

A study on dietary intake among school going adolescent girls in rural and urban area of Jamnagar District, Gujarat

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ABSTRACT

Background: During adolescent period, rapid changes in physical growth and psychosocial development have placed these young adults in nutritionally vulnerable groups with poor eating habits that fail to meet essential dietary requirements. Health of adolescent girls has intergenerational effect. **Objectives:** (1) To assess the dietary intake of various food items and (2) to see the variation in dietary intake of girls from rural and urban area. **Materials and Methods:** A cross-sectional study was conducted among 670 school going adolescent girls of Jamnagar District of Gujarat, with the help of a predesigned and pretested questionnaire. Information were collected regarding sociodemographic features and dietary pattern, intake of nutritious, and non-nutritious food items from 9th to 12th std. girls who were willing to participate. Analysis was done using percentages and χ^2 test to see rural-urban differences. **Results:** Most of the girls (90%) in both rural and urban area were pure vegetarian and had regular meal. 83.1% of girls had habit of snacks 1–2 times a day. Only 1.5% of rural and 9% of urban area girls consume pulses daily. 59.6% of study adolescents were taking green leafy vegetables 1–3 times a week. Two-third (67%) of study participants had intake of fruits 1–3 times a week. Only 17.5% had daily intake of milk. 16.7% of girls had habit of daily consumption of tea/coffee. Frequency of intake fast food and sweets/ice cream/pastries was 1–3 times a week in two-third of adolescents. Statistically significant difference was observed in intake of various nutritious and non-nutritious food items (except for milk and fast food) in rural and urban area girls ($P = 0.000$). **Conclusion:** Majority of the adolescents had regular enough number of meals and snacks, but intake of nutritious food such as milk, protein-rich food, green leafy vegetables, and fruits was not enough according to ICMR standards. On the other hand, intake of non-nutritious food such as tea/coffee, fast food, sweets, ice cream, and pastries was observed in girls. On comparison, intake of nutritious food items was less in rural area, whereas non-nutritious food items were more in urban area.


KEY WORDS: Adolescent Girls; Dietary Intake; Nutritious; Non-nutritious

INTRODUCTION

Adolescence is a tumultuous time. The World Health Organization defines it as the time period between 10 years and 19 years of

age.^[1] In India, as per Census 2011, adolescent population (10–19) is 253.2 million constituting 20.9% of the total population. Today, every fifth person in India is an adolescent (10–19 years). Among them, 120 million are adolescent girls.^[2]

Adolescence is a period of transition from childhood to adulthood. These are formative years during which maximum amount of physical, psychological, and behavioral changes take place. Rapid changes in physical growth and psychosocial development have placed these young adults in nutritionally vulnerable groups with poor eating habits that fail to meet essential dietary requirements.^[3]

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Adolescents are the future generation of any country and their nutritional needs are critical for the well-being of society. The especially unhealthy diet of adolescents should be regarded as an important public health issue because it is one of the leading causes of pediatric obesity, which usually tracks into adulthood. Health of adolescent girls has intergenerational effect. A healthy adolescent girl becomes a healthy antenatal mother and gives birth to a healthy baby.^[4] Good nutrition during adolescence is critical to cover the deficits suffered during childhood and should include nutrients required to meet the demands of physical and cognitive growth and development, provide adequate stores of energy for illnesses and pregnancy, and prevent adult onset of nutrition-related diseases. A large percentage of adolescents in India suffer from nutritional deficiencies.^[5]

Diet plays a very important role in growth and development of adolescents, during which the development of healthy eating habits is of supreme importance. There is a dual burden of under nutrition and over nutrition in this age group. Pulses are one of the most important source of protein in vegetarian diet. Green leafy vegetables and fruits are good sources of vitamins, minerals, and fibers. Milk is a good source of calcium and Vitamin A which are crucial for human nutrition. All these food items are component of a balanced diet which is very important for adolescents, for their growth and development. According to the WHO, key causes of obesity are increased consumption of energy-dense foods high in saturated fats and sugars and reduced physical activity tea/coffee, fast food sweets/ice cream/pastries, etc., are energy-dense food having high-fat content. They contain empty calories and have no nutritional advantage.

Some dietary patterns appear quite common among adolescents, to mention a few: Snacking, usually on energy-dense foods, particularly breakfast or irregular meals, wide use of fast food, and low consumption of protein-rich food, fruits, and vegetables.^[6]

To the best of our knowledge, very few researches were done which compare dietary intake of adolescent girls of rural and urban area.

Hence, the present study is done with objective of:

1. To assess the dietary intake of various food items and
2. To see the variation in dietary intake of girls from rural and urban area.

MATERIALS AND METHODS

A list of taluka wise distribution of the schools of Jamnagar district was obtained from the office of the District Education Officer. There are six talukas in study district. Using systematic random sampling, a sample of 12 schools (two schools from each taluka, one from urban area, and one from rural area) from this list was selected for the study. The study obtained approval from the school principal and was started

after getting ethical clearance from Ethical Institutional Committee of Shree M. P. Shah Gov. Medical College, Jamnagar.

Sample Size

For estimating a population proportion with specified relative precision, formula used was, $n = z^2 \frac{P(1-P)}{\epsilon^2}$, according to this minimum required sample size was 662 with $P = 0.40$,^[7] including 15% sample loss. A total of 670 samples were collected, 335 from rural and 335 from urban area schools.

Study Subjects

This was a school going girls of 9th–12th standard.

Study Period

The study period was 6 months, from October 2014 to March 2015.

Method of Collection of Data

Data were collected by interviewing the study participants using predesigned and pretested questionnaires. Data regarding the diet, food habits, and food consumption pattern were collected. After permission from the principal and lecturers, students were approached in the classroom after their lectures. They were asked to participate in this study voluntarily. Informed consent from school principal and assent from each participant were taken.

Data Entry and Analysis

The data entry was done using EPI INFO version 3.5.3 and data analysis was done using Microsoft Office Excel 2007 and MedCalc by applying appropriate statistical test.

Terminology:

- Early adolescence: 9–13 years old^[8]
- Mid-adolescence: 14–15 years old^[8]
- Late adolescence: 16–19 years old.^[8]

RESULTS

Of total 670 subjects, 335 were from rural area schools and 335 from urban area schools.

Tables 1-4 summarized various sociodemographic characteristics of study subjects.

Table 1 summarizes age and standards wise distribution of adolescent girls. Majority of girls 76.72% (257) in rural area were from phase of mid-adolescents (14 and 15 years) and in standard 9th and 10th, whereas in urban area half of the girls, 51.94% (174) girls were from phase of late adolescents (16–19 years), and proportion of girls in all standard was almost

same. The difference in age and standard distribution was highly statistically significant ($P < 0.01$).

91.3% of the respondents were Hindu. 57.4% of the adolescents came from nuclear families and the rest from joint families. 36.7% of the girls from rural area and 49.9% of girls from urban area belong to middle socioeconomic class (Class II and III), whereas 60.3% of the girls from rural area and 39.7% of girls from urban area belong to lower socioeconomic class (Class IV and V) family. Statistically significant difference was found in socioeconomic status of girls in rural and urban area ($P = 0.000$) [Table 2] (SEC according to AICPI 1143 of 2014) [9].

With regard to education of parents, nearly one-third of the parents were educated up to secondary standards, 9.5% of

the fathers and 11.8% of the mothers were illiterate. Overall, literacy rate was, not surprisingly, better among fathers than among mothers. Highly statistically significant difference was present in education level of parents in rural and urban area ($P = 0.000$) [Table 3].

Occupational status of their mothers showed that 75% were housewives, and 2.7% were service class. Among the

Table 1: Age and standard wise distribution of adolescent girl ($n=670$)

Characteristics	n=335 (%)			Remarks
	Rural	Urban	Total	
Age				
Early adolescent	19 (5.67)	17 (5.07)	36 (5.37)	$\chi^2=88.71$, $P < 0.0001$
Mid adolescent	257 (76.72)	144 (42.98)	401 (59.85)	
Late adolescent	59 (17.58)	174 (51.94)	233 (34.78)	
Standard				
9	135 (40.3)	87 (26)	222 (33.1)	$\chi^2=4.31$, $P = 0.000$
10	139 (41.5)	88 (26.3)	227 (33.9)	
11	29 (8.7)	84 (25.1)	113 (16.9)	
12	32 (9.6)	76 (22.7)	108 (16.1)	

Table 2: Sociodemographic characteristics of adolescent girl ($n = 670$)

Characteristics	Rural (%)	Urban (%)	Total (%)	Remarks
Religion				
Hindu	313 (93.4)	299 (89.3)	616 (91.3)	$\chi^2=4.31$, $P=0.114$
Muslim	14 (4.2)	19 (5.7)	33 (4.9)	
Other	8 (2.4)	17 (5.1)	25 (3.7)	
Type of family				
Joint	134 (40)	152 (45.4)	285 (42.6)	$\chi^2=1.76$, $P=0.184$
Nuclear	201 (60)	183 (54.6)	384 (57.4)	
Socioeconomic class				
I	10 (3)	35 (10.4)	45 (6.7)	$\chi^2=37.96$, $P=0.000$
II	51 (15.2)	87 (26)	138 (20.6)	
III	72 (21.5)	80 (23.9)	152 (22.7)	
IV	133 (39.7)	86 (25.7)	219 (32.7)	
V	69 (20.6)	47 (14)	116 (17.3)	

Table 3: Distribution of adolescent girls according to the education of parents ($n=670$)

Characteristics	n=335		Total n=670 (%)	Remarks
	Rural (%)	Urban		
Father				
Do not know	41 (12.2)	12 (3.6)	53 (7.9)	$\chi^2=147$, $P=0.000$
Illiterate	25 (7.5)	12 (3.6)	32 (9.5)	
Primary	104 (31.3)	10 (3)	174 (26)	
Secondary	105 (31.3)	70 (21)	238 (35.5)	
Higher secondary	42 (12.5)	133 (39.8)	120 (17.9)	
Graduate and above	18 (5.4)	78 (23.4)	50 (7.5)	
Mother				
Do not know	43 (12.8)	13 (3.6)	56 (8.4)	$\chi^2=52.4$, $P = 0.000$
Illiterate	51 (15.2)	28 (30)	79 (11.8)	
Primary	117 (34.9)	82 (21)	199 (29.7)	
Secondary	75 (22.4)	123 (39.8)	198 (29.6)	
Higher secondary	29 (8.7)	57 (23.4)	86 (12.8)	
Graduate and above	20 (6)	32 (9.5)	52 (7.8)	

Table 4: Distribution of adolescent girls according to the occupation of parents ($n = 670$)

Characteristics	n = 335		Total (n = 670)	Remarks
	Rural	Urban		
Father				
Service	26 (7.5)	39 (11.6)	65 (9.7)	$\chi^2=32.03$, $P < 0.0001$
Business	37 (11)	88 (24.8)	120 (17.9)	
Laborer	115 (34.3)	70 (20.9)	185 (27.6)	
Agriculture	145 (43.3)	130 (38.8)	275 (41.0)	
Other	12 (3.6)	13 (3.9)	25 (3.7)	
Mother				
Service	10 (3)	8 (2.4)	18 (2.7)	$\chi^2=9.28$, $P = 0.09$
Business	2 (0.6)	1 (0.3)	3 (0.4)	
Laborer	36 (10.7)	21 (6.3)	57 (8.5)	
Agriculture	50 (14.9)	36 (10.7)	86 (12.8)	
Other	2 (0.6)	1 (0.3)	3 (0.4)	
Housewife	235 (70.1)	268(80)	503 (75.1)	

fathers, 9.7% were service class, 17.9% were businessmen, 27.6% were laborer, and 41% were engaged in agricultural activities. Statistically significant difference was found in occupation of father's in rural and urban area ($P = 0.000$) [Table 4].

Table 5 summarizes that more than 90% of girls in both rural and urban area were pure vegetarian. Only 2.7% in rural and 8.4% in urban area were consuming mix pattern of diet. This difference in type of diet among girls was statistically significant ($P = 0.001$).

Table 6 summarizes nearly 90% of adolescents had meals regularly (2–3 times a day). 83.1% of girls had habit of snacks 1–2 times a day.

Table 7 summarizes the frequency of intake of various nutritious food items among the adolescent girls of rural and urban area. Almost 77% of study participants consumed pulses <4 times a week, whereas 1.5% of rural and 9% of urban area girls consume pulses daily. 59.6% of study adolescents were taking green leafy vegetables 1–3 times a week, whereas 5.1% of girls from rural area and 14.9% of girls from urban area had daily serving of green leafy vegetables. Two-third (67%) of study participants had intake of fruits 1–3 times a week, whereas 4.5% of rural area and 11.9% of urban area girls had daily intake of fruits. One-third of adolescent girls had never consumed milk, and only 17.5% had daily intake of milk. Statistically significant difference was observed in intake of various nutritious food items, except for milk, in rural and urban area girls ($P = 0.000$).

Table 8 summarizes the frequency of intake of various

Table 5: Distribution of adolescent girls according to the type of diet ($n=670$)

Type of diet	n (%)		
	Rural ($n=335$)	Urban ($n=335$)	Total ($n=670$)
Mix	9 (2.7)	28 (8.4)	37 (5.5)
Vegetarian	326 (97.3)	307 (91.6)	633 (94.5)
Total	335 (100)	335 (100)	670 (100)

$\chi^2=10.3271$ $P=0.001$

Table 6: Distribution of adolescents according to the frequency of meal and snacks per day ($n=670$)

Characteristics	Frequency	Rural (%)	Urban (%)	Total (%)	Remarks
Meals	1 time	9 (2.7)	4 (1.2)	13 (1.9)	$P=0.001$
	2–3 time	300 (89.5)	298 (88.9)	598 (89.2)	
	More than 3	26 (7.8)	33 (9.9)	59 (8.8)	
	Mean±SD	2.85±0.59	2.7±0.66	2.78±0.63	
Snacks	0 times	33 (9.9)	24 (7.2)	57 (8.5)	$P=0.258$
	1–2	275 (82.1)	282 (84.2)	557 (83.1)	
	3 and 4	27 (8.1)	29 (8.7)	56 (8.4)	
	Mean±SD	1.67±0.672	1.7±0.642	1.67±0.657	

SD: Standard deviation

non-nutritious food items among the adolescent girls of rural and urban area. Almost half of the study participants (48.4%) consumed tea/coffee 1–3 times a week. 16.7% of girls had habit of daily consumption of tea/coffee. On comparing the frequency of fast food and sweet, ice cream, and pastries, almost two-thirds had reported intake 1–3 times a week while 0.6% in fast food and 2.2% in sweet, ice cream, and pastries daily intake reported. Statistically significant difference was observed in intake of various non-nutritious food items except for fast food in rural and urban area girls ($P = 0.001$).

DISCUSSION

In the present study, in rural area, majority of girls (76.72%) were in mid-adolescent phase, whereas in urban areas, majority of girls (51.94%) were in late adolescent phase. 91.3% of respondent were Hindu and 57.4% came from nuclear family. 60.3% girls from rural area came from lower socioeconomic class and 49.9% girls from urban area were from middle socioeconomic class. Nearly one-third of the fathers and one-fifth of the mothers were graduates, 32% of the mothers and 23% of the fathers were educated up to class 10. 90% of girls were pure vegetarian. Mean number of meal was 2.85 in rural area and was 2.7 in urban area. Daily intake of all nutritious food items was very low (daily intake of pulses was 5.2%, green leafy vegetables was 10%, fruits was 16.9%, and milk was 17.5%). Almost half of the study participants (48.4%) consumed tea/coffee 1–3 times a week. Almost two-thirds had reported intake of fast food, sweets, ice creams, and pastries 1–3 times a week. The statistically significant differences were observed in age distribution, socioeconomic class, literacy of parents, mean number of meal, in intake of nutritious (pulses, green leafy vegetables, and fruits), and non-nutritious (tea/coffee, fast food, sweets, ice creams, and pastries) food items in rural and urban area ($P < 0.05$).

A study conducted by Kotecha *et al.* in urban area of Baroda, about one-third were in their early adolescence and the rest belonged to the late adolescence group, 93% Hindu and 65% from nuclear family.^[10] Yadav *et al.* study also revealed same finding.^[11] Census 2011, India, reports that adolescents in

Table 7: Distribution of adolescents according to the frequency of eating various nutritious food per week ($n=670$)

Food items	Frequency	n (%)			Remarks
		Rural	Urban	Total	
Pulses	Never	2 (0.6)	5 (1.5)	7 (1.0)	$\chi^2=17.36$, $P=0.0001$
	1-3	283 (84.5)	229 (68.4)	512 (76.4)	
	4-6	45 (13.4)	71 (21.2)	116 (17.3)	
	Daily	5 (1.5)	30 (9.0)	35 (5.2)	
Green leafy vegetables	Never	20 (6.0)	41 (12.2)	61 (9.1)	$\chi^2=16.98$, $P<0.0001$
	1-3	226 (67.5)	173 (51.6)	399 (59.6)	
	4-6	72 (21.5)	71 (21.2)	143 (21.3)	
	Daily	17 (5.1)	50 (14.9)	67 (10.0)	
Fruits	Never	21 (6.3)	29 (8.7)	50 (7.5)	$\chi^2=11.4$, $P=0.0001$
	1-3	237 (70.7)	215 (64.2)	452 (67.5)	
	4-6	62 (18.5)	51 (15.2)	113 (16.9)	
	Daily	15 (4.5)	40 (11.9)	55 (8.2)	
Milk	Never	117 (34.9)	113 (33.7)	230 (34.3)	$\chi^2=2.03$, $P=0.15$
	1-3	154 (46.0)	135 (40.3)	289 (43.1)	
	4-6	13 (3.9)	21 (6.3)	34 (5.1)	
	Daily	51 (15.2)	66 (19.7)	117 (17.5)	

Table 8: Distribution of adolescents according to the frequency of eating various non-nutritious food per week ($n=670$)

Food item	Frequency	n (%)			Remarks
		Rural	Urban	Total	
Tea/coffee	Never	61 (18.2)	135 (40.3)	196 (29.3)	$\chi^2=38.4$, $P<0.0001$
	1-3	204 (60.9)	120 (35.8)	324 (48.4)	
	4-6	22 (6.6)	10 (3.0)	32 (4.8)	
	Daily	48 (14.3)	64 (19.1)	112 (16.7)	
Fast food	Never	80 (23.9)	86 (25.7)	166 (24.8)	$\chi^2=0.2$, $P=0.6$
	1-3	227 (67.8)	222 (66.3)	449 (67.0)	
	4-6	27 (8.1)	24 (7.2)	51 (7.6)	
	Daily	1 (0.3)	3 (0.9)	4 (0.6)	
Sweet, ice cream, pastries	Never	53 (15.8)	58 (17.3)	111 (16.6)	$\chi^2=15.7$, $P=0.0001$
	1-3	236 (70.4)	242 (72.2)	478 (71.3)	
	4-6	44 (13.1)	22 (6.6)	66 (9.9)	
	Daily	2 (0.6)	13 (3.9)	15 (2.2)	

general population. NFHS 3 findings in Gujarat revealed that 70% of women (aged 15–49 years) were vegetarians [12]. According to the report of 61st round of NSSO, [13] the average number of meals consumed by females in urban population of the Gujarat was 2.07. A study on nutritional status of adolescent girls of Dongria Kondh tribe reported 62.36% girls had inadequate protein intake. [14] Daily intake of fruit was 17.3% and milk was 25% in a study conducted by Yadav *et al.* in college going adolescent of Belagavi. [11] According to NFHS-3, 74.1% of women in the Gujarat consumed milk at least once a week. [12] In Nepal, a study among schoolchildren revealed that fast foods were referred by more than two-thirds of them. [15] Study from school girls of rural West Bengal reported daily consumption of fast food was 8%. [16]

RECOMMENDATIONS

Based on the findings of the present study, adolescents must be educated about the importance of regular intake of healthy nutritious food and harmful effect of non-nutritious food. It is important that periodic talks on nutrition by specialist guest speakers should be arranged and parents should be invited to these lectures as well.

The present study was conducted with equal representative sample from rural and urban area and compare results but only school going girls were included in the study.

the age group of 10–14 years are contributing to more than half of the adolescent population. The differences observed in age distribution of the present study is because the study subjects are school students and census data reflect the

CONCLUSION

In the present study, it was observed that the majority of the adolescents had regular enough number of meals and snacks, but intake of nutritious food such as milk, protein-rich food, green leafy vegetables, and fruits was not enough according to ICMR standards. On the other hand, intake of non-nutritious food such as tea/coffee, fast food, sweets, ice cream, and pastries was observed in girls. On comparison, intake of nutritious food items was less in rural area, whereas non-nutritious food items were more in urban area.

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