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A study on the nutritional status of adolescent girls (12-14yrs) residing in rural area of Bijnor district of Uttar Pradesh

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Abstract
Adolescence is a critical period of growth and development as it is transition between childhood and adulthood. Health and nutrition of the girls affect the health and survival of future generation. However there is very little information about the nutritional status of adolescents, particularly from rural areas in Uttar Pradesh. In view of this fact, an attempt was made to assess the nutritional status of rural adolescent girls. The present study was undertaken to study the nutritional status of adolescent girls of Bijnor District. Anthropometric measurements of 12-14 years of girls were taken to assess their nutritional status. Data on weight and height was collected using standardized techniques. The result revealed that the mean weight and height of the studied sample were below the NCHS standard. About 35% girls were below the suggested weight and 5% girls were overweight as calculated by BMI.

Keywords: adolescence, anthropometry, NCHS, BMI

Introduction
Adolescence refers to the period of human growth that occurs between childhood and adulthood. India's population has 21% of adolescents. World Health Organization suggest that in South East Asian region, a large number of adolescents, suffer from malnutrition, which adversely affects their health and development [1]. This period is very crucial since these are the formative years in the life of an individual when major physical, psychological and behavioural changes take place. This age group needs special attention because of the turmoil of adolescence which they face due to the different stages of development that they undergo, different circumstances that they come across, their different needs and diverse problems. Rural adolescent girls have been considered a low risk group for poor health and nutrition [2]. In adolescent girls, short stature that carries on into adulthood is associated with many concurrent and future adverse health and pregnancy outcomes [3].

It is well established that nutritional status is a major determinant of the health and well-being among adolescent and there is no doubt regarding the importance of the study of nutritional status [4]. Nutritional status was evaluated using anthropometric indicators recommended by WHO Expert Committee [5]. Keeping in view, the present study has been elucidated to assess the nutritional status of rural adolescent girls in Bijnor District of Uttar Pradesh.

Methodology
Study Area
The present study was carried out in Block Afzalgarh Teh. Dhampur of Bijnor District of Uttar Pradesh, India.

Selection of sample
The study was cross-sectional in nature and the subjects were selected through random sampling procedure. The sample consists of 120 girls aged between 12-14 years. The study samples were collected from Senior Secondary Schools of Afzalgarh Block of Bijnor District.

Socio-demographic information
Socio-demographic information of selected sample was assessed by personally interviewing the subjects using pre-planned questionnaire. The accurate age of subjects was recorded from the school registration books. Information on economic status, educational qualification, occupation of parent were also recorded.

Anthropometric Measurements
Anthropometric measurements such as height and weight were made by standard techniques. Heights of subjects were recorded to the nearest 0.1 cm by non-stretchable metal tape. Body weights of subjects were recorded to the nearest 0.1 kg with the help of portable weighing machine. Each subject was weighed with minimum clothing and no footwear.

Stastical Analysis
All the analysis was carried out by using SPSS 17.0 version. Data was tabulated in Microsoft Excel sheet and checked for any inconsistency. The tables were formed accordingly. T-Test was used to make categorical comparisons. The p-value <0.05 was considered as significant. For the purpose of comparison, NCHS reference value for height and weight were used. Body mass index (BMI) was computed using the standard equation: BMI (kg/m^2) = weight (kg)/height^2 (m^2).

Result

Table 1: Comparison of mean weight of adolescent girls with NCHS standard

Age (yrs)	Mean weight (kg) of studied subjects	NCHS standard (median value)	p-value
12 (n=40)	38.07 ± 6.29	41.5	0.001
13 (n=40)	45.86 ± 8.11	46.1	0.876
14 (n=40)	49.17 ± 7.25	50.3	0.332

Table1 revealed that mean values of weights for 12, 13 and 14 years aged adolescent girls are 38.1±6.29, 45.9±8.11 and 49.2±7.25 respectively. There was a significant difference observed in age 12 when compared with NCHS standards

Table 2: Comparison of mean height of adolescent girls with NCHS standard

Age (yrs.)	Mean height (cm) of studied subjects	NCHS standard (median value)	p-value
12 (n=40)	149.32 ± 7.84	151.5	0.087
13 (n=40)	152.23 ± 6.22	157.5	0.000
14 (n=40)	153.17 ± 5.17	160.4	0.000

The mean height of studied sample was elaborated in table 2. It can be said that adolescent girls of ages 12, 13 and 14 years recorded their heights 149.32±7.84, 152.23±6.22 and 153.17±5.17 respectively. A significant difference was observed between height of selected sample and NCHS standard in age group 13 and 14 years.

Table 3: Body mass Index (B.M.I.) of adolescent girls

Grade	BMI	% of Subjects
Under weight	< 18.5	35
Normal weight	18.6 - 24.9	60
Overweight	25 – 29.9	5
Obese grade I	30 – 34.9	-
Obese grade II	35 – 39.9	-
Obese grade III	> 40	-

Table 3 Indicates that 35% respondent belongs to underweight (<18.5 BMI) which is alarming and needs attention to supplement their food with additional nutrients so that they reach to normal level. About 60% girls were belonging to normal range of 18.5 –24.9, indicating their normal growth and development. Only 5% of the respondents were overweight. None of the respondents were in obese I, obese II and obese III category.

Discussion

Adolescence is an important stage of growth and development that requires increased nutrition and adolescent anthropometry varies significantly worldwide [5]. Growth and development is closely linked to the diet they receive during childhood and adolescence. Adolescents may represent a window of opportunity to prepare nutritionally for a healthy adult life [6]. Adolescent girls are backbone of healthy and progressive family and thus future builders of positive health of community [7]. Undernutrition among adolescent girls is a serious public health problem internationally, especially in developing countries [8].

The present study has concluded that the prevalence of underweight was found in 35% girls which was almost same as the result (35.5%) reported by Kapoor & Aneja among adolescent girls in Delhi [9]. But in this study the prevalence of undernutrition appeared to be distinctively higher than the earlier studies among adolescents in Kolkata (30.61%) by A Mukhopadhyay [10] and in rural area of Kavre district of Nepal (30.8%) by DI Mansur *et al.* [11]. Low prevalence of underweight (26%) has also been reported by Josh *et al.* among children from Kaski district of western Nepal [12]. Anjum *et al.* also reported the prevalence of underweight to be 11.1% among children from Kashmir, India [13]. However, high prevalence of underweight has also been reported. A study was conducted by Kalhan M *et al.* which revealed high prevalence of undernutrition (79.4%) in rural Haryana [14]. A study was conducted by Yerpude *et al.* (2013) which revealed high prevalence of underweight (46.67%) in South India [15]. Nabag also reported a high prevalence of underweight (59.1%) from Khartoum state, Sudan [16].

Conclusion

The mean weight and height of selected sample of adolescent girls was below the average weight and height of their counterparts of NCHS standards. But a significant difference was observed between weight of selected sample and NCHS standard in age 12 years only. However, a significant difference was observed between height of selected sample and NCHS standard in age group 13 and 14 years.

From BMI data, it is clear that about 60% of sample was according to the standard and 35% sample was underweight who need attention to supplement their food with additional nutrients so that they can reach to normal level.

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