

ORIGINALARTICLE

Impact of Nutrition on Anthropometric Attributes of Adolescent in Relation to Socio-Economic Status

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ABSTRACT

A study was conducted to determine socio-economic factors associated with nutritional status among children age between 12-14 years in district Hoshiarpur, Punjab. The existing dietary pattern, food & nutrient intake in adolescent were observed in children of belonging to medium socio-economic group. The methodology was formulated to collect the general information, anthropometric measurements, clinical signs, symptoms, dietary assessment & nutrient intake level of the children. Demographic and household characteristics were documented and anthropometric measurements were collected to calculate weight-for-age, height-for-age and BMI-for-age used for the analysis of data. The various clinical signs and symptoms of nutritional inadequacy derived from data are discussed. The intake of energy in girls was not satisfactory as it was less than the Recommended Dietary Allowance (RDA). Very few clinical signs and symptoms of nutritional inadequacy were seen in children except a few had dry scaly skin, dental caries, and dry & dull hair with thin built.

Keywords: Nutrition, Balanced diet, Socio-economic, Demographic, BMI, Anthropometric

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INTRODUCTION

Nutrition and the adolescent transition are closely intertwined. The development of adolescents is affected by the nutrition level. It is known that adolescents with a balanced diet have advantages in academic success as well as physiological development. The healthy nutrition is required for healthy development and individual success of adolescents. Eating patterns and behaviors are influenced by many factors, including peer influences, parental modeling, food availability, food preferences, cost, convenience, personal and cultural beliefs, mass media, and body image [1]. Adolescence is the period of utmost growth and development across the lifespan. During this period longitudinal height increases 20%, body weight doubles, 40% to 60% of peak bone mass is accrued, muscle mass increases, blood volume expands, and the heart, brain, lungs, liver, and kidney all increase in size. As a result, nutritional requirements increase dramatically and may exceed those of adulthood [2]. Multiple factors may influence an adolescent's susceptibility to eating culture, and act as a barrier to healthy eating. Fundamental to all nutritional assessments is the evaluation of dietary intakes and eating pattern, identification of cultural patterns, consumption of unusual foods or non-foods and the use of snacks. Consuming an adequate and balanced healthy diet during the fast phase of pubertal growth spurt is necessary to assure proper growth and normal pubertal development [3]. In children, food consumption is associated with foods that are available and accessible at homes. Several studies have reported that despite adequate nutrition awareness and knowledge and positive attitude towards healthy nutrition, lack of food availability and accessibility experienced by the children or individuals in low socioeconomic households may remain as an important deterrent in the achievement of a healthy and varied diet.

Parental employment can be used as indicators of the children's socioeconomic status. Despite social and economic development, the burden of malnutrition across the globe remains unacceptably high. A vital relationship exists between nutritional status, human capital, and economic standing. Malnutrition and poverty, and both serve as the cause and consequence of each other [4]. Diet quality is an important factor for health and can be improved by reducing the consumption of energy-dense foods such as those high in fat and sugars, and by increasing the intake of dietary fiber. For this, Dietary reference intakes (DRI) and Recommended Dietary Allowances (RDA) are very much significant. Dietary reference intakes (DRI) are a set of reference values for vitamins, minerals, and other nutrients important to human health and provide guidance about the appropriate amount of each nutrient. DRIs are specific to age group, gender, and for women, reproductive status. The RDA is the amount of a nutrient that meets the needs of 97-98% of all healthy individuals within the group.

Parental employment can be used as indicators of the children's socioeconomic status. It is equally important to address the factors within the child's familial environment such as increasing parental awareness on ways to make healthful foods more available and accessible at homes for their children, encouraging breakfast consumption, avoiding excessive control of children's food intake and modeling of healthy food behaviors. Overall, a comprehensive and sequential school-based nutrition education is needed to provide school children the knowledge and skills as prerequisites for acquiring healthy nutrition-related behaviors. To prevent both the short- and long-term health consequences of overweight and obesity, prevention efforts should start early in childhood. More studies are urgently needed to understand the relationship between food marketing, health and nutrition of children. Hence, the present study is focused on to improve the nutritional health and assessment of under nutrition in adolescents. Nutritional status of adolescents has been assessed using anthropometric measurements (measurements of humans to understand human physical variation). The subject has been studied in Hoshiarpur. The survey includes adolescents from families with relatively medium socioeconomic status. Data has been compared before and after improving the diet using RDA. A nutritious, balanced diet can help to maintain good behavior and longer-lasting energy in a child and can lead to better performance in the classroom. The nutritional needs of adolescents are greater than for any other age group. This is because they have large appetites and are still growing. Promoting healthy eating practices and regular physical activity in young children have been shown to benefit the health of children as well as later in life.

MATERIAL AND METHODS

The present study is based on the survey conducted in Hoshiarpur District of Punjab state, India. A questionnaire was developed to collect information from adolescent children in the age group of 12-14. Data on various parameters including weight, height and BMI were recorded on sample size of 50 boys and girls. Anthropometric method was used to determine the nutrition impact on the children. Anthropometric measurements are noninvasive quantitative measurements of the body. According to the Centers for Disease Control and Prevention (CDC), anthropometry provides a valuable assessment of nutritional status in children and adults [5].

The adolescent children under investigation belong to different food habits i.e. vegetarian, non-vegetarian and ovatarian.

An interview schedule was formulated to collect the general information, anthropometric measurements, clinical signs and symptoms, dietary assessment & nutrient intake level of the children (12-14 years).

Twenty-four-hour recall method for three consecutive days was used for collecting information about dietary and nutrient intake.

Demographic and household characteristics were documented and anthropometric measurements were collected to calculate weight-for-age (WAZ), height-for-age (HAZ) and BMI-for-age (BAZ).

Anthropometric measurements can be used to monitor changes in growth of adolescents. Measurements of height, weight and nutrient intake are the reliable means to evaluate the nutritional status and it is very much in need. The measurement of direct body fat is difficult. So, we use an indirect method called BMI and can be calculated by using weight (Kg)/Height (m)². It provides a reasonable indication of the nutritional status of adults and has a good correlation with fatness (overweight and obesity).

RESULTS AND DISCUSSION

The present study was resolved in to collection of data through a questionnaire and personal interviews of the subjects (adolescents) between age group of 12-14years. Results of these studies are presented below.

Food Habits The adolescent children under investigation belong to different food habits i.e. vegetarian, non-vegetarian and ovatarian including 60% of boys and 68.57% of girls as vegetarian and 26.67% of

boys and 22.86% of girls as non-vegetarian while 13.33% of boys and 8.57% of girls were ovatarian (Table 1).

Table 1: Distribution of subjects according to their food habits

Food habits	Boys	Girls	Total
Vegetarian	9	24	33
Non-vegetarian	4	8	12
Ovatarian	2	3	5
Total	15	35	50

Anthropometric Measurements:

The data on Anthropometric measurements of growth of adolescents of 12-14 years were recorded and computed for comparative analysis as per criteria suggested by ICMR (1990). The salient feature of anthropometric measurement are given below

Height: Results of the study indicate that height of boys and girls of age group 12 to < 13 yr ranged from 135.64 - 151.5cm and 144.62-152.40cm with means of 147.14 ± 4.80 and 149.36 ± 1.74 cm respectively and those of 13 - 14 years ranged from 153.0 - 157.0cm and 147.32 -160.02cm with mean of 154.98 ± 1.69 and 154.11 ± 3.94 cm. These results are compared with ICMR (1990) and presented in Table 2.1 and 2.2

Table 2.1: Description of height of boys as per their age group and its comparison with ICMR norms

Age (yrs)	No.	Present study height (cm)	ICMR (1990)	% of standard
12 to < 13	10	147.14 ± 4.80	148.91 ± 0.30	98.81
13 - 14	5	154.98 ± 1.69	158.32 ± 0.31	97.89

Table 2.2: Description of height of girls as per their age group and its comparison with ICMR norms

Age (yrs)	No.	Present study height (cm)	ICMR (1990)	% of standard
12 to < 13	15	149.36 ± 1.74	153.00 ± 0.39	97.62
13 - 14	20	154.11 ± 3.94	155.04 ± 0.36	99.4

Body Weight:The body weight of 12 to < 13 yrs boys and girls ranged from 29.0- 44.0Kg and 24.33-32.8Kg with mean of 35.0 ± 4.23 Kg and 29.92 ± 4.02 Kg respectively. The weight of 13 to 14 yrs boys and girls ranged from 34.0 - 47.0kg and 34.4 - 47.4kg with means of 40.2 ± 6.06 kg and 39.6 ± 3.47 kg respectively. Results indicate that 13-14 yrs boys and girls have less weight in comparison to ICMR (1989) while the weights of 12 to < 13 yrs boys and girls are almost similar to values of ICMR (1989) (Table 3.1,3.2).

Table 3.1: Description of body weight of boys as per their age group and its comparison with ICMR norms

Age (yrs)	No.	Present study weight (Kg)	ICMR (1989)	% of standard
12 to < 13	10	35.0 ± 4.23	35.40	98.87
13 - 14	5	40.2 ± 6.06	47.80	84.1

Table 3.2: Description of Body weight of girls as per their age group and its comparison with ICMR norms

Age (yrs)	No.	Present study weight (Kg)	ICMR (1989)	% of standard
12 to < 13	15	29.92 ± 4.02	31.50	94.98
13 - 14	20	39.6 ± 3.47	46.70	84.8

Body Mass Index (BMI): Boys with normal BMI are 53.33%. No boys were found with obese grade II (Table 4.1). Girls with normal BMI are 54.28%. No girls were found with obese grade II (Table 4.2)

Table 4.1 Description of Body Mass Index of adolescent boys between age group 12-14 years

BMI	Presumptive diagnosis	No.
< 18.5	Chronic energy deficiency	0
18.5 - 20	Low normal weight	1
20.0 - 25.0	Normal	8
25.0 - 30.0	Obese grade I	6
> 30	Obese grade II	0

Table 4.2 Description of Body Mass Index of adolescent boys between age group 12-14 years

BMI	Presumptive diagnosis	No.
< 18.5	Chronic energy deficiency	6
18.5 - 20	Low normal weight	9
20.0 - 25.0	Normal	19
25.0 - 30.0	Obese grade I	1
> 30	Obese grade II	0

Comparative analysis of food habits, dietary allowance and anthropometric measurements revealed that The intake of energy in girls was not satisfactory as it was less than the RDA. A significant difference was also found between energy intakes of boys and girls, the former took greater amounts of calories per day. The main source of energy in the diet of children was fats and oils, sugar and jaggery and cereals. The percentage of calories obtained from carbohydrates tends to decrease. 53.33% of boys and 54.28% of girls having normal BMI. All adolescent children under study are taking high amount of fat than the RDA values. This high fat intake can be due to high intake of fast foods.

The calcium intake in boys of age group 12 to < 13 yrs. was adequate while in girls of same age group less than RDA. Both girls and boys of age group 13 to 14 yrs. took quite low amount of calcium. This may be due to the inadequate intake of milk and its products.

Both boys and girls have quite low levels of iron in comparison to RDA. So they can have low amount of hemoglobin in both sexes. The inadequate intake of iron might be due to poor intake of green leafy vegetables and other iron rich foods. Most of the children were found with normal built appearance during clinical assessment. Very few clinical signs and symptoms of nutritional inadequacy were seen in children except a few had dry scaly skin, dental caries, and dry & dull hair with thin built. Remarkable association was found between the nutritional status of the children, parent's occupational status and educational level of mother. Children of educated family were normal clinically as compared to children of uneducated family. Children of parents whose income was more than Rs. 3000 per capita per month had comparatively low prevalence of under nutrition. Overall, the consumption of food stuffs was inadequate among the adolescent children under study.

CONCLUSION

Our study results are in conformity with earlier results of Mogul Sana Tabassum and Varsha Peram[6] and Zeković et al. [7]. In general adolescent boys recorded higher dietary allowance and anthropometric measurements than girls of the same age group. On overall basis there was non-significant difference for anthropometric measurements between vegetarian and non-vegetarian adolescent boys as well as girls. The food habits of adolescents of boys and girls revealed that they are more apt to consume sugary starchy carbohydrate rich food commodities over protein and calcium rich diet. Also, there was tendency to skip morning meals, therefore their dietary allowance was less than RDA. It is therefore concluded that the diet of adolescent boys and girls should be customize as per recommendation of ICMR for proper growth and development by including more proteinaceous components which would favorably impact their energy, stamina, muscular and bone strength for better performance.

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