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## Food gap and nutritional insecurity among adolescent girls in rural community of Muzaffarpur district, Bihar

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### Abstract

**Objective:** To study the Socio- economic factors, Dietary pattern and Nutritional status of adolescent girls to assess the prevalence of under-nutrition.

**Methods:** It was a cross sectional study carried out in rural areas of Muzaffarpur District, Bihar. The study was designed to include all eligible aged 13-19 years adolescent girls. Three hundred twenty adolescent girls were selected randomly for the study. Data on socio-economic conditions, Dietary intake, food habits and knowledge about the food was obtained with interview schedule. Food consumption of the subjects was assessed using a 3-day 24-hour Dietary recall method. Under nutrition was assessed in terms of BMI (Body Mass Index).

**Results:** The present study showed that a little more than half of the respondents 58 per cent belonged to Low income group. Seventy five per cent of Adolescent girls had unsatisfactory knowledge about the healthy/ balanced diet. It was evident that adolescent girls diets were largely deficient in macronutrients and micronutrients, with the mean intake of energy and protein being 1300kcal/d and 18.6 g/d respectively. The intake of cereals and millets was 33.3% more than their respective RDA. Roots and tubers intake was double than their respective RDA. Adolescent girls take 43.5 per cent less amounts of green leafy vegetables. The intake of other vegetables and fruits was 47.8 per cent less than the RDA. A substantial proportion of the girls did not take milk than their respective RDA. Mean intake of iron rich foods was half of the RDA. Chronic Energy Deficiency Grade of adolescent girls shows that 40 per cent was Normal, 36 per cent having Mild Energy deficiency/Underweight (Grade I) followed by 21 per cent Moderate Energy deficiency/Underweight (Grade II). Three per cent having severe Energy deficiency/Underweight (Grade III).

**Conclusion:** In rural areas of Muzaffarpur district of Bihar, adolescent girls face health problems due to low socioeconomic conditions, poor nutrition and gender discrimination. There is an immediate need to address the high burden of hunger and under-nutrition in adolescents girls by instituting routine annual monitoring of nutritional status, Nutritional counseling for underweight adolescents and expanding research on the causes and impact of under-nutrition.

**Keywords:** Under nutrition, Nutritional status, BMI, Average food intake, RDA

### Introduction

According to the report of WHO, individuals between 10-19 years are considered adolescents. The period of transition from childhood to adulthood is called adolescent with accelerated physical, biochemical and emotional development. There are many physical and mental changes which result due to the influence of hormones. It is during this period that the final growth spurt occur with increase in height and weight. Dasgupta *et al.* (2010) <sup>[4]</sup> revealed that up to 45per cent of skeletal growth takes place and 15 per cent to 25 per cent of adult height is achieved during the adolescent growth spurt and upto 37 per cent of total bone mass may be accumulated. Adolescents represent around 20 per cent of the global world's population and around 84 per cent of them are found in developing countries. In India, they constituted around 22.8 per cent of the population as on 1st March'2000. But, unfortunately, there is a dearth of data on the nutritional status of adolescents despite of the fact that adolescents nutritional problems represent a heavy health.

Studies carried out by National Nutrition Monitoring Bureau (2003) in the rural population revealed that the prevalence of under nutrition among adolescents, as assessed by weight for age is about 40-50 per cent and that of iron deficiency anaemia is about 70 per cent. Result of the studies conducted at National Institute of Nutrition Hyderabad (1990) showed that more

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than one third of upper- middle class girls (36 per cent) had deficit in BMI indicating that the weight deficit is major factor, possibly related to the poor energy intake of this group population. While among the urban poor and rural girls this is mainly due to their getting lower priority for the food over the boys in the family. In the upper class, the weight deficit is related to the personal likes and dislikes and also a conscious attempt towards maintaining a low weight in the fear of becoming overweight. Avoiding milk, peer influence, skipping meals, food faddism and emotional disturbance may all contribute to under nutrition in adolescence. Often a significant proportion of Indian girls married soon after menarche and bear a child when she herself is still a child. These child mothers are considered high risk as maternal and perinatal death rates and infant mortality rates are higher among them.

In India almost 40 per cent of girls are married and have the first child before 18 years of age. Studies on age –related infant mortality in various parts of the country have shown that early neonatal deaths are almost double in the adolescent age groups. Maternal mortality again is high due to eclampsia and haemorrhage. CMS Rawat *et al.* found 35.1 per cent prevalence of anemia among adolescent females in Meerut. The National family Health Survey (NHFS-3) conducted study in 2005-2006 presents the statistics that 56 per cent of adolescents are anaemic. A recent study in adolescent girls of rural Wardha, India, Kaur S *et al* (2006) [10] found prevalence of anemia to be 59.8per cent. In Bihar, adolescent girls face serious health problems due to socioeconomic conditions, nutrition and gender discrimination.

Underweight and stunting are highly prevalent public health problems in developing countries, particularly among

populations exposed to food insecurity and chronic malnutrition. Underweight results from relatively recent malnutrition whereas empirical research has shown that early childhood malnutrition is a strong predictor of stunting. Dietary diversity has been recognized as an indicator of food security, with consumption of more food groups suggesting better nourishment. Greater dietary diversity has been associated with better nutritional outcomes and improved micronutrient intake. Zinc, an essential mineral, plays a critical role in child growth and development. A deficiency in Zinc may contribute to increased risk for stunting in childhood and adolescence. With profound growth of adolescence there is increased demands for energy, protein, minerals and vitamins.

### Methods

It was a cross sectional study carried out in Muzaffarpur District, Bihar. The study was designed to include all eligible aged 13-19 years adolescent girls. Three hundred twenty girls were selected randomly for the study. Information on socio-economic conditions, Dietary intake, food habit and knowledge about the food was obtained with Interview schedule. Food consumption of the subjects was assessed using a 3-day 24-hour dietary recall method.

**Anthropometry** (Height & Weight) for calculating the Body Mass Index and comparing with standards. It is a measure of relative body fitness and can be computed by using weight (kgs); (minimal clothing) and height (meters); (without shoes).

$$\text{BMI} = \text{Weight (kg)}/\text{Height (m}^2\text{)}$$

**Table 1:** FAO/ WHO Classification for chronic Energy Deficiency/or Underweight

Chronic Energy Deficiency Grade (FAO)	Underweight Grade (WHO)	BMI(Kg/m <sup>2</sup> )
Normal	Normal	>18.5
Grade I	Mild Underweight	17.0 -18.4
Grade II	Moderate Underweight	16.0 -16.9
Grade III	Severe Underweight	<16.0

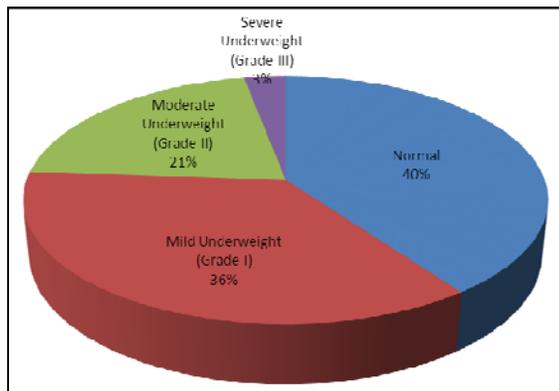
### Results

The present study showed that a little more than half of the respondents 58 per cent belonged to Low income group. A little more than half of families 52 per cent had medium size followed by 41 per cent and 7 per cent had large and small size respectively. A detailed and relevant history of 320 cases revealed that 52% girl students were vegetarian and 48% were non vegetarians. Improper education and dearth of awareness among mothers results in poor health of adolescents. Seventy five per cent of Adolescent girls had unsatisfactory knowledge about the healthy/ balanced diet. It was evident that adolescent girls diets were largely deficient in macronutrients and micronutrients, with the mean intake of

energy and protein being 1300kcal/d and 18.6 g/d respectively. The average food intake of rural girls was less than Recommended Dietary Allowances (RDA).The intake of cereals and millets was 33.3% more than their respective RDA. Roots and tubers intake was double than their respective RDA. Adolescent girls take 43.5 per cent less amounts of green leafy vegetables. The intake of other vegetables and fruits was 47.8 per cent less than the RDA. A substantial proportion of the girls did not take milk than their respective RDA. The largest proportion of energy 78 per cent was obtained from carbohydrates, followed by fat (10%) and protein (12%). Mean intake of iron rich foods was half of the RDA.

**Table 2:** Malnutrition (Chronic Energy Deficiency) in Adolescent girls

Chronic Energy Deficiency (CED)	BMI kg/m <sup>2</sup>	Total (%)
Normal	Normal (> 18.5)	128 (40)
Grade I	Mild Underweight (17.0 -18.4)	115 (36)
Grade II	Moderate Underweight (16.0 -16.9)	67 (21)
Grade III	Severe Underweight (<16.0)	10 (3)
	Total	32 (100)



**Fig 1:** Nutritional Status of Adolescent Girls according to Body Mass Index (BMI)

Chronic Energy Deficiency Grade of adolescent girls shows that 40 per cent was Normal, 36 per cent having Mild Energy deficiency/Underweight (Grade I) followed by 21 per cent Moderate Energy deficiency/Underweight (Grade II) and 3 per cent having Severe Energy deficiency/Underweight (Grade III).

### Conclusion

In rural areas of Muzaffarpur district of Bihar, adolescent girls face health problems due to socioeconomic conditions, nutrition and gender discrimination. Medhi *et al* (2007) [7] stated that poor nutrition among adolescents resulting in short stature and low lean future adverse health outcomes including poor reproductive output among women. There is an immediate need to address the high burden of hunger and under-nutrition in adolescents girls by instituting routine annual monitoring of nutritional status, Nutritional counselling for underweight adolescents and expanding research on the causes and impact of under-nutrition. There should be a special programme for adolescent girls to motivate them for self-recording of weight periodically. A weight card should be given for this purpose.

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