

## Original Article

## A STUDY OF NUTRITIONAL STATUS OF ADOLESCENT GIRLS IN RURAL AREA OF BHOPAL DISTRICT

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## ABSTRACT

**Introduction:** Adolescent girls are backbone of healthy and progressive family and thus future builders of positive health of community. To attain healthy reproductive outcome and efficient physical activity nutritional status of adolescent girl is valuable. In India especially in rural area there is high prevalence of malnutrition amongst adolescent girls.**Objectives:** The objective of the study was to determine the nutritional status of adolescent girls in rural area of Bhopal district and to study the socio-demographic factors affecting the nutritional status of adolescent girls in rural area of Bhopal district.**Material & method:** A community based cross sectional study was carried out amongst adolescent girls in the age group of 10-19 years. Two Government schools of Ratua village of Bhopal district were selected for study purpose. Study period was from June to August 2013. Total 200 adolescent girls were included. Variables included were age, socio-economical status, weight, Height and dietary intake pattern.**Statistical analysis:** Data was analysed using SPSS version 20 statistical software and Odds ratio and Chi square test was applied to test the strength of association between the variables.**Result:** Amongst all adolescent girls 69% suffered from under nutrition. Only 31% girls had normal nutritional status. Majority i.e. 87.20% of adolescent girls belonging to the age group of 10-14 years were undernourished**Conclusion:** Majority of rural adolescent girls were under nourished. There was significant association between socio-economic status (SES) and nutritional status of adolescent girls. Nutritional status has profound effect on health and school performance of adolescent girls.**Key words:** Nutritional status, Adolescent girls, rural area.

## INTRODUCTION

Adolescent girls are backbone of healthy and progressive family and thus future builders of positive health of community. Adolescence is a crucial part of life. During this period, adolescents gain up to 50% of their adult weight, 20% or more than that of their adult height and 50% of their adult skeletal mass<sup>1</sup>. To attain healthy reproductive outcome and efficient physical activity nutritional status of adolescent girl is valuable.

Adolescents are the best human resources. But for many years, their health has been neglected because they were considered to be less vulnerable to disease than the young children or the very old. Their health

attracted global attention in the last decade only.<sup>2</sup> One way to break the intergenerational cycle of malnutrition is to improve the nutrition of adolescent girls prior to conception. The vicious cycle of malnutrition, if not broken, will go on resulting in more and more severe consequences<sup>3</sup>. Nutrition is the cornerstone of socio-economic development and that nutritional problems are not just medical problem but multifactorial with roots in many other sectors of developments such as education, demography, agriculture and rural development.<sup>4</sup> According to NFHS-3 malnutrition level are higher in adolescent girls as almost half of the girls i.e. 46.8% in age 15-19 years are undernourished<sup>5</sup>. Among women who are thin, almost half (45 percent)

are moderately or severely thin<sup>5</sup>. Nutritional problems measured in NFHS-3 are particularly serious for rural women. In general adolescent girls are the worst sufferers of the ravages of various forms of malnutrition because of their increased nutritional needs and low social power<sup>6</sup>.

Unfortunately assessment of nutritional status of adolescent girls has been the least explored area of research particularly in rural India.<sup>7</sup> Socio-cultural factors, peer influences, craze for trendy foods; mood; body image; and extreme changes in the lifestyle, and food habits of adolescents in recent past have affected both their nutrient intake and needs<sup>8</sup>.

So, now it is essential to study the dietary pattern of adolescent girls especially in rural area for designing strategy to tackle the problem of poor nutrition. Hence, this study was conducted to know the nutritional status of adolescent girls in rural area of Bhopal.

## OBJECTIVES

The objective of the study was to determine the nutritional status of adolescent girls in rural area of Bhopal district and to study the socio-demographic factors affecting the nutritional status of adolescent girls in rural area of Bhopal district.

## MATERIAL & METHOD

A community based cross sectional study was carried out amongst adolescent girls in the age group of 10-19 years. There are two Government schools in which adolescent girls are studying in Ratua village of Bhopal district and we have selected both the schools for study purpose. According to information available from school authority the Government Middle School is having 114 adolescent girls and Government High school is having 125 adolescent girls. After taking permission from the principal of the schools, all the adolescent school girls aged 10-19 years who were enrolled in the selected schools and given consent for interview and anthropometric measurements were included in the study. Thus out of 239 total 200 adolescent girls available at the time of data collection were included in the study. Study period was from June to August 2013.

**Variables:** Variables included were age, socio-economical status, weight, height and dietary intake pattern. 24 hours dietary recall method was used to calculate the calories.

### Age estimation<sup>9</sup>:

Assessment of age is most essential for conducting growth studies. The accurate age of the adolescent girls was recorded from the school registration books.

### Measurements:

**Height<sup>10</sup>:** Height in centimetres was marked on a wall with the help of a measuring tape. All girls were

measured against the wall without foot wear and with heels together and their heads positioned so that the line of vision was perpendicular to the body. A scale was brought down to the topmost point on the head. The height was recorded to the nearest 1 cm.

**Weight<sup>9</sup>:** A bathroom scale was used. It was calibrated against known weights regularly. The zero error was checked for and removed if present, every day. Their weight was recorded to the nearest 500 grams.

**BMI:** BMI of each participant was computed by using the formula weight (kg)/ height (m<sup>2</sup>) and were graded in different grades of nutritional status according to proposed criteria for Asians. Calorie calculation was done by using 24 hr recall method.

Socio-economic status was calculated by Modified Prasad's classification. Data was collected by personal interview with a structured questionnaire and care was taken to avoid fasting and festival days while noting the dietary intake. Data was analysed using SPSS version 20 statistical software. Chi square test was applied to calculate P-value and statistical significance.

## RESULT

In the present study 33.5% subjects suffered from chronic energy deficiency (CED) grade III (BMI<16), 35.5% adolescent girls were under weight (BMI<18.5) and only 31% study subjects had normal nutritional status (Table-1).

**Table 1:- Distribution of adolescent girls according to the Body mass index**

Body mass index	Frequency (%)
CED Grade III (BMI <16)	67 (33.5%)
Under Weight ( BMI 16-18.4)	71(35.5%)
Normal (BMI 18.5-22.9)	62 (31%)
Total	200 (100%)

Majority of the participants i.e. 85.5% consume <1400 kcal daily in their diet. About 70% of adolescent girls who consumes <1400 kcal were under nourished while 87.5% of adolescent girls who consumes calorie between 1600-1800kcal.and 75% who consumes calorie between 1800-2000k cal. Were under nourished (Table-2).

Out of 200 adolescent girls, 138 i.e.69% are under-nourished (BMI < 18.5). Majority i.e. 87.20% of adolescent girls belongs to the age group of 10 - 14 years are under nourished. Similarly 55.26% of adolescent girls belongs to the age group of 15-19 years are under nourished with Odds ratio = 5.5195, X<sup>2</sup> = 23.4 & P value = < 0.0001 showing highly significant association between age of participants and Body Mass Index (Table -3).

**Table 2: Association of Calorie intake of adolescent girls with their Body mass index**

Calorie (Kcal.)	BMI			Total
	CED Grade III (<16)	Under Weight (16 - 18.4)	Normal (18.5 - 22.9)	
< 1400	61 (35.7%)	59 (34.5%)	51 (29.8%)	171 (100%)
1400 - 1600	3 (20.0%)	3 (20.0%)	9 (60.0%)	15 (100%)
1600 - 1800	2 (25.0%)	5 (62.5%)	1 (12.5%)	8 (100%)
1800 - 2000	1 (25.0%)	2 (50.0%)	1 (25.0%)	4 (100%)
2000- 2200	0 (0%)	0 (0%)	0 (0%)	0%
2200-2400	0 (0%)	0 (0%)	0 (0%)	0%
2400 - 2600	0 (0%)	2 (100%)	0 (0%)	2 (100%)
Total	67 (33.5%)	71 (35.5%)	62 (31.0%)	200(100%)

**Table 3:-Association of Nutritional status with age of adolescent girls.**

Age of adolescent girls	Body mass index		Total
	Underweight (<18.5)	Normal (18.5-22.9)	
10 - 14yr.	75 (87.20%)	11 (12.79%)	86 (100%)
15 - 19 yr.	63 (55.26%)	51 (44.73%)	114 (100%)
Total	138 (69%)	62 (31%)	200 (100%)

Odds ratio = 5.5195,  $X^2 = 23.4$  & P value = < 0.0001

Maximum i.e. 71.72% of participants of middle and lower socio-economic class is under nourished while only 11.11% of upper class participants are under nourished with Odds ratio = 20.2963,  $X^2 = 14.8$  & P value = < 0.0001 showing significant association between socio-economic class and Body Mass Index (Table-4)

**Table 4:-Association of Nutritional status with Socio-economic status of adolescent girls.**

Socioeconomic status	Body mass index		Total
	Underweight (<18.5)	Normal (18.5-22.9)	
Middle & Lower class	137 (71.72%)	54 (28.27%)	191
Upper class	01 (11.11%)	08 (88.88%)	09
Total	138 (69%)	62 (31%)	200

Odds ratio = 20.2963,  $X^2 = 14.8$  & P value = < 0.0001

## DISCUSSION

The nutritional status of adolescent girls, the future mothers, contributes significantly to the nutritional status of the community<sup>10</sup>. The nutritional requirement increases during adolescent period. In the present study 69% of adolescent girls are under nourished. The results of the Goyle A study<sup>11</sup> revealed that about 72% of the subjects and Soumyajit Maitistudy<sup>9</sup> revealed 71.8% of the subjects as per weight for age criterion were suffering from various degrees of malnutrition. In H.R. Shivaramakrishna<sup>7</sup> study 73.5% girls were under nourished.

Total 85.5% adolescent girls consume calories <1400kcal/day and 70% of which are undernourished. This shows that their average nutrient intake is much below the recommended dietary allowances. Thus, most likely reason for being underweight is not hav-

ing enough calories. Similar findings of low energy consumption among adolescents have been reported by CH Maliyeetal<sup>12</sup> and Beena Sachan studies<sup>13</sup>. In the present study there is no significant association between calorie intake and BMI of adolescent girls. A similar finding was observed in a study by Seema Choudhary<sup>6</sup>.

Majority of under nourished adolescent girls i.e. 87.20% belongs to the age group of 10- 14years, followed by 55.20% of adolescent girls of 15-19 years. National Nutrition Monitoring Bureau also reported that under-nutrition decreased from 78% in 10-13 years to 66% in 14-17 years<sup>8</sup>. Similar findings were reported in Neyamul Akhter<sup>1</sup> study. This could be because of the early growth spurt seen in the girls with sudden increase in height in early age group<sup>14</sup>.

In the present study significant association was found between Socio economic status and nutritional status of rural adolescent girls. Nutritional status of low-income families' adolescents was low. Similar findings revealed in Neyamul Akhter<sup>1</sup> study. In study of Seema Choudhary maximum 82.54% under nutrition was observed in subjects belonging to lower SES, followed in middle (69.92%) and then in high (54.05%) SES categories thus showing significant association between SES and nutritional status<sup>6</sup>. In study of K Venkaiah<sup>10</sup> also significant association was seen between SES and nutritional status.

**Limitation:** As this is a school based study, we could not find the difference regarding nutrient intake among the school and non school going rural adolescent girls.

## CONCLUSION

Majority of rural adolescent girls were under nourished. This will affect their health and school performance. There was significant association between Socio-economic status and nutritional status of adolescent girls and highly significant association between age of adolescent girls and Body Mass Index.

Recognizing the intergenerational effect of malnutrition and high prevalence of adolescent under nutrition, intervention strategies such as extension of the mid-day meal programme and provision of nutritional counselling are needed which will also help to meet

out the goals of Reproductive and Child Health programme.

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