times 46}{5.4 \times 5.4}$$

= 341

Where, L=permissible error in the estimated prevalence; p=estimated prevalence of thinness in adolescent girls; q=(100-p) and n=sample size.

Therefore, to cover the desired sample size; 86 girls (who fulfilled the inclusion and exclusion criteria) from each of

the selected school and 344 girls in total were interviewed and examined for the study.

Inclusion criteria

Adolescent girls studying in class 9th, 10th, 11th and 12th. Adolescent girls who were willing to participate in the study and whose guardian gave consent for the participation of girl in the study.

Exclusion criteria

Girls who were physically challenged. Girls who were not willing to participate in the study and whose guardian did not give their consent.

A written permission from the principals of the schools was obtained prior to conducting the study. After explaining the purpose of the study, information was collected on a pre-designed and pre-tested proforma. The proforma comprised of socio-demographic characteristics and questions regarding nutrition intake and dietary nature of adolescent girls. The dietary nature was arbitrarily classified into vegetarian, non-vegetarian, eggetarian and occasional non- vegetarian. BMI-for-age (Z scores) by WHO was taken as indicator for nutritional status assessment.6 BMI of each study subject was computed using the Quetelet's formula i.e., weight (kg)/ Height (m²), then was compared with the readings of the simplified field tables provided by WHO and categorized subsequently according to labeled chart (BMI-for-age girls, Z scores) by WHO.6,7 Weighing machine and stadiometer were utilized for recording the weight and height respectively. The completed proformas were compiled and entered into Microsoft excel and analysed using SPSS version 20.0.

RESULTS

Majority (45.06%) of the study subjects belonged to the age group 16-18 years. Mean age of girls was 16.2 years. One hundred and two (29.65%) subjects belonged to class 10^{th} followed by class 9^{th} (29.07%), 11^{th} (21.80%) and 12^{th} (19.48%) (Table 1).

Table 1: Age and education wise distribution of study subjects (n=344).

Parameters	S	N	%
Age (years)	13-15	141	40.99
	16-18	155	45.06
	>18	48	13.95
Education (class)	9 th	100	29.07
	10 th	102	29.65
	11 th	75	21.80
	12 th	67	19.48

As per BMI-for-age Z scores chart by WHO, 8.72% girls were found to be thin and only 0.58% girls were severely thin. 13 (3.78%) girls were overweight and 2 (0.58%)

girls were found to be obese. Rest of the girls had normal BMI for their age (Table 2).

Table 2: Nutritional status of adolescent girls according to BMI for age (for girls).

BMI for age (Z scores)	N	%
Obese (>+2)	2	0.58
Overweight (+1 to +2)	13	3.78
Normal (+1 to -2)	297	86.34
Thinness (-2 to -3)	30	8.72
Severe thinness (≤3)	2	0.58
Total	344	100.00

According to their dietary habits, 84.30%, 13.37%, 1.45% and 0.87% adolescent girls were vegetarian, non-

vegetarian, occasional non- vegetarian and eggetarian respectively (Table 3).

Table 3: Dietary nature of adolescent girls (n=344).

Dietary nature	N	0/0
Vegetarian	290	84.30
Non-vegetarian	46	13.37
Eggetarian	3	0.87
Occasional non-vegetarian	5	1.45

Out of 290 girls, taking pure vegetarian diet, 11.0% were found to be undernourished. Dietary nature of girls showed significant association (p=0.006) with their nutritional status (Table 4).

Table 4: Nutritional status of study subjects according to their dietary nature.

Parameters N		BMI (Kg/m²) for age Above normal BMI for age (overweight, obesity) (Z score >+1)		Normal BMI for age (Z score +1 to -2)		Below normal BMI for age (thinness, severe thinness) (Z score<-2)		χ^2	P value
		N	%	N	%	N	%		
Dietary habits									
Vegetarian	290	15	5.2	243	83.8	32	11.0		
Non-vegetarian, Eggetarian and occasional non- vegetarian	54	0	0.0	54	100	0	0.0	10.137 (df=2)	0.006
Total	344	15	4.4	297	86.3	32	9.3	-	-

DISCUSSION

Body mass index has been considered as an important parameter of nutritional assessment. As per BMI-for-age z-scores chart by WHO, 8.72% girls were found to be thin and 0.58% severely thin in the present study. These results were almost similar to the findings of Shrestha et al, and Akhter et al, who reported the prevelance of thinness as 9.5% and 10.3% respectively. 8,9 Similarly, a little higher prevalence (14.94%) of thinness was reported according to "low BMI for age" as described by WHO criteria by Mansur et al, and Nair et al, (18.87%). 10,111 Very high prevalence of thinness was reported in several other studies from different regions.^{5,12} As compared to the studies showing very high prevalence, this study showed a very low prevalence of thinness, which might be due to the change in dietary intake over a period of years. However, these differences in the prevalence of thinness could be because of small study population representing the rural society. In the present study, 3.78% girls were overweight, and 0.58% girls were found to be obese which was same as compared to the data (3.6%) reported by Patanwar et al, among Kurmi adolescent girls from Raipur city, Chhatisgarh, India.⁵ A similar finding (3.22%) was also reported by Mansur et al, from Kavre district, Nepal.¹⁰ Low prevalence of overweight was also reported among rural adolescents from West Bengal, (1.6%) and rural Gujarat (1.2%).^{13,14} While Singh et al, and Alok et al, in their study, reported a prevalence of overweight as 16.3% and 26.2% respectively, which was higher than the present result.^{15,16}

Out of 290 girls, taking pure vegetarian diet, 11.0% were found to be undernourished. Dietary nature of girls showed significant association (p=0.006) with their nutritional status. Pavithran et al, also reported a higher prevalence of undernutrition i.e., 30.8% among vegetarians compared to non-vegetarians and eggetarians and these results were significant at p value (<0.05) in their study, but nature of diet was not significantly (p>0.05) associated with nutritional status of the study subjects in a study by Choudhary et al. 12,17

CONCLUSION

Nutritional status of adolescent girls was found to be satisfactory and prevalence of thinness and severe thinness was found to be low as compared to NFHS (2015-16) data and several other studies from different regions in India. The decreasing prevalence of thinness might be due to the change in dietary intake over a period of years. However, these differences in the prevalence of

thinness could be because of small study population representing the rural society. So, this requires further research.

Recommendations

Early detection of malnutrition through regular school health check-ups can prevent adverse consequences and School Health Services can be considered as an ideal platform for diagnosing health problems among adolescents at the earliest.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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