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# Study of nutritional status of Adolescent girls from an urban slum area in Pune: a Prospective study

**Lt. Col. Neha Joshi[1], Major Manoj Kumar[2], Col Kunal Chatterjee[3]**
[1] MD, DNB, Community Medicine, Graded Speciality, Army Medical Corps, Pune, Maharastra, India
[2] DGO, DNB, Obstetrics and Gynaecology, Army Medical Corps, Pune, Maharastra, India
[3] MD, DNB, Professor, Community Medicine, AFMC, Pune, Maharastra, India

**Abstract**
**Background:** Day to- day life of adolescent girls from an urban slum is more physical and challenging because of modernization pressure as compared to rural girl. They are involved in earning to cope with the future demand of life. For that they are required to work hard both physically and mentally as compare to girls from the rural set up.
**Aims and Objectives:** To study the nutritional status of the adolescent girls from the urban slum area.
**Materials and methods:** Two hundred and twenty four adolescent girls having age between 10-19 years were studied at Urban Health Training Centre of Pune from Jan 2013 to Jan 2014. Detailed sociodemographic details including age, education and socioeconomic status (SES) was recorded. Dietary history and a routine examination of hemoglobin were also carried out.
**Results:** Mean age of study cohort was 14.29 ±1.86 years. Majority (74.55%) gave the history of taking meals three times a day, 83.48% gave the history of taking green vegetables 2 to 3 times a week, 76.34% gave the history of taking mixed diet and 49.12% gave the history of taking non-vegetarian diet once a week. Mean hemoglobin level was 10.67± 1.81 gm/dL. Majority of the adolescent girls had anaemia (78.13%), of those mild anemia was most common (49.55%) followed by moderate anaemia in 23.66% girls.
**Conclusion:** We found a high prevalence of under nutrition among adolescent girls in this slum community. Health education and nutrition interventions are needed on priority basis.

**Keywords:** mixed diet, nutritional deficiency, anemia, green vegetables

## Introduction

Adolescence is an age of transition when an individual experiences rapid growth and development, both physical and psychological and changes from being a child to an adult [1]. There are approximately 190 million adolescents living in India which make one-fifth of the entire population [2].

This period is very important for the development of the reproductive system, sexual maturation, formation of identity, and gender roles set in, and issues relating to identity, gender roles, and related problems arise [3]. For the rapid physical growth among adolescence development of healthy eating habits is very important. Previous reports on and nutrition intake of adolescents and young adults has shown that in majority of the adolescents diet comprises of often high fats and refined carbohydrate [4].

Regular snaking mainly on energy-dense foods; meal skipping, particularly breakfast, or irregular meals; frequent use of fast food; and low consumption of fruits and vegetables has been observed among the adolescents [5, 6]. Previous reports have also highlighted lower intake of micronutrients as per the Indian Council for Medical Research (ICMR) recommended daily allowances (RDA) among young girls [7]. It is also observed that both men and women of slum area are consuming less than 70% of the calcium and vitamin A of the RDA [8].

Studies on the nutritional status of women and girls are available from several part of India However data on nutritional status of the slum area of Pune region is lacking. Hence in present study we tried to evaluate the nutritional status of the adolescent girls of Pune regions.

## Materials and Methods

Present prospective cross sectional study was performed at Urban Health Training Centre which is around two kilometers away from the teaching institute from Period of study.

The study population comprised all the girls of age between 10-19 years in the households in the urban area. All the adolescent girls of age group 10-19 years and who gave the written informed consent were included. Adolescent girls who were not the permanent residents (Permanent residents were those who lived in the slum for the period of 6 months or more) were excluded from the present study.

In this area there were 350 adolescent girls. List of all 350 adolescent girls was prepared and 230 were selected by simple random sampling using lottery method. Only 6 girls out of 230 could not be studied and were considered as non-responders. The reasons for non-response were moving out of the place among two of them and four were unwilling to cooperate. Hence the final sample size which undergone data analysis was 224 adolescent girls.

Before survey, familiarization visits were made to the houses along with medico social workers, and active women of the community. Following that, interviews with adolescent girls and physical examinations after informed consent were carried out in the nearest anganwadi /urban health center.

In this study socio-demographic profile (age and education), anthropometric measurements (height, weight and BMI), dietary history (through semi quantitative food frequency questionnaire) and clinical examination to assess the signs of nutritional deficiencies were assessed. A routine examination

of hemoglobin was carried out on subjects studied. After initial examination, adolescent girls were advised treatment where necessary.

**Definitions of the variable studied**

- **Age:** Age was recorded as a continuous variable in completed years as on the date of interview.
- **Education:** According to the manual of socioeconomic scale, the study subjects into seven categories as illiterates, primary, middle, high school, intermediate, graduate, post graduate. Illiterate: A person who could not read or write. This category also included those who could only sign or reproduce some writing mechanically without meaning. Primary: Those who had studied up to 4th standard. Middle school: Those who had studied from 5th to 8th standard. Higher school: Those who studied 9th and 10th standard and had obtained higher secondary school certificate from any educational board. Intermediate/Diploma: Those who had studied 11th and 12th standard or any equivalent certificate course. Graduate: A person who had obtained graduate degree from any university (B.A./B.Sc./B.Com Degree). Post graduate: A person who had obtained post graduate degree from any university
- **Socioeconomic Status (SES):** Socioeconomic status of study subjects was calculated by using Kuppuswamy's socioeconomic scale, which has been in use as an important aid to measure socioeconomic status of families in urban communities.
- **Body mass index (BMI):** The subjects were categorized into four groups based on BMI according to WHO Asian Pacific (102) standards as <18.5 kg/m$^2$ (Underweight), 18.5–22.99 kg/m$^2$ (Normal), 23 - 24.99 kg/m$^2$ (Pre obese) and > 25 kg/m$^2$ (Obese).
- **Anaemia:** All Adolescent girls having hemoglobin less than 12 gm% were considered anaemic. Grading of anaemia was done according to WHO criteria as Mild (10-11.99 gm/dL), Moderate (7-9.99 gm/dL) and Severe (<7 gm/dL).
- All the data analysis was performed using IBM SPSS ver. 20 software. Frequency distribution and cross tabulation was used to prepare the tables. Age and hemoglobin levels are expressed as mean ± standard deviation whereas as categorical data like education status and SES are expressed as percentage.

**Results**

Mean age of study cohort was 14.29 ±1.86 years. Majority of the adolescent girls were in the age group of 14-16 years (54.02%) followed by 11-13 years (33.03%) age group.

Majority of subjects (96.4%) were studying. Only 3.6% were school drop outs. Majority of study subjects had completed high school education [118 (52.4%)] followed by middle school [80 (35.6%)] and only 10.7% had completed intermediate and above.

Majority of the individuals belonged to class III (48.2%) and Class IV (36.6%) SES class. Only 34 out of 224 individuals (15.2%) belonged to upper middle that is class II.

According to WHO BMI staging, majority of study subjects [102 (45.5%)] were in normal category while 41.1% were underweight, 8.5% were pre obese and 4.9% were in obese category.

**Table 1:** Distribution of study cohort as per number of meals taken per day

| No. of meals per day | No of patients | Percentage (%) |
|---|---|---|
| Once a day | 0 | 0 |
| Twice a day | 46 | 20.54 |
| Three times a day | 167 | 74.55 |
| Four times a day | 11 | 4.91 |
| Total | 224 | 100 |

**Table 2:** Distribution of study population as per frequency of taking green vegetables

| Green vegetables | No of patients | Percentage (%) |
|---|---|---|
| Daily | 37 | 16.52 |
| 2 to 3 times a week | 187 | 83.48 |
| Total | 224 | 100 |

**Table 3:** Distribution of study subjects as per history of taking mixed Diet

| Mixed diet | No of patients | Percentage (%) |
|---|---|---|
| Yes | 171 | 76.34 |
| No | 53 | 23.66 |
| Total | 224 | 100 |

**Table 4:** Distribution of study subjects as per frequency of taking non-vegetarian in diet

| Frequency of taking non-vegetarian diet | No of patients | Percentage (%) |
|---|---|---|
| Once a week | 84 | 49.12 |
| Twice a week | 65 | 38.02 |
| Fortnightly | 15 | 8.77 |
| Others | 7 | 4.09 |
| Total | 171 | 100 |

In the present study, the mean hemoglobin of study subjects was 10.67± 1.81. Out of 224 subjects, 175(78.13%) had anaemia, of those majority of study subjects 111(49.55%) were in category of mild anaemia followed by 53 (23.66%) in moderate anaemia and 11(4.9%) were in severe anaemia category.

**Discussion**

Increasing investment in improving the lives of adolescents will also have an impact on achieving several of the Millennium Development Goals (MDGs) that includes gender equality, education, improving maternal and child health. Nearly one fourth of India's population comprises of adolescents representing a vibrant human resource. Hence it is of utmost importance to strengthen efforts and formulate innovative strategies to channelize adolescents' energies in a constructive direction.

In the present study, majority of the adolescent girls were in the age group of 14-16 years (54.02%) and mean age was 14.29 ±1.86 years. This is slightly different from the study by Chaturvedi *et al.* [9] conducted in 1996 in Rajasthan where, 74.38% adolescents were in the age group of 10 to 14 years. Similar trend was observed in a study in Bangladesh [10] where majority (82.25%) had ages between 10 to 14 years with mean age of 12.9±2.06 years. Whereas in a study conducted in Ratnagiri in 2009 [11] reported that 94.6% in the age group 15 to 19 years mean age as 16.9 years.

In the present study out of 224 adolescent girls, majority (96.4%) were presently studying. Only 3.6% were school

drop outs. Of the literates, majority had completed high school education (52.4%) followed by middle school (35.6%) and only 10.7% had completed intermediate and above. Similar results were seen in studies conducted at Kolkata [12] and Ratnagiri [11] who reported literacy rate of 75% and 90% respectively with 8% to 23% school dropouts. Whereas, a study conducted in Wardha [13] reported that 0.9% girls were illiterate while 50% girls had completed secondary level education and 5.6% had completed collegiate education.

In the present study, 48.2% of the individuals belonged to class III and class IV (36.6%) of SES. Similar findings were seen in study by Kaur *et al.* [13] who reported 79.7% participants from lower socio-economic strata whereas a study conducted in Meerut [14] reported that 54.75% participants were from lower socio-economic strata.

In present study 45.5% of subjects were in normal category while 41.1% in underweight, 8.5% in pre obese and 4.9% were in obese category. In a study by Medhi *et al.* [15] in adolescent children of tea garden workers, median BMI was far below the NCHS median and overweight was detected in very less number of adolescents (0.33%). In the present study 8.5% were in pre-obese, 4.9% in obese category. Reason may be due to better socioeconomic status in comparison to the tea garden workers and different age groups assessed. Higher prevalence of underweight was seen in study by Patil *et al.* [11] in Maharashtra according to WHO Asian Pacific BMI criteria, 67.8% were under weight.

In present study majority (74.55%) of the girls gave the history of taking meals three times a day, 83.48% gave the history of taking green vegetables 2 to 3 times a week, 76.34% gave the history of taking mixed diet and 49.12% gave the history of taking non-vegetarian diet once a week followed by those taking it twice a week. A similar report of 1651 sample size from Mumbai shown that a quarter of subjects ate fruit and green leafy vegetables < 3 times per week [16]. A similar study from Baroda city by Kotecha *et al* including 748 adolescent girls 80% of the subjects were eating green vegetables, however nearly half of them consumed chocolates, and about one fourth consumed fast foods while 50% consumed bakery items [17].

In the present study, the mean haemoglobin was 10.67 ± 1.81. A total 78.13% had anaemia, of those majorities (49.55%) were in category of mild anaemia. This may be due to low consumption of green vegetables in present study. Verma *et al.* [18] carried out a study among 1295 girls of school going age (6-18 years) residing in 15 randomly selected slums of the north Ahmedabad city, 81.8% of girls were anaemic, out of which 55.2 % were mildly anaemic. Another study by Trivedi *et al* conducted in 360 school going adolescent girls of 13-18years age group of Raipur city, the prevalence of anaemia was 82%. [19] Results are comparable to present study. Probable reason for similarity may be due to the studies was done in nearly same age groups. Similar prevalence of anaemia was noted in studies by Srinivasan *et al.* [20] from Tirupati (80.4%), chathurvedi *et al.* from Rajasthan (73.7%) [9] and Mohapatra *et al*. from Orissa (79%) [21].

Widespread under nutrition, low dietary knowledge, and low coverage of iron supplements among adolescents are concerns for public-health nutrition. Adolescents are not the sole decision-makers. Parents, particularly mothers, often make decisions on their behalf, and they need to be sensitized about diet and nutritional needs of adolescence and adverse effects of under nutrition of adolescents, to bring about a positive change in their mindset.

Dietary education in schools, communities, and health facilities in a coherent manner can bring larger effects than stand-alone interventions. Schools can incorporate dietary education and nutritional needs at this age into family-life education or health education.

Present study has few limitations; first being that we did not collected the detailed information on dietary intake. Second the information collected by asking questions about health related events may be incomplete, since it was provided by adolescent girls from their memory. There is a need to a large randomized clinical trial to provide strength to present study findings.

## Conclusion

In present study we found the nutritional status of adolescent girls was severely affected by dietary habits. It is very important to adopt healthy dietary habits by all the adolescent girls for preventing nutritional disorders like anemia. This can be achieved by giving nutrition education to the adolescents which should focus on behavioral, cultural and institutional constraints to good nutrition, detrimental attitudes and practices toward food and eating behavior.

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