

Nutritional assessment of adolescent girls living in Cherah Union Council

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Abstract

Objective: To assess the nutritional status of adolescent girls living in the Cherah union council, Islamabad and to determine the association between dietary intake and iron deficiency anaemia.

Methods: It was a cross sectional survey conducted in union council Cherah of Islamabad. Study participants comprised of 150 adolescent (11-19 years of age) girls selected by simple random sampling living in that area during the study period.

Results: It was observed that 7% of the adolescents were overweight, 46% were underweight and 1% were obese. Minimum weight of the participants was 23kg, minimum haemoglobin was 5.6g/dl, 67% had mild anaemia, 9% had moderate, 1% severe and 48% had normal haemoglobin. Association of food groups labeled as in USDA guideline with the haemoglobin level, was statistically insignificant except in the case of beef and liver intake (meat group) showing association of beef liver intake with haemoglobin level.

Conclusion: Adolescent girls living in the union council were under weight and had mild to moderate anaemia. There was a significant association of the intake of meat with the haemoglobin level.

Keywords: Nutritional status, Adolescent girls, Iron deficiency anaemia. (JPMA 64: 1220; 2014)

Introduction

Adolescence, a transitional period between childhood and adulthood, covers the ages between 11-19 years.¹ It is considered to be the most important and versatile period of life where growth and development are accompanied by physical, physiological, behavioural, and social changes. During this period the demand for nutrients increases posing a greater risk of nutritional deficiencies. Adolescents from developing countries are susceptible to nutritional deficiencies due to early childhood nutritional insults, which include underweight, stunting and low dietary intakes.² Under nutrition increases the risk of poor obstetric outcomes for teen mothers and put at risk the healthy development of future children. Children born to short, thin women are more likely themselves to be stunted, underweight and less cognitively able than normal birth weight peers. In addition, the heightened obstetric risk caused by stunting in childhood and adolescence persists throughout a woman's reproductive life.³ Adolescence is also a unique intervention point in the life-cycle. It is now realized that nutritional insults at early age become evident during adolescence.⁴

Pakistan is the 6th most populous country in the world with a population of about more than 160 million. Two

third of the population is rural. Forty one percent of the population is below 15 years of age.⁵ Adolescents constitute about one fourth of the population but haven't received much attention with respect to their nutritional needs and wellbeing.⁶ Adolescence being a critical period of human life is subjected to a variety of challenges and include diverse dietary and health care practices. These result in a complicated scenario which has to be dealt with individual support and counseling to avert long term functional and economic consequences. Underweight and stunting remain significant problems in many Asian communities, and micronutrient deficiencies continue to trouble large population groups. Effective data collection and analysis are essential to formulate and implement intervention programmes to address both sides of the altering nutrition scenario in Asia.⁷

Early indicators of atherosclerosis, the most common cause of heart disease, begin as early as childhood and adolescence. Atherosclerosis is related to high blood cholesterol levels, which are associated with poor dietary habits.⁸ Overweight and obesity, influenced by poor diet and inactivity, are significantly associated with an increased risk of diabetes, high blood pressure, high cholesterol, asthma, joint problems, and poor health status.⁹ The onset of menstruation adds a further nutrient burden. To meet this demand, requirements for Fe increase by an estimated 70% after the age of 10 years. In developing countries, where anaemia is generally more severe, associations of Iron Deficiency and Iron Deficiency

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Anaemia with poor cognitive function are evident.¹⁰ Among adolescent girls, anaemia has negative consequences on growth, school performance, morbidity and reproductive performance.¹¹ It is reported that 2170 million people are affected worldwide by nutritional anaemia. Out of these 90% live in developing countries. Among these developing countries South East Asia has the highest prevalence of anaemia. The prevalence of iron deficiency anaemia in developing countries is 36% whereas only 8% in developed countries.¹²

It is estimated that at least 25% of women in the developing world have their first child by the age of 19 years. Teenage pregnancies, where girls haven't reached their full growth potential, have been associated with an increased risk of obstructed labour due to cephalo-pelvic disproportion (CPD), which in turn is associated with an increased risk of peri partum and maternal mortality. Adolescent mothers also have an increased risk of severe anaemia, preterm delivery, still birth, and neonatal death, due to competing nutritional requirements of the developing foetus and growing mother. In developing countries, factors associated with under nutrition of adolescents are poor household economic condition, periodic food-shortage, burden of disease, poor knowledge about long-term consequences of under nutrition of adolescents, quantity and quality of food, and access to health and nutrition services.¹³

Adolescents often have chaotic eating patterns that do not follow dietary recommendations. Fewer than 2% of adolescents eat enough of all the food groups, and almost 20% of females and 7% of males do not eat enough of even one of the food groups. Frequent dieting or restricted eating, skipping meals and vegetarian eating styles are all risk factors for anaemia in adolescents. In spite of increased iron needs, many adolescents, especially females, do not get enough iron from their diets. About 75% teenage girls, do not meet their dietary requirements for iron, compared to only 17% of teenaged boys. Studies have shown that adolescents with anaemia have decreased verbal learning and memory, as well as lower standardized math scores. Even before anaemia might develop, iron deficiency can cause shortened attention span, alertness, and learning in adolescents.¹⁴ It is thus essential to prevent malnutrition at every stage of the life cycle. Investing in nutrition throughout the life cycle will have both short term and long-term benefits of economic and social significance, including large savings in health care costs, increased education and intellectual capacity, and increased adult productivity. So far, most of the interventions have either focused on children aged 0-5

years or on pregnant women however, not much attention has been paid to adolescents by nutrition-related programmes in developing countries.¹⁵

The present study was conducted as very little information about the diet and nutritional status of adolescent in Pakistan is known and there was a need to establish a base line data to enable government and other non-government agencies to formulate policies for the well-being of adolescent girls. Secondly there have been many studies on school adolescents and very few studies on community adolescents. The school based studies cannot be extrapolated to adolescent girls as their school enrollment is less than that of boys especially in the rural area. The study was conducted to assess the nutritional status of adolescent girls living in the Cherah Union Council and to determine the association between dietary intake and iron deficiency anaemia.

Subjects and Methods

The study was cross sectional and descriptive, conducted in union council Cherah of Islamabad among the adolescent (11-19 years of age) girls living in that area during the period April to June 2010. Union council Cherah has an estimated population of 20,979 inhabitants spread over 3,225 households as per census 1998 and four main villages which were, Cherah, Ara, Harnothandapani and Darkala. The sample size estimated on the basis of expected 50% prevalence of malnutrition in adolescent at 5% level of significance was 100. Further adjusting for 5% non-response rate and 1.5 design effect, the final sample size was 150 participants. Multi stage sampling technique was used. All unmarried, willing, healthy adolescent girls 11-19 years of age living in Cherah union council were included in the study and married adolescent girls those with debilitating illness or whose parents not willing to give consent were excluded. Study tool was the structured questionnaire translated into Urdu language for convenience. Weight machines, measuring tapes and stationary were used for data collection. Pilot testing of questionnaire was carried out, Field editing was done of questionnaire accordingly. Team of about six members was hired comprising of both male and female members and they were trained to collect data.

Body mass index was calculated by using the formula weight/height (m²). Weight measured in kgs and participant standing at the center of the scale and not holding anything, adjusting scale at zero. Height of participant was measured by standing straight without shoes, heels together and looking straight ahead by non-stretchable measuring tape. Measurement taken from heel to knee, knee to hip, hip to shoulder and shoulder to

top of the head. BMI was calculated and categorized in to four groups.¹⁶

Under weight less than BMI of 19kg/m²

Normal BMI of 19.8-24.9 kg/m²

Overweight BMI OF 25-29.9Kg/m²

Obese BMI of more than 30kg/m²

Dietary Intake

Frequency of specific food intake in last one week was determined by dietary recall. The food guide pyramid developed by the USDA was used as the tool to determine the type and quantity of food.¹⁷

Haemoglobin Estimation

Haemoglobin level was checked and categorized as follows.¹⁸

Mild anaemia 11-14 grams/dl

Moderate anaemia 7-10 grams/dl

Severe anaemia <7 grams/dl

Normal >14grams/dl

Analysis was done using SPSS version 17. Written approval was taken from the concerned authorities. Data was collected after detailed written consent of the participants with the consent from being translated in Urdu. Confidentiality of the data was ensured at all levels.

Results

The study sample comprised of 150 participants of 11-19 years of age living in two villages of Cherah Union Council. Table-1 shows the details of the demographic characteristics of the population. The anthropometric details and the association of dietary intake with the

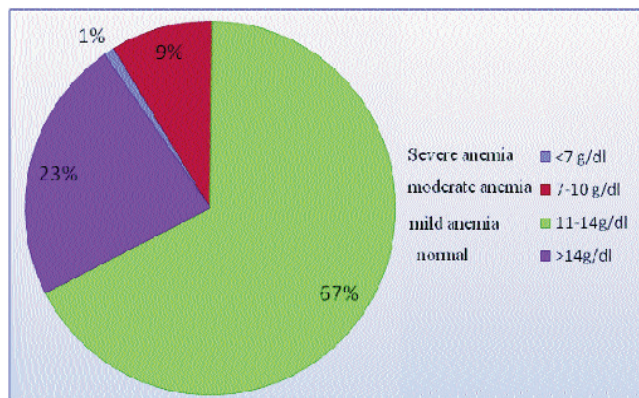


Figure: Categories of anaemia.

Table-1: Demographic characteristics of the population of Cherah.

Level of education of adolescent	N (Percentages)
None	11 (6%)
Primary	52 (28.6%)
Middle	55 (30.2%)
Matric	40 (22%)
FA/FSc	23 (12.6%)
Graduate	1 (0.5%)
Fathers occupation	
Employed	111 (61%)
Unemployed	71 (39%)
Family monthly income in PKR	
<5000	28 (15.4%)
5000-9499	46 (25.3%)
9500-15000	70 (38.5%)
>15000	38 (20.9%)
Mothers education	
None	79 (43.4%)
Primary	63 (34.6%)
Middle	24 (13.2%)
Matric	12 (6.6%)
FA/FSc	04 (2.2%)
Graduate	0 (0%)
History of gastrointestinal bleed	
Present	8 (2.2%)
Absent	177 (97.8%)
History of excessive menstrual bleed	
Present	04 (2.7%)
Absent	178 (97.3%)

PKR: Pakistani Rupees. FA/FSc: Class XII.

Table-2: Anthropometric measurements (categories of BMI).

Categories	N (Percentages)
Normal (19.0-24.9kg/m ²)	81 (44.5%)
Overweight (25-29.9kg/m ²)	13 (7.1%)
Underweight (<19kg/m ²)	66 (36.3%)
Obese (>30kg/m ²)	22 (12.1%)

haemoglobin level are projected in Table-2 and 3 respectively.

It was observed that 6% of the adolescents had no education, 39% of the adolescent's fathers were unemployed and 79% had income below 15000 rupees.

Table-2 shows that 46% of the adolescents living in Cherah union council were underweight and the mean BMI was 19.51±3.6.

Figure shows that 67% of the adolescents had mild anaemia and the maximum haemoglobin of the adolescent was 16.1gm/dl.

Table-3: Association of food intake with haemoglobin level.

Food intake	Haemoglobin in Normal range n (%)	Haemoglobin Below Normal range n (%)	P-value
1-Apple taken	83 (87.4%)	12 (12.6%)	0.099
Not taken apple	68 (78.2%)	19 (21.8%)	
2-Spinach taken	76 (80.9%)	18 (19.1%)	0.433
Not taken spinach	75 (85.2%)	13 (14.8%)	
3-beef liver taken	68 (76.4%)	21 (23.6%)	0.02
Not taken beef liver	83 (89.2%)	10 (10.8%)	
4-tea taken	88 (81.5%)	20 (18.5%)	0.52
Not taken tea	63 (85.1%)	11 (14.9%)	
5-milk taken	90 (86.5%)	14 (13.5%)	0.12
Milk not taken	61 (78.2%)	17 (21.8%)	

The intake of apple, spinach, milk and tea had no statistical association with the haemoglobin level.

Discussion

The study showed that the 61% of the adolescent's fathers were employed and 39% were unemployed. It has been observed in other publications that there is a significant association of fathers¹ employment with level of nutrition as those who are unemployed have difficulty in maintaining their children's health.^{19,20}

Obesity and under nutrition co-exist in Pakistani school-children. Socio-economic factors are important since obesity and overweight increase with Socio economic status. Whereas under-nutrition is a problem of lower socioeconomic status.²¹ Another study has shown that maternal educational status, socio-economic status and family size are important determinants of the nutritional status of the child. Efforts directed towards improvement of female literacy, socioeconomic status and restricting family size will have a positive impact on the nutritional status of school children.^{22,23}

No significant association was noted between specific foods and the haemoglobin level, of the study subjects. This may be used as a baseline data for further studies. The main limitation of the study was failure to make a cause effective relationship as it was a cross sectional study. As the study was performed in one union council of one district only and was limited to 3 months only, the results could not be extrapolated to other districts. The data was collected by recall method for food intake over the past one week and this gives chances of bias.

Conclusion

Iron deficiency anaemia is a serious health problem affecting the adolescent age group. It is clear from the study that about 46% of the adolescents livings in Cherah

union council were underweight, 12% had moderate anaemia and 65.2% had mild anaemia. Association between different food products like in fruits (apple) vegetables (spinach) meat (beef, beef liver) dairy product (milk) was not statistically significant. Those taking fruits, vegetables, meat, dairy products had a normal range of haemoglobin. This proved that diet has a positive effect on haemoglobin level but is not statistically significant. Currently there is a need to focus on the dietary education of the adolescents to choose correctly different food product. Girls should be the prime focus because they are the future mothers, iron deficiency anaemia must be prevented by educating them through LHW, media ,educational institutions in order to prevent future adverse outcomes and their routinely monitoring and reporting must be done.

Acknowledgement

Special thanks to Supervisor Dr. Asad Hafeez, LHW for their help in data collection and Health Services Academy for providing the resources for conducting the research.

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