

# Assessment of dietary intake of adolescent girls belonging to low socio economic status: a community based study from Lahore

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**Summary.** *Aim:* To assess the dietary intake and dietary habits of adolescent girls belonging to low socio economic status to provide a baseline data for future intervention studies, a community based descriptive analytical study was conducted. *Method:* Unmarried adolescent girls, who had had their first menarche, were selected through convenience sampling. Informed verbal consent was obtained from the participants and their parents. Three days dietary recall was used to gather dietary data which was analyzed according to recommended servings of food groups in MY PLATE (USDA, 2011) and through modified Healthy Eating Index (HEI) scoring. Means and percentages were calculated and the data was analyzed through SPSS version 17. *Result:* All the adolescents were consuming less than recommended calories for their age. More than 50% of adolescent girls were taking less than half the required calories. About 74 % adolescents were skipping one meal or another at least four times a week. Majority of adolescent girls 80% were not consuming even a single serving from fruit group. The mean HEI score was also very low (29/100) and fell into poor category. A strong correlation  $r=0.88$  was found between HEI scores and caloric intake. *Conclusion:* Dietary intake of adolescent girls belonging to low socio economic status is far from satisfactory which does not meet the recommended diet for this age group. Intervention strategies are needed to improve the dietary intake of adolescent girls so that their requirements of energy along with other nutrients are met.

**Key words:** Adolescent girls, dietary intake, socio economic status, HEI

## Introduction

South Asia has one of the highest infant and maternal mortality rates in the world (1). Poor nutritional status of expecting mothers is one of the major reasons behind this high maternal mortality. Studies have found preconception nutritional status to be an important regulator of successful pregnancy outcome including health of mother and the neonate (2, 3). This calls for focus on improving nutritional status before a girl gets married.

Good nutrition plays a pivotal role in attainment of better health status. Health of adolescent girls is of special significance from this perspective as they are potential future mother and investment in the health

of these adolescent girls is an investment in one's future generation. Dietary intake of adolescent girls is of paramount importance as it's a famous idiom that prevention is better than cure hence a good dietary intake ensures good nutritional status and consequently builds resistance to diseases. Therefore the present study was undertaken to assess the dietary intake of adolescent girls from low socio economic strata as girls belonging to this strata are usually at a disadvantage of getting the least amount of attention as far as health is concerned. Nutrition during adolescence is critical for healthy development (4) yet many adolescents have diets that are not consistent with dietary guidelines for health (5). Adolescent is a period that is marked with

rapid growth and deficiencies both in terms of health and nutrition are usually masked behind this visible growth spurt. Hence little attention has so far been paid to health of adolescent girls. Socio economic status also determines in a way what one can afford to eat or not. Among a lot of other risk factors poverty is also one that predisposes people to health and nutrition problems (6-8). The studies carried out in past have established that a direct link exists between socioeconomic status and the nutritional quality of diets. A study in France showed that consumption of cereals, bread, sweets and potatoes were significantly higher among children of low socio economic status group than children belonging to upper socio economic group (9). Similarly in a study carried out in the United States of America, it was found that consumption of fruits and vegetables was quite low among children and adolescents from low income households (10).

As the foods usually consumed by these adolescent girls are usually those which are low in cost and have higher satiety value, these foods are calorie dense but not nutrient dense so consequently the diet of these children and adolescent girls are low in micro nutrients especially iron, folate and vitamin C as reported in previous studies (11-13). Similarly the foods which are nutrient dense usually have a lower satiety value and also expensive, hence not preferred by low socio economic community.

Low-cost foods satisfy hunger and are more affordable and more accessible in low-income areas. Past studies have proven that with decrease in purchasing power, nutrient dense foods are often the first ones to be omitted from the diet. People belonging to low socio economic status tend to decrease consumption of fruits, vegetables, meat and fish and instead took foods which are calorie dense (13, 14).

Hence it can be concluded that it is micronutrient intake which is more affected as compared to macronutrients when there is decrease in income (15). Adolescence is a time which requires adequate diet which can meet the demands of building new tissues and contributes towards proper mineralization of bones. During the period of puberty, the body requires high calories and nutrients like protein, calcium, iron, folate and zinc. Iron and calcium are particularly important nutrients during adolescence (16).

## Objectives

- To assess the dietary habits of adolescent girls from low socio economic strata.
- To assess the diet quality of the adolescent girls.
- To find out the usual daily intake from cereals, dairy, vegetables fruit and meat & legumes groups.

## Methods and Materials

The present cross sectional community based research study was conducted between August, 2013 to February 2014, at *Shah de Khoe* and *Mochi Pura*, both semi urban and low socio economic communities of Lahore, Pakistan. The data was collected through convenience sampling. Anemia was taken as an indicator of malnutrition and sample size was calculated on the basis of prevalence of anemia among adolescent girls. A recent study in Pakistan had found the prevalence of anemia among adolescent girls at above 60% (17). On the basis of calculation, a sample of 116 was selected, using 0.95 confidence level and 0.8 power of study, no response rate was calculated at 20%. The following website for sample size calculation was used:

<http://epitools.ausvet.com.au/content.php?page=2Proportions&P1=0.6&P2=0.3&Conf=0.95&Power=0.8&Ratio=1&Tails=2>

Only unmarried adolescent girls between the ages of 13 to 19 were selected for the study.

All the girls belonged to low socio economic strata. Informed verbal consent was obtained from the participants after the researcher explained the purpose of the study. The data was collected through three day dietary recall and it was made sure that weekend was included in this recall. This data was used to assess the dietary habits, total calorie intake and usual daily intake from dairy, fruit and meat & legumes groups.

The data was analyzed with the help of Social Statistical Packages version 17. Due to damage to 4 forms final analysis was carried out on 112 forms. The data cleaning was done by arranging the data in descending and ascending order.

The dietary data collected through 3 days dietary recall was analyzed by calculating averages of both total calorie intake and dietary intake from selected food groups.

The total calorie intake was also calculated through 3 days dietary recall and average was compared to recommended dietary intake of this age group. The data was qualitatively analyzed according to the recommendations for this age group in “My Plate (USDA, 2011)”. Further analysis of dietary data was done by assigning weights to the diets consumed by the participants. Modified HEI (Healthy Eating Index, 2010) was used for assigning weights or scores. The score was derived out of 100, allocating 20 points to grains, vegetables, fruits, dairy and meat/legumes group each. The scores were rated as good (>79), moderate (79-50) and poor (<50).

## Results and Discussion

According to FAO Statistical yearbook 2010, there are 43.4 million people who are undernourished in Pakistan (2005-2007) or 26% of the total population is undernourished (18). The findings of the present study suggested the same as it was found that all the participants were taking well below recommended calories for their age.

Pakistani food basket has set the minimum intake of calories to be around 2150 per day (19). Similarly MY PLATE USDA also set the limit around 2200 calories/day. None of the participants was able to consume the recommended calories by either standard. More than 50% of the participants were consuming lesser than half the recommended calories for their age. Due to this reason the researcher was unable to categorize the data into adequate/normal, above normal and below normal intake. Instead the quartiles were used to categorize the data.

It was found that 25% participants were taking below 850 calories, 25% below 1000 calories, 24% below 1200 calories and about 26 % were taking above 1200 but below 1700 calories /day (Table 1). This showed that more than 70% of the adolescent girls were taking below half the calories recommended for their age. Same findings of below normal caloric intake was reported in a Bangladesh study of adolescent girls whose diet was found to have a deficit of 473 cal/day in energy (20). Similarly other studies carried out in India in the same socio economic set up also showed

**Table 1.** Categorization according to caloric intake/day

Categories	Total Caloric Intake/Day	Frequency (%) N=112
Category I	600 – 850	28(25%)
Category II	860 - 990	28(25%)
Category III	1000-1180	27(24.1%)
Category IV	1200-1700	29(25.9%)
Total		112

calorie intake/day by the adolescents to be deficient by 39% (21, 22).

It was also found that almost 83% of the girls were skipping meals which could be a plausible explanation for low caloric intake (Table 2).

Lunch was the most commonly skipped meal among adolescent girls as about 52% of the girls were skipping lunch whereas 21 % were skipping dinner and about 17% of the participants said that they did not skip meals (Table 2).

## HEI Scores

The score was derived out of 100, allocating 20 points to grains, vegetables, fruits, dairy and meat/legumes group each. The scores were rated as good (>79), moderate (79- 50) and poor (<50). The researcher again had to analyze data into quartiles for HEI scoring as not

**Table 2:** Dietary habits of adolescent girls

Variable	Levels	Frequency (%) N=112
Skipping of meals	Yes	93(83%)
	No	19(17%)
How often skip	Daily	50(44.6%)
	Four times/week	12(10.7%)
	Thrice/week	31(27.7%)
	Does not skip	19(17.0%)
Which meal is usually skipped?	Breakfast	11(10.0%)
	Lunch	58(51.8%)
	Dinner	24(21.4%)
	Does not skip	19(17.0%)

a single subject scored above 50 and all fell into 3<sup>rd</sup> category which denoted poor score (<50). So the research categorized the obtained scores by quartiles. Category I was allotted to those who scored between 14–23, category II who scored between 24–30, category III represented those who had scores between 31–35 and the last category IV had a score range between 36–49. Table 3 illustrates the categories made by quartiles. Almost 28% and 23% of the participants fell into category I and II, which denoted very poor and poor, scores respectively (Table 3).

### Food groups intake

#### 1) Grains group

According to recommendations by My Plate (UDSA, 2011), the servings to be consumed from this group should be six. Only 24% of the subjects were taking recommended number of servings and 45% were taking 5 servings/day. Similar results were found in a previous studies which noted less than recommended intake of fruits among adolescents from low income families (23, 24)

#### 2) Vegetables group

Vegetable intake was also poor, with most of the participants scoring well below the recommended intake. Despite the fact that vegetables were abundantly available during winters when the dietary data was collected, the intake was very low. The prices of vegetables were also affordable but there was a lack of habit for intake of vegetables. A vast majority 55% were taking only one serving/day whereas 33% were not consuming even a single serving from this group (Table 4). Similar findings were reported in a study in Pakistan which showed about three fourths of the study participants who were

adolescent girls (77%) did not have green vegetables in their diet (25). Similar findings were reported in other studies which noted low consumption of vegetables among adolescents (24, 26).

#### 3) Dairy intake

The HEI score was further analyzed for dairy group intake and it was found that instead of taking three servings a day from this group, 33% of the participants were not taking even a single serving of dairy group, whereas 42% were taking only half serving of dairy group and on inquiry it was found that half serving was also due to milk added in tea that was almost taken daily by these 42% girls. Only 24% of the subjects were taking one serving of dairy group a day (Table 4). A study carried out on adolescent in Iran

**Table 4:** Servings consumed/day from five food group by adolescent girls

Food group	Servings consumed/day	Frequency (%) N=112
Grain	6	27(24.1%)
	5	50(44.6%)
	4	24(21.4%)
	3	11(9.8%)
Vegetable	2	3(2.7%)
	1.5	9(8%)
	1	61(54.5%)
	0.5	2(1.8%)
	0	37(33%)
Dairy	1	28(24%)
	0.5	47(42%)
	None	37(33%)
Fruits	0.5	13(11.6%)
	1	9(8%)
	None	90(80.4%)
Meat & legumes	2	13(11.6%)
	1.5	14(12.5%)
	1	47(42%)
	0.5	27(24.1%)
	None	11(9.8%)

**Table 3:** Categorization according HEI score

Categories	HEI score	Frequency (%) N=112
Category I	14-23	31(27.68%)
Category II	24-30	26(23.21%)
Category III	31-35	32(28.57%)
Category IV	36-49	23(20.54%)
Total Score	100	112

also showed less than recommended intake of milk and dairy products by adolescents (27). One of the reasons for low consumption of dairy products might be its high cost as past studies have also reported that milk, milk products, fruits and protein foods are omitted from diets with decrease in income (13, 15, 28)

#### 4) Fruit intake

Fruit and vegetable intake is an important indicator of diet quality and protective against certain chronic diseases (5, 20-22, 25, 27). Despite these benefits, adolescents do not meet dietary guidelines for fruit and vegetables.

The most alarming was the fact that almost 80% of the participants were not consuming even a single serving from fruit group and only 12% had one serving of fruit per day (Table 4). The findings of the current study were in contrast to a study carried out in a neighboring country, Bangladesh that reported about 77% of the girls took daily fruit serving at least four times in a week (29).

The findings of the present study are crucial from the perspective that fruits and vegetables are an excellent source of vitamins and minerals and nowadays the slogan "FIVE a DAY" is quite popular in health circles especially to those who believe in prevention rather than cure. But as found by previous researches when there is decrease in income, fruits are usually the first food to be excluded from the diet (14):

#### 5) Meat and legumes group

Similar trends were observed in consumption of protein and legumes group but somehow the participants managed to score better on this because of inclusion of legumes and pulses in this category as the later

being comparatively affordable financially than meat. Still a majority (42%) of the participants consumed only a single serving from this food group (Table 4). This also showed the findings of this study to be concordant with previous study that showed teenage girls were consuming less than recommended sources of protein and that was mainly of plant origin (30).

The daily protein and calorie intake was found to be lower than the recommended dietary allowance in another research study carried out in India which also highlighted the fact that the deficit was more profound in respondents belonging to lower socio economic group (31).

#### Association of total caloric intake with HEI scores

Association of total caloric intake with HEI scores was checked with Pearson Correlation. It was found that HEI scores were highly correlated with total energy intake ( $r=0.88$ ), indicating a strong association with the quantity of food consumption (Table 5). Similar findings were observed in a study conducted in United States of America, which also showed a strong correlation between total caloric intake and healthy eating index scores (32).

#### Limitations

The study was self funded, therefore could not be performed on a larger sample due to financial constraints. Moreover, convenience sampling method was used instead of random sampling method because of cultural and social hindrances as people were reluctant

**Table 5:** Association of Healthy Eating Index scores with total caloric intake

Total calories categories	HEI Categories	Total	Correlation	p-value		
I	II	III	IV	R		
I	11	10	6	1	28	
II	10	6	8	4	28	0.88 0.037
III	3	5	11	8	27	
IV	7	5	7	10	29	
Total	31	26	32	23	112	



to allow their daughters to participate in any research study. Therefore only those participants were recruited who themselves and their guardians consented to participate. Due to these limitations the results of the present study cannot be generalized but the study can be an important asset in providing a direction for future studies conducted on a large scale.

## Conclusion

It can be concluded from this study that low financial status leads to reduction in total food consumption especially limiting the intake from milk, fruits and meat group, as it was found that the daily caloric intake of adolescent girls belonging to low socio economic community was well below the recommended intake and the diets consumed by these girls were also inadequate in terms of milk, fruit and protein group servings as recommended by MY PLATE (USDA, 2011). Although the daily intake of junk food was negligible, it might be playing a role of appetite suppressant as nearly three fourth of the girls were skipping one meal or another meals at least four times a week. It might be concluded that these under nourished adolescent girls might be at risk to poor nutritional status owing to their inadequate dietary intake and form a vulnerable group which might be susceptible to different diseases.

## Recommendations

As socio economic status of the subject is not a controllable variable which can be manipulated or changed, efforts can be made at imparting nutrition education to these adolescent girls so that they can make nutritionally wise choices out of the available resources and try consuming healthy foods like fruits and milk instead of spending money on nutrient deficient foods. At government level, a nutrition policy can be made which makes nutrition a part of curriculum from the elementary level and most importantly, nutrition counseling at community level by trained nutritionists should be ensured.

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