

Nutritional Status of Kurmi Adolescent Girls of Raipur City Chhattisgarh, India

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Abstract- Introduction: There are about 1.2 billion adolescents, a fifth of the world's population, and their numbers are increasing. Hence, it is essential to assess their nutritional status. **Objectives:** 1. To assess the nutritional status of adolescent girls and 2. To identify the correlations between socio-demographic characters and nutritional status among them. **Materials and Methods:** 500 adolescent girls aged between 16 -19 years were selected from the higher secondary schools of Raipur city, Chhattisgarh. Pretested multiple choice questionnaire applied. **Variable Studied:** Age Group, Type of Family, Monthly Family Income, Literacy and occupation, Diet habit. Height, Weight and Body Mass Index Were measured. **Results:** The study found that 53.8% of the adolescent girls were thin (BMI \leq 18.5). The prevalence of chronic energy deficiency based on BMI (grade I, II and III) were 26.0%, 14.4%, and 13.4 % respectively. None of the girls was found to be obese. Only 3.6 percent girls were overweight and 42 percent girls were found normal. **Conclusion:** It is essential to implement adolescent friendly health services as recommended by the World Health Organization (WHO) to improve the nutritional status.

Index Terms- Body Mass Index, under nutrition, overweight, Adolescent Girls, Raipur city.

I. INTRODUCTION

Adolescence is a journey from the world of the child to the world of the adult. It is an important stage of growth and development in the lifespan. Unique changes that occur in an individual during this period are accompanied by progressive achievement of biological maturity (Tanner, 1992). This period is very crucial since these are the formative years in the life of an individual when major physical, psychological and behavioral changes take place (Patil et.al 2009). Adolescent may represent a window of opportunity to prepare nutritionally for a healthy adult life (Kaur et al., 2007).

Adolescent girls, constituting nearly one tenth of Indian population, form a crucial segment of the society (Government of India, 2001). The girls constitute a more vulnerable group especially in the developing countries where they are traditionally married at an early age and are exposed to greater risk of reproductive morbidity and mortality. 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 (Choudhary et al. 2009). Early adolescence is a period of rapid growth and maturation in human development. The nutritional status of adolescent girls, the future

mothers, contributes significantly to the nutritional status of the community (Venkaiah, 2002).

Under-nutrition among adolescent girls is a major public health problem leading on impaired growth (Kalhan et al, 2010). Nutritional deficiencies has far reaching consequences, especially in adolescent girls. If their nutritional needs are not met, they are likely to give birth to undernourished children, thus transmitting under nutrition to future generations (Mulugeta et al, 2009). Previous study showed that girls from disadvantaged backgrounds have poor nutritional status (Choudhary et al. 2009, Ghosh and Paul, 1991) Their weights and heights are lower than the well-to-do Indian counterparts (Goyle, 2009). This age group needs special attention because of the turmoil of adolescence which they face due to the different stages of development that they undergo, different circumstances that they come across, their different needs and diverse problems. Rural adolescent girls have been considered a low risk group for poor health and nutrition (Soumyajit, 2011). Despite all these important considerations, adolescent girls did not receive adequate attention in rural areas in our country, and only recently few studies have been carried out in this population group (Patil et.al 2009, Choudhary et al. 2009, Venkaiah, 2002). It is well established that nutritional status is a major determinant of the health and well-being among adolescent and there is no doubt regarding the importance of the study of nutritional status (NFHS 2). Nutritional status was evaluated using anthropometric indicators recommended by WHO Expert Committee (WHO, 1995). Keeping in view, the present study has been elucidate to assess the nutritional status of Kurmi school going adolescent girls in Raipur city, Chhattisgarh.

II. MATERIAL AND METHOD

Chhattisgarh is a state in Central India. The state was formed on November 1, 2000 by partitioning 16 Chhattisgarhi-speaking southeastern districts of Madhya Pradesh. In 2011, Raipur had population of 40, 62,160. Of which Kurmi caste population is 1.5 lakh (approx.) in Raipur. 500 randomly selected Kurmi, Other Backward Class (OBC) Girls of Raipur city, Chhattisgarh, India are the sample for present study. OBC is one of socially disadvantaged groups, as they still continue to lag behind the rest of the society due to their social and economic backwardness. In the specific census data it is not possible to quote the exact figure of their population. However estimate of OBC constituting 52% of the country's total population (Nema and Sharma). According to NFHS 1998-99 OBC constituting 39% of the country's population.

The present study was carried out among selected 500 higher secondary Kurmi girls students (16-19yrs of age) of Raipur city by purposive sampling method. After taking permission from the school authority, the class teachers of class were explained the purpose of the study and rapport was built up with the girl students and verbal consent was obtained from them. Briefing was done to the students regarding the questionnaire provided to them. Data on anthropometric and socio-demographic variables (i.e. Occupation, income and Literacy, Family type, diet habit) were collected using a pre designed questionnaire. Height and weight were measured using standard procedure as described below. Body mass index was computed from height and weight (weight in kg/ height in meter²). Data were entered and analyzed by using SPSS 15.0. Nutritional status were assessed using WHO recommended anthropometric indicators. The students who were physically challenged were excluded from the study.

Anthropometric Measurement Height

Height was measured using a vertical measuring rod with headpiece without wearing footwear. The children were asked to stand on flat surface, heels together and head positioned so that the line of vision was perpendicular to the body. The arms hanged freely by the side and head back, buttocks and heels are in contact with vertical measuring rods. The individuals were asked to inhale deeply and maintain a fully erect position. The movable headpiece brought onto the topmost point on the head with sufficient pressure to compress the hair. Height was recorded to the nearest 0.1cm.

Weight

Weight was recorded using a weighing machine. The accuracy of weighing machine was checked in every session against known weight. The girl were asked to stand still in centre of the weighing machine platform without support, with the body weight evenly distributed between both the feet. Weights were taken with standard minimal clothing required to maintain privacy. They were also asked to remove the shoes, socks etc. Weight was recorded to the nearest 0.5kg. The body mass index (BMI) was computed following the standard formula: $BMI (kg/m^2) = Weight (kg) / Height^2 (m^2)$.

III. FINDINGS

The Body Mass Index (BMI), estimated from the height and weight measurements of individuals, is a widely accepted measure of nutritional status. Based on the BMI, women and men are classified as abnormally thin if their BMI is less than 18.5; overweight or obese if their BMI is 25 or more; and normal if their BMI is 18.5 or higher but less than 25. Persons with a BMI which is less than 18.5 are usually classified as having chronic energy deficiency.

In the present study, Out of the total 500 selected adolescent girls, 53.8% of the adolescent girls were thin ($BMI \leq 18.5$). The prevalence of chronic energy deficiency based on BMI (grade I, II and III) were 26.0%, 14.4%, and 13.4 % respectively. None of the girls was found to be obese. Only 3.6 percent girls were overweight and 42 percent girls were found normal. The mean age of the sample population is 16.9.

The results of multivariate regression analysis have been presented in **table-4**. Out of nine independent variables, two are found to be significantly associated with the BMI of the girls. These are Age of student and Diet habit. Therefore, these variables have come out as important predictor variables determining BMI. The independent variable age of student shows the significantly associated with BMI. This indicates that Age of girls more than 18 years of age, their BMI was lower than the girls whose age was below 18 years diet habit of the girls is also found to be significantly associated with BMI. The relationship indicates that girls whose diet habit was vegetarian, Their BMI was low as compared to non vegetarian. Other independent variables like type of family, Parents occupation, Parents education, Parents income when regressed with BMI the result shows the level of significance is comparatively low as compared with the age of student and Diet habit.

IV. DISCUSSION

The study highlights the extent of thinness and Overweight among kurmi adolescent girls of Raipur city. Nutritional status was evaluated using anthropometric indicators recommended by the WHO expert committee. In the present study we used BMI for age as an indicator to describe thinness or overweight. BMI for age as recommended by WHO as the best indicator for use in adolescents to describe under nutrition (thinness) or overweight. But there are few studies in india, which have attempted to describe thinness using BMI-for- age as indicator. (**GK Meidhi**). Prevalence of under nutrition were common among the girls in the late adolescent group (16-19yrs) (**Ashok Kumar**).

Present study shows that 53.8% girls were under-nourished ($BMI \leq 18.5$). Deshmukh et al reported an overall prevalence of 53% of thinness among adolescents; which is similar to present study. Nearly similar findings observed by **Singh N & Mishra CP (2001)** that 51.43% of adolescent girls from Varanasi were suffering from Chronic Energy Deficiency (CED). In a study conducted by **GK medhi**, (56.3%) of girls (15-18) had BMI less than 18.5.. The prevalence of thinness found in the present study is higher than the national average of 47% (**NFHS 3**). A higher percentage of thinness was reported by several of the studies from southern states and Rajasthan (93.5%) (**NNMB, Chaturvedi S.**). Choudhary et al have reported 68.52% of adolescents having a BMI less than 18.5 kg/square meter in rural area of Varanasi. Studies overseas in developing country like Bangladesh have also reported higher rate of prevalence (67%) of thinness among girls in the south east region (**Shahabuddin . Anand et al** however reported lower percentage (30.1%) of thinness in north Indian rural school going girls near Delhi . **Kapoor G & Aneja S (1992)** reported 35.5% of adolescent girls (11-18 years) of Delhi to be undernourished. It was observed, that overall overweight among kurmi adolescent girl of Raipur city school was 3.6%. Subramanyam, et al., in their study among adolescent girls in Chennai, observed that prevalence of overweight ($BMI > 85$ th percentile) was 9.6% in adolescent girls which is higher than present study findings. While Mehta, et al. and Sood, et al in their study, reported a prevalence of overweight 15.2% and 13.1%, respectively, which was more than our study. The prevalence of overweight in our study is lower in

comparison to other studies. It is not towards increasing trend. So still the prevalence of under nutrition is major concern.

A multivariate regression analysis was performed in order to explain the most significant independent variables which influenced the dependent variable BMI of Adolescent girls. The regression analysis has been done to find the variations in dependent variable as influenced by independent variables and to study the relative significance and impact of various socio-economic, cultural and demographic independent variables on dependent variable. In Present study diet and age of student was significantly associated with BMI. This indicates that Age of girls more than 18 years of age, their BMI is lower than the girls whose age is below 18 years. These findings oppose the study conducted by the Shahabuddin et al reported that as age increased, thinness decreased in Bangladeshi girls. National Nutrition Monitoring Bureau⁶ also reported that under-nutrition decreased from 78% in 10-13 years to 66% in 14-17 years. In the present study the mean BMI was (18.6 ± 2.7) . Similar findings reported by (Yogesh Saxena) that the Mean BMI was higher in late adolescent (17.87 ± 1.74) than the early adolescents. Diet habit of the girls is also found to be significantly associated with BMI showing beta value of $(.090)$. The relationship indicates that girls who are vegetarian, their BMI was low as compared to non vegetarian girls. One of the major reasons for thinness may be poor nutritional intake of adolescent girls and the increased physical activity, excessive energy outflows due to hard labour in agricultural activities. The frequency of overweight is low compared to that of underweight. One possible reason for the high occurrence of underweight could be traced to poverty, low dietary intake, excessive energy outflows due to hard labour, and chronic infections (M. Ramzan). The other possible reasons could be explained through factors such as biological, emotional, physical appearance, and behavioral factors. This, however, needs to be asserted by further research. In any case, several studies show that peer pressure, eating habits or emotional factors, and need to maintain an acceptable physical appearance are important factors that may result in underweight (Hossain, & Werner). Higher percentage of thinness may prove an obstacle in achieving RCH (Reproductive and Child Health) program targets, like reduction in proportion of low birth-weight babies and in improving reproductive outcomes. (Kirchengast S.)

V. CONCLUSION & RECOMMENDATIONS

These studies found that majority of the adolescent girls are undernourished. These percentages of malnourished adolescent girls are quite alarming and steps need to be taken to improve their nutritional status. Hence It is essential to implement adolescent friendly health services as recommended by the World Health Organization (WHO) to improve the nutritional status. Implementing this will decrease the poorly nourished adolescent mothers, who are more likely to give birth to low birth-weight babies, perpetuating a cycle of health problems which pass from one generation to the next.

Considering the results of this study, it is suggested that a comprehensive strategy should be implemented in disadvantaged groups of our country in order to prevent adolescent girl undernourishment. Efforts are needed to use the school system favorably for improving the nutritional status of girls. This has

earlier been suggested by Gopalan (1974)²⁰. In future, studies should be done on adolescent girls in urban and rural sectors for to identify the factors responsible for this problem, which may in turn help to adopt and implement the proper strategies for upliftment of whole community.

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Table- 1 Distribution of Girls According to the Various Grades of Under nutrition Based on BMI

BMI	Category	Number of girls
<16.0	Grade 3 thinness	67 (13.4%)
16.0 -16.99	Grade 2 thinness	72 (14.4%)
17.0 -18.49	Grade 1 thinness	130 (26%)
18.50 -24.99	Normal	213 (42.6%)
25.0 -29.99	Overweight	18 (3.6%)
>30.0	Obese	-
Total		500 (100%)

Table 2: Demographic data of adolescent girls

Variables	Mean±SD
Age (years)	16.91±0.953
Height (cm)	152.99±5.22
Weight (Kg)	43.59±7.26
BMI (Kg/m2)	18.6±2.7

Table 3 Regression Analysis

Model	Beta Value	Sig.
Constant	.508	
Age of Student	.102	.048*
Occupation Mother	-.195	
Occupation Father	.003	
Education Mother	-.025	
Education Father	.255	
Income Father	-.094	
Diet Habit	.090	.045*
Type of family	.012	

R)-Reference Category Sig- ≤ 0.01 : Highly Significant, Sig between 0.05 and 0.01: Significant at 1 to 5% level,

Selected characteristics of the study population

Variables	Frequency
<i>N</i> = 500	
Education of father	
Illiterate	2
Primary	5%
Middle	9%
Matriculate to below graduate	43
Graduate and above	42
Occupation of father	
Government sector	47.4%
Private sector	7.8%
Business	10%
Agriculture	32.6%
Not working	2.2%
Education of mother	
Illiterate	6
Primary	12.5%
Middle	25.9%
Matriculate to below graduate	42.1%
Graduate and above	13.0
Occupation of mother	
Government sector	9.8%
Private sector	2.6%

Variables	Frequency
Business	4.6%
Agriculture	11.8%
Housewife	71.2%
Father Income	
<5000	46.8%
5000-10000	50.6%
>10000	2.6%
Family Type	
Joint	33.2%
Nuclear	66.8%
Diet habit	
Vegetarian	52.8
Non-vegetarian	47.2%