



Nutritional Status and Dietary Pattern of Adolescent Girls: A Study From Urban Slums of Agra

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ABSTRACT

Introduction: About 10% of Indian population are adolescent girls. This proportion of population faces a series of serious nutritional challenges not only affecting their growth and development but also their livelihood as adults. Our objective of the study was to assess the nutritional and dietary pattern of adolescent girls in urban slums of Agra.

Methods: A cross-sectional study was conducted among 240 adolescent of girls urban slums of Agra using predesigned and pre-tested questionnaire. Data was analyzed by using univariate and bivariate analysis.

Results: Mean age of the adolescent's girls was found 12 Yrs. The dietary pattern indicated poor consumption of milk, fruits and leafy vegetables. Majority of them were vegetarian, while remaining was non-vegetarian. The result shows the nutrient intake and age groups, there is a significant difference with all the macronutrients and micronutrients intake of the adolescent's girls.

Conclusions: The study shows that the majority of adolescent girls were not aware about their nutritional status healthy dietary habits and thus to take appropriate interventions to improve the nutritional status of adolescent girls.

Keywords: Health, Adolescent girls, dietary habits, nutritional status

INTRODUCTION

Adolescence is a most important period of life because it is a time of intense physical, psychosocial, and cognitive development. Unique changes that occur in an individual during this period are accompanied by progressive achievement of biological maturity. It is a period of rapid growth and maturation in human development. The nutritional status of adolescent girls, the future mothers, contributes significantly to the nutritional status of the community¹.

The nutritional status and development of adolescent girls are related to their nutritional requirements, dietary intake, dietary practices, cultural traditions and meal patterns. Diets of Indian adolescent girls especially in rural areas are inadequate both in terms of quality and quantity². Factors that tend to reduce macro and micro nutrient

intake of adolescent girls might be distribution of food, adverse and harmful dietary practices including dieting, specific food taboos and dietary restrictions during menstruation, pregnancy and lactation. According to WHO technical report; among adolescents, girls constitute a vulnerable group, particularly in developing countries where they are traditionally married at an early age and exposed to a greater risk of reproductive morbidity and mortality. The main nutritional problems affecting adolescent populations worldwide include under nutrition, iron deficiency and anemia; Iodine and Vitamin A deficiency. Indian council of medical research³ had proposed recommended daily allowances for different age groups. Adolescent is a very vulnerable age. The needs of various nutrients increase at this age. In girls, particularly 10-19 year of age, need of various nutrients increase as this is the building years for the child bearing age.

Under-nutrition negatively affects adolescent girls by affecting their ability to learn and work at maximum productivity, increasing the risk of poor obstetric outcomes for teen mothers, arresting the healthy development of future children, affecting sexual maturation and growth, and preventing the attainment of normal bone strength⁴. Accordingly a study is planned to assess the nutritional status and dietary pattern of the adolescent girls (10-19Yrs) of age residing in urban slum of Agra wherein focus will be on studying the general profile, dietary pattern of the selected subjects along with taking the anthropometric measurement, assessment of nutritional status.

MATERIAL & METHOD

The present cross sectional study was conducted in urban slum areas of Agra district in Uttar Pradesh among adolescents (age group of 10-19 years). A pretested questionnaire was, used for the data collection the face-to-face interview method. Major objectives of our study were to examine the nutritional status and dietary habits of the adolescent girls. The data were collected on socio demographic features, micro and macro nutritional-status and dietary habits of the adolescent girls. The 24 recall method was used during the interview process and then was calculated in terms of total nutrient intake by using standard volumetric measures and food values tables provided by ICMR (2010). Dietary intake in terms of calorie, protein, calcium, vitamin A, vitamin C, vitamin B1 and vitamin B2 was assessed. Thereafter, the averages were compared with the corresponding Recommended Dietary Allowances (RDAs) recommended by the Indian Council of Medical Research (ICMR). Data was entered, in EXCEL and analyzed by SPSS version 22.0. Exploratory data analysis was performed for outlier detection and missing observations. Descriptive statistics for continuous variables and frequency distribution for categorical variables were generated. For the testing the significance difference of two group means independent t test were used. Also for more than two groups tests of significance ANOVA test and further we used post hoc test to find out difference between the each age groups. A p value of <0.05 was taken as statistically significant using a two-tailed distribution.

OBJECTIVES

The major objectives of the study were to assess the socio demographic profile of the adolescent girl (10-19Yrs) of age residing in urban slums of Agra and also to find out the dietary pattern & Nutritional status of the adolescents girls

RESULTS

Mean age of the adolescents was 12.0±4.0 years. Of the 240 adolescents girls, half belong to age group 10-12 followed by 13-15 year 67 (27.92%) and 16-19 year 53 (22.08%). Majority of respondents were Hindu 162 (67.50%) and 64 (26.67%) Muslims, only 14 (5.83%) belonging to other categories. Most of the girls found to be living with joint family 133 (55.42%) and 107 (45.58%) living in nuclear family. The highest percentage of family members in (5-7) 56.25%, (> 7) 25.00% and (2-4) 18.75% family members respectively. It was seen to be only 30 (12.50%) were illiterate girls and 112 (46.67%) has primary education and 98 (40.83%) secondary education respectively. Majority of the adolescent girl's fathers has to primary educated 120 (50.00%) and only 16 (6.67%) were graduate. Approximately 140 (58.3%) father's has the labor occupation and 64 (26.67%) belonging to business, 36 (15.00%) service class respectively. Majority of the participant found to be (1547-2577) income group 135 (56.25%). None of the participant belonging to the 5156 & above and below 777 income group respectively. (Table 1)

Table 1: Socio demographic Profile of Adolescent Girls (n=240)

Characteristics	Adolescent Girl (%)
Age Group	
10-12	120 (50)
13-15	67 (27.92)
16-19	53 (22.08)
Religion	
Hindu	162 (67.5)
Muslim	64 (26.67)
Others	14 (5.83)
Type of Family	
Joint	133 (55.42)
Nuclear	107 (44.58)
Total Member of Family	
02-04	45 (18.75)
05-07	135 (56.25)
More than 7	60 (25)
Education of Girls	
Illiterate	30 (12.5)
Literate/Primary	112 (46.67)
Secondary	98 (40.83)
Education of Fathers	
Illiterate	39 (16.25)
Primary	120 (50)
Secondary	65 (27.08)
Graduation \ PG	16 (6.67)
Occupation Of Father	
Service	36 (15)
Business	64 (26.67)
Labor	140 (58.33)
Income of Family	
5156& above	0 (0)
2578-5155	45 (18.75)
1547-2577	135 (56.25)
773-1546	60 (25)

Table 2: Nutrient intake of adolescent girls as percentage of recommended dietary allowances (n=240)

% RDA	Calorie N (%)	Protein N (%)	Iron N (%)	Calcium N (%)	Vitamin A N (%)	Vitamin C N (%)	Vitamin B1 N (%)	Vitamin B2 N (%)
<=50	26 (10.8)	26 (10.8)	114 (47.5)	231 (96.3)	219 (91.3)	175 (72.9)	94 (39.2)	206 (85.8)
50.1-60	31 (12.9)	12 (5)	21 (8.8)	7 (2.9)	15 (6.3)	23 (9.6)	25 (10.4)	21 (8.8)
60.1-70	66 (27.5)	20 (8.3)	21 (8.8)	1 (0.4)	2 (0.8)	19 (7.9)	19 (7.9)	9 (3.8)
70.1-80	54 (22.5)	13 (5.4)	26 (10.8)	1 (0.4)	2 (0.8)	9 (3.8)	25 (10.4)	3 (1.3)
80.1-90	42 (17.5)	25 (10.4)	23 (9.6)	0 (0)	2 (0.8)	8 (3.3)	14 (5.8)	1 (0.4)
90.1-100	13 (5.4)	18 (7.5)	9 (3.8)	0 (0)	0 (0)	3 (1.3)	21 (8.8)	0 (0)
>100	8 (3.3)	106 (44.2)	26 (10.8)	0 (0)	0 (0)	3 (1.3)	42 (17.5)	0 (0)
Total	240 (100)	240 (100)	240	240 (100)	240 (100)	240 (100)	240 (100)	240 (100)

Majority of 66 (27.5%) study subjects had calorie consumption 60% of RDA. Only 8 (3.3%) adolescent girl's calorie consumption was > 100% of RDA. Subjects with protein intake 106 (44.2%) and between >100 to 90% of RDA were 18 (7.5%) respectively; Participants with <50% intake was 46 (19.2%). In 114 (47.5%) adolescent girls Iron intake was 50% of RDA. Subjects with Iron intake > 100% of RDA were 26 (10.8%). Adolescent girls with calcium intake 50% were 231 (96.3%). Majority 219 (91.3%) of study subjects had vitamin A intake 50%, subjects had vitamin C intake 175 (72.9%) respectively. Also highest percentage found to be in Vit B1 and Vit B2 intake 94 (39.2%), 206 (85.8%) respectively with RDA 50%. **Table 2** According to dietary habit of the girls 58 (24.17%), 100 (41.67%) and 82 (34.17%) participant were vegetarian, non-vegetarian and eggitarian, respectively. Most of the girls not including the milk in diet 140 (58.33%) only few 100 (41.67%) were taken the milk in a diet. Meals taken by girls two times / day thrice times / day and more than thrice was observed by 160 (66.7%), 72 (30.0%) and 8 (3.3%) participant, respectively. Consumption of green leafy vegetables found to be 172 (71.67%) which is quite high percentage as compare to the no consumption 68 (28.33%).only 110 (45.83%) were included fruits in a dietary habits **Table 3**.Average calorie intake per day (1479.76±329.20 Kcal) of adolescent girls was 65.36% of the estimated RDA; corresponding values for protein and Iron intake were 88.16% and 59.11%, respectively. Average calcium consumption was (230.67±65.09) mg/day; this was 32.03% of the RDA. Mean vitamin A, vitamin C and vitamin B1 intake were 32.44%, 37.47 % and 63.24% of RDA, respectively **Table 4**. Average daily calcium and protein intake of the participant in age groups 10-12, 13-15 and 16-19 years were significantly (p<0.0001). Difference between mean protein intake of the participant was significant (p=0.0206). Mean daily calorie intake was maximum (1696.63± 348.135 Kcal/d) in the age group 16-19 years followed by 13-15 years (1582± 321.07 Kcal/d) and 10-12 years (1326± 239.013 Kcal/d). These values were significantly (p < 0.05). Consumption of mean protein between the age groups 10-12 years and 13-15 years as well as between 13-15 years and 16-19

years age group; compared to these groups this was significantly (p < 0.0212) less in the age group 10-12 years and 13-15 years . In comparison to age group 10 -12 years mean calcium intake was significantly (p < 0.05) more in age groups 13-15 (16.76± 8.68gm/d) and 16 - 19 years (19.03± 13.4gm/d); between later two groups intake was statistically not significant (p > 0.05).Mean iron intake was significantly (p < 0.05) in the age groups 10-12 years and 13-15 years; this pattern was not observed for 13-15 years age group 16-19 years. Average vitamin A intake in 10-12 years, 13-15 yrs and 16-19 years was (178.57± 65.95 g/d) , (207±88.139 g/d) and 213.78± 100.93 g/d, respectively These values were significantly (p < 0.05) **Table 5**.

Table 3: Dietary habits of adolescent girls

Dietary Habit	Adolescent Girls (%)
Food habits	
Vegetarian	58 (24.17)
Non vegetarian	100 (41.67)
Eggitarian	82 (34.17)
Milk	
Yes	100 (41.67)
No	140 (58.33)
Meal Pattern	
Twice a day	160 (66.7)
Thrice a day	72 (30)
More than thrice	8 (3.3)
Consumption of Green leafy vegetables	
Yes	172 (71.67)
No	68 (28.33)
Consumption of Fruits	
Yes	110 (45.83)
No	130 (54.17)

Table 4: Nutrient Intake by Adolescent Girls

Nutrient	Nutrient Intake Mean ± SD	Estimated Mean RDA	Percentage of RDA
Calories	1479.76 ± 329.20	2264	65.36
Protein	40.96 ± 17.61	46.46	88.16
Iron	13.83 ± 7.5	23.4	59.11
Calcium	230.67 ± 65.09	720	32.03
Vit A	194.64 ± 81.73	600	32.44
Vit C	14.98 ± 9.76	40	37.47
Vit B1	0.683 ± 0.32	1.08	63.24
Vit B2	0.42 ± 0.17	1.3	32.25

Table 5: Macro and Micro Nutrients intake of Adolescent girls according to age groups

Age Group	10-12 Yrs (1) (n=120)	13-15 Yrs (2) (n=67)	16-19 Yrs (3) (n=53)	ANOVA p value	1 vs 2	1 vs 3	2 vs 3
Calorie Intake Per day (mean±SD)	1326±239.01	1582±321.07	1696.63±348.13	<0.05	<0.05	<0.05	0.08
Protein Intake Per day (mean±SD)	77.30±50.44	66.19±32.37	58.53±31.35	0.02	0.21	0.02	0.56
Calcium Intake Per day (mean±SD)	9.78±2.41	16.76±8.68	19.03±13.4	<0.05	<0.05	<0.05	0.26
Iron Intake Per day (mean±SD)	214.36±52.21	238.51±71.47	257.52±72.96	<0.05	0.033	<0.05	0.22
Vitamin A Intake Per day (mean±SD)	178.57±65.95	207.26±88.13	213.78±100.93	0.010	0.045	0.024	0.090

DISCUSSION

Survey on diet has very importance to know the deficiency of nutrition and food gap of under-nutrition in India. In this study nutrients were assessed in adolescent girl 10-19 year of age by 24 hours recall method; deficiencies of all nutrients in adolescent girls were observed (Table 2). However, deficiency of vitamin A has been alarming; majority (91.3%) of subjects had vitamin A intake 50% of RDA. Average intake of all nutrients except vitamin A was 32.3% of estimated RDA (Table 4). Dietary deficiencies in adolescent girls have been observed by several observers. However comparison to other studies deficiency of vitamin A has been glaring in the study area^{6,7,8}. A study in BNF9 has also reported lower intakes of vitamins. Another study⁹ also reported lower intake of energy and blood forming micronutrient in rural adolescent girls. Iron deficiency has been found in majority of girls (Table 2). Iron deficiency in adolescent girls is very common according to reports in both developed¹¹ and developing countries. Contrary to the findings of energy inadequacy in the present study, some studies^{10,12} reported adequate energy intake in adolescent girls. In contrast to the finding of other researchers^{11,12} of excess lipid intake in adolescent girls, in this study only in 25% girls fat intake was more than 100% of RDA.

Table 5 reports mean intake of micronutrients increased with increase in age. Calcium and iron intake per day were pronounced in 13-15 years and 16-19 years, respectively, however vitamin A deficiency was significantly more in all age groups with respect to RDA. Vitamin A consumption in the age group 10-12 years was significantly ($p < 0.05$) more than the corresponding value in the age groups 13-15 years and 16-19 years. In the later two groups mean vitamin A intake was statistically not ($p > 0.05$) significant (Table 5). Similarly we found for calcium intake found significant in two age group of adolescent girl ($p < 0.05$).

Above findings shows that deficiencies of nutrition intake in adolescent girl are alarming in the study area. Thus there is must need for nutrition related awareness programme for adolescent girls to improve their dietary intake in terms of calorie and protein as well as iron, calcium and vitamin A. Its

direct relation to linkage of adolescent girls with ICDS is obvious.

Thus the dietary practices of adolescent girls have far from being satisfactory. However study¹³ also reported which was conducted in same settings that important dietary practices of adolescent girls have not been very up to the level. Such practices might be due to differences for family type, availability of food and knowledge about nutrition intake.

CONCLUSION

Extreme poverty, low status of girls and lack of law enforcement are the main causes of under nutrition conditions of adolescent girls. To achieve wholesome adolescent health, we need to have a multidimensional approach covering all the health problems of adolescent girls with special emphasis on nutritional health, behavior change communication towards healthy lifestyle and positive social environment to acquire life skills.

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