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Assessment of Nutritional Status of Adolescents Versus Eating Practices in Islamabad City

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Abstract: The study was focused on adolescents' (n = 654) age 14-16 years studying in class 9th and 10th in Federal government schools. Anthropometric data and eating practices of adolescents were collected with the help of a pretested questionnaire and food intake diary. Selected anthropometric measurements were taken using standard techniques. Their Body Mass Index (BMI) for age was calculated and compared with WHO (2007) standards. The results revealed that three main meals were taken by the adolescents per day. The 79.51% took breakfast regularly all days of the week which had an excellent bearing on their nutritional status (p = 0.006). The 82.8% took lunch regularly in all days of the week and enjoyed better Nutritional Status (p = 0.033). Dinner was the main meal of the day and 83.8% (n = 654) dined regularly. Consumption of foods from different food groups varied. Junk foods consumption was quite high, as 95.4% consumed these regularly. Fizzy drinks were taken by 86.9% by the children of educated mothers and from higher Socio Economics Status consumed more (p<0.050). Majority i.e. 66.2% of adolescents was normally nourished and 14.1% were obese or overweight. Stunting was 12.2% and male adolescents were affected more (p = 0.053). The nutritional status and eating practices of majority of the adolescence in the urban capital are found satisfactory in terms of meal pattern. However inclination towards consumption of fast and junk foods, fizzy drinks is alarming for the future researchers.

Key words: Adolescents, nutritional status, eating practices, food intake, meal pattern, dietary pattern, dietary habits

INTRODUCTION

Adolescence is a decisive period of development because it represents the transition between life as a child, and life as an adult. During this crucial period, food intake patterns, meal intake patterns and dietary patterns are set in place and these patterns can have vital impact on lifetime nutritional status and health of the individuals. In the longer term, food consumed in childhood, particularly adolescence can set the pattern for future food preferences and eating behavior in adult life. There is also substantial evidence to suggest that poor eating and physical activity habits in childhood can store up problems for later life, particularly in relation to obesity, heart disease, diabetes, osteoporosis and cancer Stanner (2003). Young people's eating behavior I determines adult practice and thus strategies to promote healthy eating at this stage will have longer term health benefits Landon and Giles (2002). Dietary practices developed during adolescence may contribute to obesity and eating disorders and may increase the risk for several important chronic diseases later in life (Story et al., 2002).

Adolescence is period of growth spurt therefore both male and female require high energy intake and large amounts of nutrients, particularly iron, calcium and zinc.

Giskes et al. (2005). Daily eating patterns refers broadly to occasions of eating and the context of eating occasions. That is as the number of eating occasions increased, so did the overall energy intake (Dwyer (1995), where as Videon and Manning (2003) found that adolescents who ate a higher number of family meals during the week were more likely to eat the recommended amounts of fruit, vegetables and dairy products. A study on the breakfast eating practices of teens revealed that many adolescents skip this essential meal. Shaw and Mary (1998). Schools can promote healthy eating through school policies, role modeling by school staff, curricula and regulating the availability of foods for students to purchase at school (Wechsler et al., 2000). Studies based in the US and in Europe examining the effects of schools' physical environments on student nutrition have shown that the availability of snack foods and soft drinks i.e. carbonated drinks such as cola) at school have a significant impact of overall child nutrition, Templeton (2005) and Kubik et al. (2003).

Dietary habits of any group of individuals are normally established from long term dietary patterns of those individuals in any society. Dietary patterns are the outcome of meal patterns of the individuals, that are

determined from short term individual food or composite foods intake patterns Liaqat and Zulfikar (2009). The current study was initiated to establish association between nutritional status of urban adolescents studying in schools of Islamabad city, in relation to their eating practices and daily food intake pattern.

MATERIALS AND METHODS

In order to draw a statistically representative sample, from a population of 2699 adolescents studying in 52 federally located schools, a sample of 897 (33.23%) adolescents was drawn through systematic random sampling (males 51.61% and females 48.39%). From the drawn sample a sample size of 654 (72.91%) actually took part in the study actively in all aspects. Thus the response rate was almost 73%.

This was a descriptive cross sectional study aimed at assessment of nutritional status of adolescents in relation to their eating practices and dietary intake. Their socio demographic profile, dietary history, eating practices and anthropometrics were recorded with help of pretested questionnaire and three days Food Diary. Anthropometric measurements were taken using carefully standardized procedures. BMI-for-age was used as a gold standard for assessment of nutritional status of adolescents. Gender wise BMI-for-age percentiles was calculated with the help of WHO, (2007) reference values.

Food Diary and Food Frequency questionnaire were pretested before actual collection of food intake data. Food diary was prepared in accordance with the food diary earlier used by Lillegaard and Andersen (2005). The most important determinant of a child's liking for a particular food perhaps is the extent to which it is familiar (Cooke and Wardle, 2005). Therefore the adolescents were also evaluated for their food choices with the help of a Food Frequency Questionnaire (FFQ). The most commonly used foods were listed in this FFQ and children were asked to tick the eating frequency of each enlisted food.

The foods taken by the adolescents on three consecutive days (2 week days and one weekend) were recorded by adolescents. The diary carried a set of instructions regarding accurate recording, food atlas with three portion sizes of the most often consumed foods was included with enough space for recording of three days food intake (type of food/drink, description/preparation and amount/portion size) and a semi quantitative food questionnaire, to assess the approximate consumption of various foods by adolescents.

Data collected were analyzed with the help of SPSS version-16. The nutritional data were analyzed with the help of frequencies of foods eaten. Nutritional status was determined as thinness (BMI-for-age < 5th percentile), normally nourished (BMI-for-age > 5th

percentile to < 85th percentile) and at risk of overweight (BMI-for age = 85th percentile).WHO standards (2007).

RESULTS

The overall response rate to this survey was 72.91% (n = 654). The age of the adolescents ranged 14-16 years (middle adolescents). Mean age of the adolescents (both male and female) was 15.27±0.55 years. The response rate was more among females i.e. 52.6% as compared to males' i.e. 47.4%.

Anthropometrics: The mean age of male adolescent was 15.5±0.47 years with mean height of 1.66 meters and with a mean weight of 52.3±10.8 kg (Table 1) where as a female adolescent with mean age 15.1±0.54 years had a mean height of 1.55 ±0.06 meters with mean weight of 47.6±9.59 kg.

Nutritional status of adolescents according to BMI for age percentiles: Different indices like stunted, thin, overweight or normal or overweight were used to declare the nutritional status of adolescents. The stunting was found in 12.2% adolescents with BMI-for-age percentile criteria (Fig. 1); among these stunted adolescents 57.5% were males and 42.5% females, which shows that stunting is more common in males but the gender difference was not found statistically significant.

Meal pattern: Three meals were taken per day i.e. breakfast, lunch and dinner, which is a typical oriental pattern. Snacks between the meals were not a common feature.

Consumption of breakfast: Out of these adolescents 79.51% (n = 653) took breakfast regularly all days of the week detail shown in Table 2. This had an excellent bearing on the nutritional status of the adolescents (p = 0.006) as majority who took breakfast regularly all the days of week were normally nourished. It had no relation to the stunting according to the percentiles of the BMI-for-age (p = 0.099) as stunting was common in those adolescents who took breakfast regularly on daily basis.

Consumption of snacks in the school break: Out of 653 adolescents 187 (28.6%) took snacks at schools regularly throughout the week; where as 17.3% did not take any sort of snack at school. A strong correlation was observed between school snack consumption and gender of the adolescents (p = 0.006) and Nutritional status of the adolescents (p = 0.018) was observed. Adolescents who took regular school snacks were better nourished. However adolescents' girls who took regular school snacks enjoy better nutritional status than adolescent boys.

Consumption of lunch: Out of total respondents 82.8% (n = 652) took lunch regularly in all days of the week.

Table 1: Genderwise mean age, height and weight of the adolesnetnts

Characteristics	Male	Female
Mean age in years	15.5±0.47	15.1±0.54
Mean height im meters	1.66±0.08	1.55±0.06
Mean weight in kg	52.3±10.8	47.6±9.59

Table 2: Meal pattern of the adolescents

Meal	Frequency of Meal pattern		
	Daily (%)	Sometimes (%)	Never (%)
Breakfast	79.51	17.9	2.6
School recess	28.6	54.1	17.3
Lunch	82.8	15.5	1.8
Tea Time	11.7	42.8	47.1
Dinner	83.8	15.1	1.1
Bed Time	17.2	42.8	40.6

Only 1.8% did not take lunch for detail see Table 2. No correlation was found between frequency of lunch and different age groups and gender, stunting was found (p>0.050). Prevalence of obesity had some association with frequency of the lunch per week as those who took lunch regularly throughout the week had higher incidence of obesity (p = 0.025). Similar observation was noted between frequency of the lunch per week and national status of adolescents as assessed by BMI-for-age percentiles (p = 0.033).

Consumption of dinner: This is the main meal of the day and 83.8% (n = 653) took dinner regularly throughout the week and 1.1% were the skippers, for detail see Table 2. Frequency of dinner had no association with gender, age, nutritional status, stunting and obesity (p>0.050). Consumption patterns of adolescence for various foods form different food groups was also studies with the help of food frequency questionnaire. It revealed the eating practices of adolescents more specific to commonly eaten food items such as milk, poultry and other meats, vegetables and fruits, cereals, fizzy drinks including flavoured juices, junk and fast foods. No obvious relationship was noticed with consumption of various foods and nutritional status except with the frequency of taking milk. It is considered a complete food for infants but one of the major food required for adolescence. It was found that 60.6% adolescents were consuming milk at least once a week, whereas 27.1% reported not to be taking milk at all. Adolescents consuming milk regularly enjoyed better nutritional status (p = 0.024).

DISCUSSION
The residents of capital city of Pakistan are privileged as they enjoy all the civic, health and educational facilities and have ready access to the information being in touch with the media, both electronic and print. This population is socio-economically sound as compared to the rest of the country Economic Survey of Pakistan (2007-08). The current study conducted in the capital revealed some interesting findings.
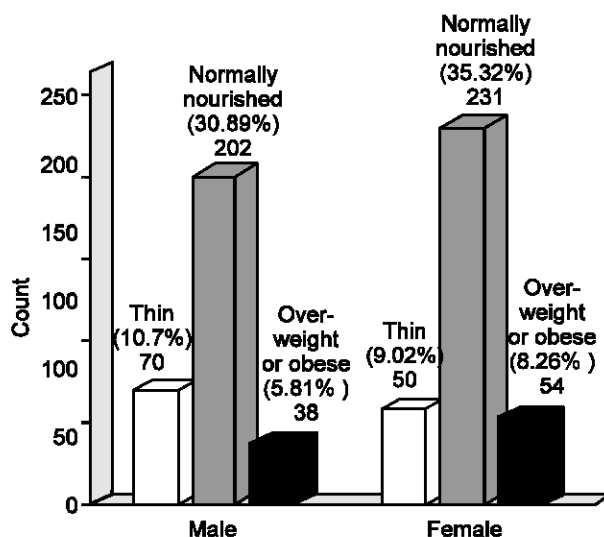

Fig. 1: Nutritional status of the adolescent according to BMI-for-age percentiles (n = 654)

Anthropometrics: Age and Gender wise mean weight in kilograms indicates the increasing trend with increase in age. Average weight of boys for all age categories was more than girls which is the expected value as boys are normally heavier than girls due to their physiological differences. The mean weight of girls (47.6 kg) was slightly less than the recommended weight for same age group of Pakistani population which is 51.5 kg. This indicates growing trend among urban girls to remain thin. Same trend was observed in male population. The mean weight found in study population of male subjects was 52.3 kilograms while for reference Pakistani adolescent population of same age group, it was 54.5 kilograms (Food composition tables for Pakistan, 2001). On average the difference in mean weight of 2-3 kg among the study population as compared to mean weight given for the reference Pakistani adolescents of same age group was probably due to limiting the study area just to urban capital city of Islamabad, which cannot be representative of whole adolescent population of Pakistan.

Nutritional status: BMI-for-age is the gold standard for assessment of the nutritional status of the adolescents in recent researches. This is calculated with the help of basic parameters like age, height and weight. The nutritional status assessed using BMI-for-age percentiles indicated that out of total sample 31% (n = 202) of males were normally nourished while this figure for females was 35% (n = 231). Similarly 6% (n = 38) among males were overweight/obese while among females it was 9% (n = 54). Under nourished or thin population among males and females was 11% (70) and 9% (59) respectively. A similar study was conducted among Pakistani student population by (Rehman *et al.,*

2003). The study revealed that 17% of the students were underweight (below the 5th percentile), 65% were normal weight (5-85th percentile) and 18% were overweight (above the 85th percentile). Both the studies show stunting and under nutrition as a common feature. The findings of similar studies in developed countries indicate that they are facing other side of the picture i.e. the prevalence of obesity (generally BMI >95th percentile) is steadily increasing among children and adolescents.

Dietary pattern: It is important to assess dietary pattern of any population in order to have a broader idea of nutrient intake and nutritional status of any population. Review of literature a show that no in depth research is available for such data in Pakistan. National Nutrition surveys reflect a general behavior of Pakistani Population regarding number of meals they eat per day. These surveys are deficient in covering all stages of life cycle among which adolescence is one. Meal pattern is covered to some extent but is not focused on any specific age group. It reflects that in Pakistan, usually three meals a day are eaten, a morning meal (breakfast), a mid-day meal (lunch) and an evening meal (dinner). Everybody irrespective of the region of his/her residence eats breakfast. Lunch at midday is common and is taken regularly by 90-95% of the population. Dinner is the major meal usually taken at the end of the day. (NNS, 2001-2002) The present study revealed similar meal pattern i.e. percentage of subjects eating three major meals (breakfast, lunch and dinner) was more than those having in-between meals.

If we review the meal pattern of adolescence in the present study, it shows that skipping of breakfast is not a much problem among Pakistani adolescents as only 20% of the children skipped breakfast due to one reason or the other. Irregularity in having breakfast had no relation to the stunting according to the percentiles of the BMI-for-age as stunting was also common in those adolescents who took breakfast regularly. This is fortunate that large majority of our adolescents are in the habit of having regular breakfast as compared to developed countries. Breakfast eaters generally consumed more daily calories yet were less likely to be overweight, although not all studies associated breakfast skipping with overweight. Review of related literature shows that breakfast consumption may improve cognitive function related to memory, test grades, and school attendance,

In the present study out of 653 adolescents 28.6% took snacks at schools regularly throughout the week; where as 17.3% did not take any sort of snack at school. A strong correlation was observed between school snack and sex of the adolescents and NS of the adolescents. Adolescents who took regular school snacks enjoy better NS and it is more so in the females. The 85.7% of

adolescents or their parents thought that school meal/snacks were important; females were significantly more inclined for this.

In Western countries Dieticians and health professionals have done a lot of research on school meals and its importance. It is unfortunate that little work done for improving health of school children could not succeed due to multiple reasons. For example in last decade Tawana Pakistan Project (TPP, 2004) - a joint initiative of the Ministry of Women Development, Pakistan Baitul Mal and the Aga Khan University (AKU) - was initiated as an attempts to fill this vacuum through a three-year school nutrition package for girls. It ended up with not much success.

It is very important to provide healthy foods at school cafeterias for adolescents. In this context (Helen, 2005) says that the components of an eating well strategy for school food are now being brought together and we should welcome this new opportunity to make a real impact on the health of young people. We need however to remain vigilant that the basic principles of good nutrition remain at the forefront of decision making. Similar spirit is required to uplift present situation of School canteens in Pakistan as well, so that healthy food is available to this most important group of Pakistani population.

Lunch and dinner are the major meals in Pakistani culture. In the present study 82.8% of the adolescents took lunch regularly in all days of the week and only 1.8% skipped lunch. While 83.8% of the adolescents took dinner regularly throughout the week while only 1.1% was the skippers.

Researches show that the type, quality and quantity of foods eaten affect nutritional status of individuals in normal circumstances. A study conducted among adolescents in selected schools of Peshawar indicated that, "A significant correlation was found between the anthropometric, dietary and socioeconomic characteristics of the families". Zia-U-Din Paracha (2003). Same concept was studied among the adolescents in the present study. The adolescents were asked to report frequency of most commonly eaten foods during the "week", on "monthly" basis and "never" eaten. Broader groups of these foods included milk, all types of meats, cereals, pulses and legumes, junk foods such as candies, chocolates, fizzy drinks, fast foods, fruits and vegetables etc. The consumption pattern of various foods had no obvious relationship with nutritional status of adolescents accept with frequency of milk intake. It was found that adolescents with better milk consumption enjoyed better nutritional status (p = 0.024). It was further established that males were taking milk more frequently as compared to females. (p = 0.000). This indicates that the cultural and gender disparity is prevailing in our society in which more preferences is given to males as compared to females in terms of food distribution.

Another growing trend among adolescents studying in schools of Islamabad was consumption of fast foods and fizzy drinks. Fast foods are quick, reasonably priced, and readily available alternatives to home cooking. While convenient and inexpensive for a busy lifestyle in urban areas, Adolescents in the US visit fast food outlets more than twice a week Story *et al.* (2002). In present study 82.6% adolescents consumed these foods on weekly basis. Commercially prepared fast foods are becoming more popular as they are liked more as compared to home prepared. Consumption of fast foods and fizzy drinks have negative effect on health of young generation. A study conducted by French *et al.* (2001), show that among adolescents, fast food restaurant use has been found to be positively associated with energy intake and soft drink consumption and negatively associated with consumption of fruit, vegetables and milk, thus depriving the youth from consumption of a balanced diet.

Conclusion: Adolescents are the future and back bone of any nation. Therefore their health issues need special attention. Findings of the present study indicate that over nutrition or obesity is not the major problem of adolescents of capital, rather some are suffering from under nutrition as well. It is therefore pertinent to focus on improvement of the eating practices of both urban and rural adolescents in order to prepare a future healthy nation. More attention needs to be given to the regular consumption of breakfast, school time snacks, while fast foods and fizzy drinks may be discouraged for maintaining healthy eating practices for achieving desired nutritional status of the adolescents.

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