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Nutritional status of school going adolescent girls: A study of Nellore District

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Abstract

Adolescence is a period of transition between childhood and adulthood. Nutritional requirements during this period increase tremendously compared to preceding years of growth. In human growth and maturation, adolescence period is significant. In India, 21.4 percent population is adolescents (10-19 years) which accounts for one fifth of the total population. The present study was conducted among 120 adolescent girls in the age group of 13 to 15 years studying in high schools in Nellore. The present study relates to a survey of daily nutritional intake (total calories, protein, iron and vitamin A) in adolescent girls belonged to different schools in Nellore. The growth status of children was evaluated by applying anthropometric parameters.

Keywords: Nutritional status, Adolescent girl, Dietary intake

Introduction

Adolescence, a period of transition from child-hood to adulthood is crucial in the life of human beings. They are no longer children but not yet adults. This phase is characterized by exceptionally rapid rate of growth. Growth in stature, muscle and fat mass during the peak of adolescent growth spurt calls for the need of extra nutrients. In human growth and maturation, adolescence period is significant. In India, 21.4 percent population is adolescents (10-19 years) which accounts for one fifth of the total population.

Adolescence is a journey from the world of the child to the world of the adult. It is an important stage of growth and development in the lifespan. Unique changes that occur in an individual during this period are accompanied by progressive achievement of biological maturity (Tanner, 1992) [2]. This period is very crucial since these are the formative years in the life of an individual when major physical, psychological and behavioral changes take place (Patil *et al.* 2009) [3]. Adolescent may represent a window of opportunity to prepare nutritionally for a healthy adult life (Kaur *et al.*, 2007) [4].

The girls constitute a more vulnerable group especially in the developing countries where they are traditionally married at an early age and are exposed to greater risk of reproductive morbidity and mortality. In general adolescent girls are the worst sufferers of the ravages of various forms of malnutrition because of their increased nutritional needs and low social power (Choudhary S, 2009) [5]. Anthropometrics can be used to evaluate health, growth, nutrition and development in infants, children and adolescents (WHO, 2002; Bose K, 2004) [7]

Poor nutritional status during adolescence is an important determinant of health outcome. Moreover, adolescents have different needs and have diverse problems. Chronic energy deficiency in adolescents results in short stature and lean body mass and is associated with deficiencies in muscular strength and working capacities. In girls, short stature persisting into adulthood increases the risk of adverse reproductive outcomes (Kirchengast S, 1996; Thame M, 1997) [8, 9]. Under-nutrition among adolescent girls is a major public health problem leading on impaired growth (Kalhan M, 2010) [10]. Nutritional deficiency has far reaching consequences, especially in adolescent girls. If their nutritional needs are not met, they are likely to give birth to undernourished children, thus transmitting under-nutrition to future generations (Mulugeta A, 2009) [11].

The present study was undertaken to assess the nutritional status of school going adolescent girls of 13 to 15 years. It is also intend to examine the factors like family type, family

Occupation, income and nutritional grades etc, had any influence on nutritional status of adolescent girls.

Assessment of Nutritional status

Anthropometry

Height

Height is the indicator of under nutrition. Height was measured by asking the subject to stand without slippers, erect with both the heels together and hands freely by the side. The subject was made to look straight so that inferior orbital margin fell in the same horizontal plane. Standing on the left side of the subject, height was measured using the inch tape.

Weight

Weight is the most commonly used anthropometric measurement as it gives fairly good assessment of nutritional status. In any group of measurements, body weight is the best index of nutrition and growth. Weight was measured on a lever balance with the subject wearing minimum clothing without slipper to the nearest 0.5 kg.

Body Mass Index

Body Quetlets index, popularly known as Body Mass Index. BMI is a mathematical relation between height and weight. BMI indicates the present nutritional status and can be used to assess the negative of potential health risks associated with overweight and as guide to therapy.

Morbidity pattern of Adolescent Girls

The two major contributions to morbidity and mortality of worldwide are nutritional deficiencies and infectious diseases. These often together occur one aggravating the other. Under nutrition is proven to adversely affect specific and non-specific defense mechanisms resulting in increased susceptibility to infections, thus, in turn can cause further deterioration in nutritional status through reduced food intake. Mal absorption, mobilization of body stores, increased losses and other systemic reactions that can affect the BMI.

A large number of diet and nutrition surveys have been carried out by different workers on the nutritional status of school children and adolescents in the developing countries. The results have shown that a majority of school children and adolescents consume inadequate diets and are malnourished. The main contributory causes are:

- Inadequate Food Production
- Poverty and
- Lack of Nutritional Education

Energy and Nutrient intake

Human being needs enough energy to stay active and healthy. Energy requirement is related to energy expenditure which in turn is dependent on age, body weight, the level of physical activity, growth and physical status. No safe allowance is provided in case of RDA for energy since both inadequate and excess energy intakes are considered harmful. Prolonged intake of energy below or above the actual requirements will lead to under nutrition or obesity respectively.

Objectives

- To assess the nutritional status of adolescent girls by anthropometric measurements of Private and Government Schools

- To assess the nutritional status by different nutrient intakes of Government and Private School adolescent girls.

Methodology

Selection of the study area

The present study was undertaken to assess the nutritional status of school going adolescent girl in Nellore district. Totally six schools were chosen for the present study (three private schools: Ravindra Bharathi School, SRK School, Mythili English Medium School and three government schools: Sunku Chenganna Municipal High School, KNR High School, RSR Municipal High School). Thus the data was collected from all the six schools.

Selection of the sample

The sample for the present study consists of 120 adolescent girls who were studying 6th and 7th standards by using random sampling method. 60 adolescent girls from class 6th and 60 adolescent girls from class 7th belonging to different private and government schools of Nellore district were selected.

Results and Discussion

Table 1: Distribution of sample according to class and age

Sl. No.	13 yrs of age	14 yrs of age	15 yrs of age	Total
1.	20	20	20	60
2.	20	20	20	60
Total	40	40	40	120

The above table shows that the data regarding sample selection. 6th and 7th class adolescent girls belonging to 13th, 14th, 15th years were selected. 20 adolescent girls (10 from govt. school and private school) from each age group were selected for the present study. Finally 60 adolescent girls from private and 60 adolescent girls from govt. school were selected. Thus, the final sample comprises of 120 adolescent girls belonging to age 13 to 15 years.

Table 2: Socio-economic and demographic profile of the subjects (N=120)

Characteristic	No	%
Type of Family		
Nuclear	96	80
Joint	24	20
Fathers Education		
Literates	40	33
Illiterates	80	67
Family Occupation		
Employees	27	22.5
Farmers	22	18.3
Laborers	40	33.3
Business	31	25.8
Caste		
OC	45	33.5
BC	36	30
SC	39	32.5
Family Income		
5,000-10,000	74	61.6
10,001-15,000	13	10.8
15,001-20,000	33	27.5

The above table shows that the socio-economic and demographic profile of the respondents family. The majority

of the sample is 80 per cent of the respondents were belonged to nuclear type and remaining 20 per cent of the respondents were from joint families. 67 per cent of the respondents parents were illiterates and remaining 33 per cent were literates. Occupation of the respondent's parents is 33.3 per cent of laborers and 1/4th of the respondent parents were engaged in business. 22.5 per cent of the parents were employees and remaining 18.3 per cent of the parents were farmers. They were predominantly 37.5 per cent of the 4 families were OCs followed by 32.5 per cent of the families were SCs and remaining 30 per cent of the families were BCs and 61.6 per cent reportedly had their family income less than 10,000 Rupees and 27.5 per cent of the respondents family income was 15,001 to 20,000. There is least per cent that is 10.8 per cent of the respondents family income ranged from 10,001 to 15,000 per month.

Table 3: Anthropometric status of the adolescent girls with different age groups (N=120)

Age	Details	Height (Cms)	Weight (Kg)	BMI
13 Yrs	Mean	148.17	43.83	21.85
	SD	3.848	5.731	1.994
14 Yrs	Mean	148.42	46.45	22.75
	SD	3.477	3.559	1.933
15 Yrs	Mean	148.09	47.17	23.13
	SD	3.568	3.138	1.887

The anthropometric status of the adolescent girls with different age groups was depicted in the table 4. Among 13 years age group adolescent girls, the mean height was 148.17 and mean weight was 43.83. In 14 years age group adolescent girls, the mean height was 148.42 and mean weight was 46.45. In 15 years age group adolescent girls, the mean height was 148.09 and mean weight was 47.17.

By seeing the above table, it is clear that there is no much difference in the mean heights and weights regarding

different age groups. Looking at the overall means, the 14 years age group adolescent girls had high mean score in height compared to other two groups. 15 years age group adolescents had higher mean score in weight than their counterparts. Reason being as age increases, weight also gets increased.

The mean values of BMI clearly indicate that all the adolescent girls in the selected sample were normal. The BMI values ranges from 20 to 24 for all the age groups. Nobody in the sample was neither obese nor CED when compared with standard BMI values.

Table 4: Iron deficiency among adolescent girls

SI. No	Clinical symptoms of Iron deficiency	Age in years					
		13 yrs		14 yrs		15 yrs	
		No	%	No	%	No	%
1.	Spooned shaped nails	1	2.5	5	12.5	2	5
2.	No problem	39	97.5	35	87.5	38	95
Total		40	100	40	100	40	100

The above table shows that almost all the adolescent girls i.e. a vast majority of the sample in all age groups had not shown any signs and symptoms of the iron deficiency. Only 5 per cent of the sample shown spoon shaped nails which is the beginning indication of iron deficiency. This can be treated by providing the iron tables when administered 3 times a day i.e. daily 50-60 mg of iron, till the hemoglobin level increases to normal levels and also care should be taken to include the daily diet with natural sources of iron rich foods. It is quite important during the adolescent period for regular checkups of hemoglobin levels if it is below everyone should avoid exposure to x-rays and to toxic drugs. Hb levels were observed as immediate measures should be taken to prevent further complications.

Table 5: Percentage distribution of sample according to type of acute illness

SI. No.	Age	Status	Fever	Cold	Cough	Body pains	Stomach pain	Headache	Diarrohea
1.	13 yrs	Yes	47.50	72.50	62.50	42.50	30.00	42.50	10.00
		No	52.50	27.50	37.50	57.50	70.00	57.50	90.00
2.	14 yrs	Yes	45.0	67.50	70.00	42.50	30.00	40.00	22.50
		No	55.0	32.50	30.00	57.50	70.00	60.00	77.50
3.	15 yrs	Yes	47.50	75.00	85.00	32.50	40.00	25.00	25.00
		No	52.50	25.00	15.00	67.50	60.00	75.00	75.00

The above table shows the per cent distribution of adolescent girls according to type of acute illness. By looking at the different types of illnesses among girls was affecting major percentage of the girls of different age groups. Followed by Fever and body pains, stomach pain, headache and diarrohea stands as last. Irrespective of the age

group cold and cough was affecting the major percentage of girls i.e. 60 to 85 per cent. 40 to 70 per cent of the total sample had frequent fevers and body pains. Diarrohea is reported by least number of respondents in all age groups that is below 25 per cent.

Table 6: Mean values of Energy and Nutrient intake of 13 to 15 years of Government School adolescent girls

SI. No	Age	Nutrients	Mean	SD	RDA
1.	13 yrs	Energy(kcal)	1838.75	149.26	2060.00
		Protein (gm)	49.85	6.22	65.00
		Fat (gm)	28.05	3.91	22.00
		Iron (mg)	77.45	19.63	28.00
		Calcium	507.75	85.97	600.00
		Vitamin-A	1395.00	685.91	600.00
2.	14 yrs	Energy(kcal)	1793.75	89.75	2060.00
		Protein (gm)	47.85	3.53	65.00
		Fat (gm)	26.95	2.46	22.00

		Iron (mg)	70.00	19.48	28.00
		Calcium	491.25	62.39	600.00
		Vitamin-A	1170.25	557.50	600.00
3.	15 yrs	Energy(kcal)	1757.50	84.45	2060.00
		Protein (gm)	46.30	3.82	65.00
		Fat (gm)	27.00	3.48	22.00
		Iron (mg)	68.50	19.58	28.00
		Calcium	507.50	54.83	600.00
		Vitamin-A	1195.00	586.49	600.00

A personal of the table makes it clear that the mean energy, protein and calcium intake of 13 years adolescent girls was slightly low compared to RDA values. Fat, Iron and Vitamin-A intake was high than RDA values. The mean values of 14 and 15 years adolescent girls also indicate that the energy, protein and calcium intakes were comparatively low than RDA values.

Table 7: Mean values of Energy and Nutrient intake of 13 to 15 years of Private School adolescent girls

SI. No	Age	Nutrients	Mean	SD	RDA
1.	13 years	Energy(kcal)	2194.85	195.02	2060.00
		Protein (gm)	61.00	11.25	65.00
		Fat (gm)	41.55	9.04	22.00
		Iron (mg)	50.20	5.34	28.00
		Calcium	891.25	117.07	600.00
		Vitamin-A	1865.85	278.03	600.00
2.	14 years	Energy(kcal)	2124.85	238.34	2060.00
		Protein (gm)	57.25	13.37	65.00
		Fat (gm)	39.95	9.89	22.00
		Iron (mg)	52.85	10.48	28.00
		Calcium	887.50	120.29	600.00
		Vitamin-A	1872.50	327.29	600.00
3.	15 years	Energy(kcal)	2113.75	162.30	2060.00
		Protein (gm)	61.75	8.10	65.00
		Fat (gm)	40.40	7.72	22.00
		Iron (mg)	52.45	7.57	28.00
		Calcium	1235.05	1554.49	600.00
		Vitamin-A	1821.25	272.41	600.00

The above table clearly shows that the mean value of energy, fat, iron, calcium, and Vitamin-A intakes were considerably high when compared to RDA values of 13 years adolescent girls who have studying in the private school. The protein intake is the only nutrient which was slightly low compared to RDA. The mean value of energy, fat, iron, calcium, and Vitamin-A of 14 years adolescent girls were high when compared to RDA except for the nutrient protein. The same trend was observed in 15 years adolescent girls.

Conclusion

The present study reveals not only a high incidence of under nutrition and morbidity but also the dietary inadequacy of the subjects particularly in respect of energy, fat, iron, calcium, protein and vitamin- A was observed in the government school adolescent girls than private school girls. The present study reveals the need of large scale screening among government school going adolescent. Adolescents are now-a-days facing dual problem of under nutrition as well as over nutrition. This study found that majority of the adolescent girls undernourished due to low income. These percentages of malnourished adolescent girls are quite alarming and steps need to be taken to improve their nutritional status.

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