

A Hospital Based Epidemiological Assessment of Nutritional Status of Adolescent Girls of High Schools

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Abstract

Aim: The aim of the present study was to assess the nutritional status of school-going adolescent girls in Bihar region.

Material & methods: A Community-based cross-sectional study was conducted in Department of Pediatrics for 24 months with collaboration with schools in the urban area of Muzaffarpur region. A total of 500 adolescent girls attending high school and higher secondary school ranging from 15-18 years (IX-XII Standard) in Muzaffarpur were studied.

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Results: As per WHO nutritional measurement criteria, children were classified as per their anthropometric criteria as, 32% had moderate stunting and 5% were severely stunted. 2% had severe thinness, 29% were thin and 7% were overweight. The major morbidity among study subjects was, 20% had conjunctival pallor (anaemia), 8% had dental caries, 6% had Vitamin B complex deficiency, 4% had angular stomatitis and 1% had Vitamin A deficiency.

Conclusion: The present study recommends that efforts should be made to reduce the prevalence of malnutrition among adolescent girls. For this regular health check-ups should be done at schools with the help of school authorities and hospitals.

Keywords: Physical growth, Malnutrition, Stunting, Thinness, Adolescent Girls, India

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Introduction

Growth is the most fundamental survival mechanism. Physical growth is a complex and continuous process of physical development by which an infant develops into an adult. It involves a progressive development in terms of physical size and morphology which commences through different phases and can be described as growth during infancy, childhood, and adolescence. [1] The term adolescence has been derived from the Latin word "adolescere" which means "to grow up". World Health Organization (WHO) defines adolescents as individuals in the age group 10-19 years. [2] The adolescent period is often sub-divided into early (10-13 years), middle (14-16 years) and late (17-19 years) adolescence. [3] Adolescence is an important phase of growth and development. Unique changes occurring in an individual during adolescence are accompanied by progressive achievement of biological maturity. [4] Of these adolescents, 47.3% were female. [2]

Adolescence is the phase of life when maximum physical growth happens necessitating maximum nutrition and health care. Height and weight are considered the two most fundamental and sensitive anthropometric indicators of physical growth. In each phase of development, the height and weight increase at a particular pace. [1] An adolescent gain 15%–20% of height and 25%–50% of adult weight during adolescence. Standard daily recommended allowance of an adolescent girl is 2200 kcal/day and protein requirement is 44–46 g/day. [5,6] Physical growth of adolescent girls has been related to their dietary behaviour and if this has been compromised, it may lead to malnutrition. [7]

In India, the nutritional needs of adolescent girls, in particular, are often neglected. [8] Nutrition has been the cornerstone of socio-economic development and the problems related to nutrition are not just medical but multifactorial, with their roots in many other sectors of development such as education, demography, agriculture and rural

development. [9] In general, adolescent girls have been the worst sufferers of the ravages of various forms of malnutrition because of their increased nutritional needs and low social power. [10] Unfortunately assessment of the nutritional status of adolescent girls has been the least explored area of research particularly in India. [11]

Hence, there was a need to conducted an insightful study to evaluate the nutritional status of school-going adolescent girls (15-18 years) studying in high schools in Bihar region.

Material & Methods

A Community-based cross-sectional study was conducted in Department of Pediatrics, SKMCH, Muzaffarpur, Bihar, India for 24 months with collobration with schools in the urban area of Muzaffarpur region. A total of 500 adolescent girls attending high school and higher secondary school ranging from 15-18 years (IX-XII Standard) in Muzaffarpur were studied.

Inclusion criteria:

- High school attending girls
- Age group 15-18 years
- Studying in Std IX-XII

Exclusion criteria:

- Age group <15years and >18 years
- Girls studying in class other than IX-XII Std
- Girls with any genetic disease, metabolic problem or chronic disease.
- Girls with any history suggestive of any haemoglobinopathy or any dysmorphic features suggestive of genetic disease.
- Girls not giving consent

Methodology/ Data Collection:

Girls were enrolled after taking proper consent from them and their school principal. Socio-demographic information was collected by using pre-tested and

pre-designed structured proforma by interview technique. Nutritional status was assessed using anthropometry, clinical examination and general physical examination.

Major variables:

- Weight
- Height
- BMI- body mass index

Outcome variables:

- The proportion of adolescent girls classified as malnourished-both undernourished and overweight/obese
- The proportion of girls with moderate or severe stunting
- The proportion of clinically anemic girls.
- The proportion of adolescent girls with different vitamin deficiency.

Confounding factors:

01. Socio-economic status.
02. Religious belief.
03. Menstrual history.
04. Food habit.

Statistical Analysis

All relevant data were entered into pre-designed proforma and analyzed (with the help of a statistician) using Microsoft SPSS software for windows Version 20.0 and Microsoft Excel 2010. Data were expressed as a percentage and mean \pm SD. The Chi-square test was used to analyze the significance of the difference between the distribution of data. P-value <0.05 was considered statistically significant.

Results

Table 1: Demographic details

Parameters	N	%
Hindu	400	80
Muslim	75	15
Others	25	5
Education status of mother		
Illiterate	50	10
Middle school	80	16
Higher secondary	270	54
Graduation	100	20
Education status of father		
Illiterate	25	5
Middle school	100	20
Higher secondary	300	60
Graduation	75	15
Occupational status of father		

Jobs	225	45
Small scale	200	40
Daily wages	75	15
Occupational status of mother		
Housewives	400	80
Job	100	20
Type of family		
Joint	375	75
Nuclear	125	25
Environmental hygiene		
Good	300	60
Fair	125	25
Poor	75	25
Socioeconomic status		
SES-II	125	25
SES-III	175	35
SES-IV	200	40

Out of the total of 500 adolescent girls in the study, the majority (80%) were Hindu, 15% were Muslim, 54% girls had mothers who were educated up to Higher Secondary, 16% up to Middle School, whereas 10% girls had an illiterate mother. 60% of girls had fathers who were educated till Higher Secondary and 5% had an illiterate father. The occupational status of fathers' of study subjects showed that 45% were doing jobs either informal or in-formal sector, 40% were involved in the small scale of self business, and 15% were daily wage

workers. 80% of mothers of the study participants were housewife. The majority of the study subjects were living in the nuclear family i.e. 75% whereas 25% were living in a joint family. 60% of the study subjects had fair environmental hygiene at home, 25% had good environmental hygiene and 15% had poor hygiene. 40% girls belonged to Upper Lower (Class IV) Class of Modified Kuppuswamy Scale, 35% belonged to Lower Middle (Class III) Class and 25% belonged to Upper Middle (Class II) Class.

Table 2: Nutritional status as per WHO criteria for Height for Age

Stunting	Frequency	Percentage
Severe (<-3SD)	25	5
Moderate (<-2SD)	160	32
Normal	315	63
Total	500	100

As per WHO nutritional measurement criteria, children were classified as per their anthropometric criteria as, 32% had moderate stunting and 5% were severely stunted.

Table 3: Nutritional status as per WHO criteria- BMI (Thinness)

Particular	Frequency	Percent
Normal (-1 SD to +1 SD)	310	62
Overweight > +1SD	35	7
Severe Thinness (<-3SD)	10	2
Thinness (-3 SD to -1 SD)	145	29
Total	500	100

2% had severe thinness, 29% were thin and 7% were overweight.

Table 4: Distribution of Morbidity conditions in study subjects

Disease	Frequency	Percentage
Anemia (Conjunctival Pallor)	100	20
Dental Carries	40	8
Vitamin B Complex deficiency	39	6
Angular stomatitis (Lips)	20	4
Vitamin A deficiency (Bitot's spot)	5	1

The major morbidity among study subjects was, 20% had conjunctival pallor(anaemia), 8% had dental caries, 6% had Vitamin B complex deficiency, 4% had angular stomatitis and 1% had Vitamin A deficiency.

Discussion

Adolescence may represent a window of opportunity to prepare nutritionally for healthy adult life. [12] During this period, adolescents gain up to 50% of their adult weight, 20% of their adult height and 50% of their adult skeletal mass. [13] In India we face a big challenge regarding the nutritional status of adolescents with some studies showing that around half of them are wasted and 40% are stunted. [14] According to UNICEF, malnutrition in the form of anaemia is present in a large proportion of India's adolescents. [15] Chronically malnourished adolescents are more likely to remain undernourished during adulthood and pregnancy and thus are more likely to deliver low birth weight babies, thus creating a vicious cycle. [16] Physical growth of adolescent girls has been related to their dietary behaviour and if this has been compromised, it may lead to malnutrition. [17]

Undernutrition is a major public health problem of the adolescents. In certain cultures, from infancy onwards including adolescence, girls are at particularly high risk because of gender discrimination. Poor nutritional status during adolescence is an important determinant of health outcomes. Short stature in adolescents resulting from chronic undernutrition is associated with reduced lean body mass and deficiencies in muscular strength and working capacity. [18] The adolescents were categorized into various grade based on BMI according to WHO International Standard. [19-21] Out of the total of 500 adolescent girls in the study, the majority (80%) were Hindu, 15% were Muslim, 54% girls had mothers who were educated up to Higher Secondary, 16% up to Middle School, whereas 10% girls had an illiterate mother. 60% of girls had fathers who were educated till Higher Secondary and 5% had an illiterate father. The occupational status of fathers' of study subjects showed that 45% were doing jobs either informal or in-formal sector, 40% were involved in the small scale of self business, and 15% were daily wage workers. 80% of mothers of the study participants were housewife. The majority of the study subjects were living in the nuclear family i.e. 75% whereas 25% were living in a joint family. 60% of the study subjects had fair environmental hygiene at home, 25% had good environmental hygiene and 15% had poor hygiene. 40% girls belonged to Upper Lower (Class IV) Class of Modified Kuppuswamy Scale, 35% belonged to Lower Middle (Class III) Class and 25% belonged to Upper Middle (Class II) Class.

As per WHO nutritional measurement criteria, children were classified as per their anthropometric criteria as, 32% had moderate stunting and 5% were severely stunted. 2% had severe thinness, 29% were thin and 7% were overweight. Rengma MS et al (2016) in Assam reported similar findings that a maximum of 47% of girls was stunted from 16 years age group followed by 38% from the 17 and 18 years age group and the lowest 33.5% from 15 years age group. [22] The major morbidity among study subjects was, 20% had conjunctival pallor(anaemia), 8% had dental caries, 6% had Vitamin B complex deficiency, 4% had angular stomatitis and 1% had Vitamin A deficiency. A similar study by Chandrashekarappa SM et al (2016) [23] in Mysuru reported opposite findings that maximum (35.3%) girls were thin from 16 years age group and lowest 18.3% from 18 years age group. A similar pattern in findings was observed in a study by Kunwar R and Pillai CB (2011) [24] who did a study in primary schools of a large cantonment in New Delhi and reported that of illiterate fathers 36.51% of adolescent girls were undernourished and of educated father 30% were undernourished. Whereas of illiterate mothers 34.47% of adolescent girls were undernourished and out of educated mother 29.7% were undernourished.

Conclusion

The nutritional status of adolescent girls contributes to the nutritional status of the community. As a preventive strategy, there is a need to apply health and nutritional education program for inculcating healthy lifestyles. The present study recommends that efforts should be made to reduce the prevalence of malnutrition among adolescent girls. For this regular health check-ups should be done at schools with the help of school authorities and hospitals. All teachers and parents should be given health and nutritional education sessions by the health experts to enforce healthy eating habits among adolescent girl. Parents to be informed about the health status of the children by class teachers during parent-teacher meetings and appropriate measures should be taken to improve the lunch pack.

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