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Dietary intake in adolescents of Hajipur village, a rural area of Katihar, Bihar India: A cross-sectional study

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ABSTRACT The present population based study was conducted at Hajipur village, a rural field practice area of Department of Community Medicine, Katihar Medical College, Katihar, Bihar. The aim of study was to assess dietary intake among adolescents. 400 adolescents (213 boys and 187 girls) were selected. Systematic random sampling technique was used. Data collected was entered in Microsoft Office Excel and analysed by using SPSS version 20.0.Percentages, and Chi Square Test used. The average energy consumption(kcal), protein and iron is very low to Recommended Dietary Allowances (ICMR-2010).The average daily intake of energy in boys and girls was 1924.1±249.97,1692.05±166.62 respectively, the percentage adequacy in boys and girls was to be found 74.86% and77.97% to Recommended Dietary Allowances, the average daily intake of protein was 43.96±7.1 and 43.17±5.1 and iron was19.33±2.81and 16.16±3.62 in boys and girls respectively, the percentage adequacy of protein was to be found 81.52% and 85.14%, in boys and girls and in iron was 78.89%, 64% respectively. The percentage of anaemia was 14.5% and 40.5% in vegetarian and non-vegeterian respectively.

Introduction: Nutrition has a great influence on the growth process of an individual. Adolescents are a large and growing segment of the world's population. More than half of the world's population is below the age of 25, and one in every two young people in the world is adolescent. (WHO/UNFPA/UNICEF 1999).Total nutrient requirements increase during adolescence, failure to consume an adequate diet at this time can disrupt normal growth and pubertal development. (Mohan LK et al. 1980).The common causes of malnutrition among adolescents in the poor community are less access to food and inadequate knowledge about dietary requirements. (Pereira P et al. 1983) Energy needs for individual adolescents vary according to sex, age, body composition, pubertal development & physical activity. During adolescence an individual's total nutrient needs reach their highest point in the life cycle.

Materials & Methods: The present population based, cross sectional, descriptive study was undertaken among adolescents (10-19 Years) in Hajipur village of Katihar district, Bihar.The population of the Hazipur village is about 10000. The number of houses were approximately 1800. Data will be collected from adolescents (10 -19 Years) of Hajipur village in Katihar district, Bihar. The study was undertaken during January to December (2012).

Sample Size: On the basis of this prevalence of undernutrition among adolescents the sample size of the present study has been calculated by adopting the formula:

$$n = \frac{Z^2 \alpha / 2 \times PQ}{\Sigma^2}$$

P = Prevalence rate of the disease = 50 % = 0.50   Q = 1.0 – 0.50 = 0.50

Zα / 2 = 1.96 = 2 (at α = 0.05
= Z²α / 2 = 4
Σ = Allowable error 10% of P
= 0.05 Σ² = .0025

Then n = $\frac{4 \times 0.50 \times 0.50}{.0025}$ = 400

Hence the required study sample size is 400 adolescents (10-19 Years).

Sampling technique: Houses that are having at least one adolescent or more will be numbered serially. Then the houses were selected by systematic random sampling technique.

Inclusion Criteria for sampling: The study will be conducted on adolescents who were of both the gender (Adolescent boys and girls), willing to participate in the study and apparently healthy on general physical examination.

Exclusion Criteria for sampling: The study exclude adolescents who were above 19 years of age and below 10 years of age group, not willing to participate in the study, with chronic illness or receiving long term allopathic or indigenous drugs and with history of any severe illness within the past 2 weeks for which they required hospitalization.

Data Collection Method: Written informed consent was taken from the head of the household of adolescents who were below eighteen years, and direct written informed consent was taken from girls who were eighteen years and above. After establishing good rapport with the family, detailed information about socio-demographic characteristics/profile (age, education and occupation of parents, socio-economic status of the family, types of family, family size), dietary intake and contributory factors in relation with health were recorded in the predesigned and pretested questionnaire.

Assessment of dietary intake: Food consumption of the subjects was assessed by using a 24-hour recall method. Inquiries are made retrospectively about the nature of food and consumption was calculated into mean intake (grams) of food. Calories and other nutritive intake will be calculated by using the table of nutritive value of Indian food.

Data analysis: Data collected was entered in Microsoft Office Excel and analysed by using SPSS version 20.0. Dependent variable fre-

quencies, percentage, mean, range and proportion were calculated. Chi-square test and Yate's correction were used for statistical analysis. The differences were considered as significant at a p value of<0.05.

Results: Among 400 adolescents (213 boys and 187 girls) the largest number of adolescents 41.5% belong to 10-14 years of age group . Out of them 53.25% and 46.75% are boys and girls respectively. (Table 1)

Table-1: Distribution of Adolescent Boys and Girls According to age Group

Variables (in Years)	Description	Boys (%)	Girls (%)	Total (%)
10-14	Early adolescent	99 (24.75)	67 (16.75)	166 (41.5)
15-17	Mid adolescent	71 (17.75)	59 (14.75)	130 (32.5)
18-19	Late adolescent	43 (10.75)	61 (15.25)	104 (26)
	Total	213 (53.25)	187 (46.75)	400 (100)

As can be seen from Table-2 and Figure 1, 2 and 3 the average energy consumption (kcal), protein and iron is very low in comparison to Recommended Dietary Allowances (ICMR-2010).

Table-2: Daily Average intake of Energy and nutrients by Adolescent Boys and Girls

Energy/ Nutrient	Gender	Mean	Standard Deviation (±SD)	Standard Error (±SE)	Average of RDA* of Adolescents	Percentage Adequacy
Calorie (kcal/ day)	Boys	1924.1	249.97	17.13	2570	74.86
	Girls	1692.05	166.62	12.18	2170	77.97
Protein (gm/ day)	Boys	43.96	7.1	.49	53.92	81.52
	Girls	43.17	5.1	.37	50.7	85.14
Iron (mg/ day)	Boys	19.33	2.81	.19	24.5	78.89
	Girls	16.16	3.62	.25	25.25	64

RDA* Recommended Dietary Allowances (ICMR-2010)

Figure-1: Daily Average intake of Energy by Adolescent Boys and Girls
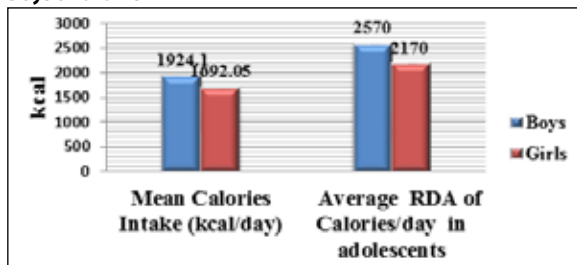

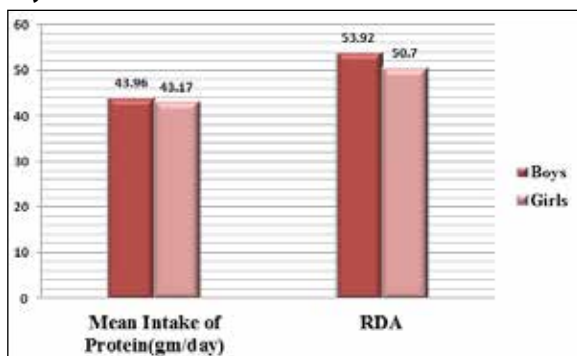**Figure-2: Daily Average intake of Protein by Adolescent Boys and Girls**

Figure-3: Daily Average intake of Iron by Adolescent Boys and Girls
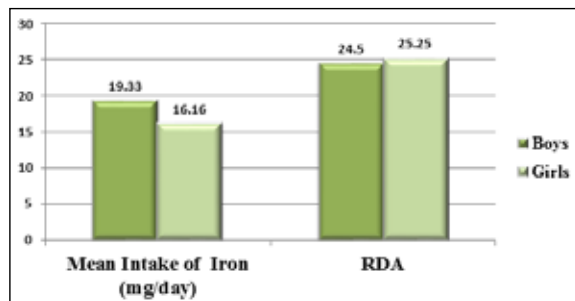

Figure-4 shows distribution of Adolescent boys and girls according to dietary habit

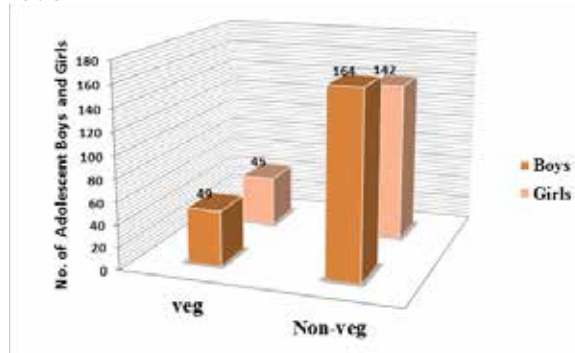**Figure-4: Distribution of Adolescents according to dietary habit**

Table-3: Prevalence of Anaemia According to Dietary Habit

Dietary Habit	Anaemia (%)	Non-Anaemia (%)	Total (%)	χ², p-value-
Vegeterian	58(14.5)	36(9)	94(23.5)	
Non-Vegeterian	162(40.5)	144(36)	306(76.5)	2.230, .135
Total	220(55)	180(45)	400(100)	

From Table-3 it is seen that the percentage of anaemia was 14.5% and 40.5% in vegetarian and non-vegeterian respectively. Most of the adolescents in our study were non-vegetarian, but their diet contained non-vegetarian food only once or twice a week, mainly because of economic constraints.

Discussion: Similar to our study Yadav RJ et al. (1998) conducted a study among 2321 adolescents (8-17 Years) in 17 tribal districts of Bihar showed the energy intake was very low as compared to RDA as a result very high proportion were calorie deficient (29 percent). Kaur IP et al. (2011) observed in a study that the average intake of energy in adolescent girls(16-18 years) was to be found 1647.29kcal±376.34 and average daily protein intake was to be found 47.46gm±9.80 and average daily iron intake was 22.93mg±5.04. The average daily intake of energy, protein and iron were found to be inadequate as compared to recommended dietary allowances. Bains K et al. (2000) , Bains et al. (2003) and Kumari S et al., (2003) also reported lower intake of these nutrients. Reddy PR et al. (1998) also found in their study that adolescent diet is deficient in proteins, minerals and vitamins. Goel S et al. (2007) mention that anaemia was significantly associated with lower intake of green-leafy vegetable and pulses. Consumption of vegetables, milk and meat resulted in lower prevalence of anaemia among adolescent girls and more vegetarians were anaemic as compared to non-vegetarians. Verma A et al. (2004) found in a study that the prevalence of anaemia was significantly lower in girls consuming green leafy vegetables. Anaemia is due to the interference of the dietary bioavailability of iron by tannin contents of tea or coffee. Verma M et al. (1999), Kaur S et al. (2006) and Thakur A et al. (2011) also quoted that vegetarians were more anaemic than non-vegetarian.

Conclusion: For adolescents to perform everyday tasks, they need to obtain a certain amount of energy from their food. Poor nutrition starts before birth and generally continues into adolescence and adult life and can span generations. The inadequate intake of iron, protein could be linked to high prevalence rate of anaemia as these are the element required for haemoglobin.

REFERENCES

1. Bains K, Singh I, and Kaur R; Impact of nutrition education on nutrition of rural adolescent girls belonging to western plain zone of Punjab. J. Res. PAU2003;40:126-131. 2. Bains K,and Maan SK; Sub-clinical iron deficiency-A major factor in reducing physical fitness of young women. Ind.J.Nutr. Dietet.2000; 37:296-300. 3. Goel S,Gupta BP;Low anaemia prevalence among adolescent of an Urban Hilly community, Indian Journal of Community Medicine, Jan 2007,Vol.1,No.1. 4. Kaur S,Deshmukh PR,Garg BS;Epidemiological correlates of nutritional anaemia in adolescent girls of rural Wardha. Ind J Community of Medicine,2006 Oct-Dec;Vol.31(4). 5. Kaur IP, Kaur S; A Comparison of Nutritional Profile and Prevalence of Anaemia among Rural Girls and Boys, Journal of Exercise Science and Physiotherapy, 2011;Vol.7,No.1;11-18. 6. Kumari S, and Singh S;Nutritional status of schedule caste adolescents from deprived section of society.Ind J. Nutr. Dietet.2003;40:147-152. 7. Gopalan C, Ramashastry BY, Balasubramanian SC; Table of Food composition ; Nutritive value of Indian Foods, National Institute of Nutrition, Indian Council of Medical Research, Hyderabad 1993 8. Mohan LK, Rees JM;Nutrition in adolescence. St. Louis. Times Mirror Mosby Publication 1980; p. 257-275. 9. Pereira P, Mehta S; Physical growth in adolescent girls of upper socio-economic group in Varanasi. Indian J. Med. Res. 1983; 77: 839-844. 10. Reddy RR, Chandralekha K, Health and Nutritional Status and quality of life in Reddy PR and Sumangala P. (Eds) Women in Develo0ment : Perspective from Selected states of India,Vol.2 (eds) BR Publishing corporation, Delhi, 1998. 11. Thakur A, Bhardwaj AK, Parashar A, Sharma D; Epidemiological correlates of Nutritional Anaemia among Adolescent Girls of Hilly State, Indian Journal of Maternal and Child Health,2011. 12. Verma M, Chhatwal J, and Kaur G; Prevalence of Anemia Among Urban School Children of Punjab. Indian Pediatrics 1999; 36:1181-1186. 13. .WHO/ UNFPA/UNICEF. Programming for Adolescent Health and Development. Report of a WHO/UNFPA /UNICEF Study Group on Programming for Adolescent Health. Technical Report Series. Geneva. 1999 No.886. 14. Verma A,Rawal VS,Kedia G, Kumar D, Chauhan J; Factors influencing Anaemia Among Girls of School Going Age (6-18 Years) From The Slum of Ahmadabad City, Indian Journal of Community Medicine.2004 Jan-March;Vol.29,No.1. 15. Yadav RJ, Singh P; Nutritional Assessment and the Dietary Intake Among Adolescents in Tribal Area of Bihar. Indian J Community Medicine. 1998Oct-Dec; 23(4): 142-148.