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ORIGINAL RESEARCH PAPER



OVERNUTRITION AMONG SCHOOL GOING ADOLESCENTS IN URBAN AREA OF EASTERN BIHAR, INDIA – A CROSS-SECTIONAL STUDY

Community Medicine

KEY WORDS: Overnutrition, School, Adolescent

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*Corresponding AuthorBackground: One of the greatest health concerns globally as well as in India today is nutrition. Nutrition contributes to

ABSTRACT

growth and development all the way through infancy, childhood and adolescence; however, during adolescence, the nutritional needs are the greatest. **Objective:** To assess the prevalence of overnutrition among school going adolescents. **Methods:** This cross-sectional study was conducted among 209 adolescent girls and boys belonging to age group 10-19 years studying in schools located in the urban areas of Kishanganj district, Bihar from October 2018 to September 2019. Data was collected, using a preformed, pretested questionnaire containing socio-demographic variables and anthropometric measurements. **Results:** Prevalence of thinness, overweight and obesity was 32.09%, 16.28% and 2.39% respectively. Percentage of overweight and obesity was more in middle and late adolescents. Consumption of cereals, vegetables, fats/oils and sugar/Jaggery was high. 67% consumed milk and 48.80% fruits. Thinness (38.80%) was higher in early adolescents, as well as among vegetarian students (32.44%). 19.04% Jain students were overweight, whereas 6.38% Muslims were obese. Higher percentage of overweight (25.84%) and obesity (3.33%) was found among subjects living in nuclear families and in those who were physically inactive (overweight 34.62% and obesity 3.84%). **Conclusion:** Adolescents are vulnerable to both undernutrition and overnutrition, hence, it is an appropriate time for the promotion of health programmes related to this age group, and to effectively tackle this double burden paradox in India.

INTRODUCTION

The word 'Adolescent' comes from a Latin word, "Adolescere" which means "to grow to maturity". It is the time to gain knowledge and practice healthy habits to avoid health and nutritional problems, as it is a stage of transition from childhood to adulthood. The term adolescents as defined by WHO includes persons aged 10-19 years.^[1]

Of the total world population, adolescents make up roughly 20%. In 2009, there were 1.2 billion adolescents aged 10-19 globally, forming 18% of world population. More than half the world's adolescents live in South East Asia and Pacific region, each of which contains roughly 330 million adolescents. India has the largest adolescent population (243 million),^[2] which constitute 21.4%, comprising one fifth of the total population.^[3]

Accelerated growth, maturation of sexual characteristics, and the attainment of adult height and body proportions are some of the physical hallmarks of adolescence. It is a period of rapid growth during which, up to 45% of skeletal growth takes place and 15 to 25% of adult height is achieved.^[4] During the growth support of adolescence, up to 37% of total bone mass may be accumulated.^[5] Habits acquired during adolescence usually lasts for lifetime. Furthermore, adolescents may adopt healthy eating patterns and lifestyle not only for themselves, but also influence others like their peers, family and other community members. Change in lifestyle, including food habits, are often more obvious among urban adolescents.^[6] Adolescents should take responsibility for their nutrition and the long-term repercussions on health. In developing countries, inadequate food intake, improper feeding practices, mal-distribution of food within family, improper cooking habit, excess intake of fast food/junk food, underlying diseases and low socio-economic condition affects the nutritional status of adolescents.[7,8] The feeding practices include both the quality and quantity of food intake by an individual, where parents are not aware of adolescent's feeding practices.⁽⁸⁾ In today's time, India is also experiencing the problem of overweight and obesity. During adolescence, development related to puberty and brain development lead to new set of behaviors and capacities that enable transitions in family, peer, educational domains, and in health behaviors.^[10] Prevalence data from 52 studies conducted in 28 states of India revealed that overall, overweight prevalence varied between 3 to 24.7% and

obesity ranged from 1.5 to 14%, highlighting the wide variability. $^{\scriptscriptstyle (11)}$

Most Indian and international studies have looked into undernutrition of adolescents in detail but comparatively somewhat less studies have been done on over-nutrition and obesity; hence there is scope to explore this area further.

It is felt that there is a need to look at various factors having effects on overnutrition among school going adolescents in Kishanganj as very few studies have been conducted in this area in particular. So, this study was embarked upon to determine the prevalence of over-nutrition and associated factors (socio-demographic) responsible among the inschool adolescents which may provide a basis for monitoring the trends and targeting interventions of school going adolescents through school health program.

METHODS

A community based descriptive cross-sectional study was conducted in higher secondary schools among adolescent girls and boys belonging to age group 10 - 19 years in urban areas of Kishanganj district, Bihar from October 2018 to September 2019 by Systemic random sampling. Study included pre-designed, pre-tested, semi-structured questionnaire, Digital weighing machine (adult), Portable anthropometric rod and measuring tape.

Data Collection Procedure

The investigators explained the participants about the purpose of conducting the study individually before initiating the data collection process. The investigators collected the responses by interview technique personally and recorded the data in the master sheet. Strict confidentiality was ensured and participants were informed that this data will be used only for research purpose. Then verbal informed consent was taken from each participant individually.

The investigators had taken behaviour change communication sessions with the participants and their caregivers to increase awareness and reduce incorrect ideas. Counselling in multiple individual and group sessions was done. Students who gave consent and were present on the day of study were included. Physically challenged or seriously ill students, married / Pregnant girl students and two subjects from the same family were excluded from the study.

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Statistical Analysis Used

The collected data was entered in MS Excel spread sheet. Tables were created and depicted as percentage and proportion. Proportion was used to express different types of malnutrition indicators. Descriptive statistics were expressed by mean and SD. Relationship between socio-demographic and other characteristics with nutritional status were calculated by using Chi-square tests wherever applicable with, p-value < 0.05 considered as significant with 95% confidence interval.

RESULTS

Table 1. Demographic Details Of The Study Population (n=209)

| Variables | Number | Percentage (%) | | | | |
|--------------------------|--------|----------------|--|--|--|--|
| Gender | | | | | | |
| Boys | 105 | 50.24 | | | | |
| Girls | 104 | 49.76 | | | | |
| Age (in completed years) | | | | | | |
| 10-13 | 54 | 25.84 | | | | |
| 14-16 | 112 | 53.59 | | | | |
| 17-19 | 43 | 20.57 | | | | |
| Religion | | | | | | |
| Hindu | 141 | 67.46 | | | | |
| Muslim | 47 | 22.49 | | | | |
| Jain | 21 | 10.05 | | | | |
| Type of Family | | | | | | |
| Nuclear | 120 | 57.42 | | | | |
| Joint | 89 | 42.58 | | | | |
| Dietary Habits | | | | | | |
| Vegetarian | 74 | 35.41 | | | | |
| Non-vegetarian | 135 | 64.59 | | | | |
| Physical Activity | | | | | | |
| Yes | 131 | 62.68 | | | | |
| No | 78 | 37.32 | | | | |

Physical activity performed in their leisure time was in the form of sports, aerobics, yoga or games inside or outside the school.

Table 2. Mean Anthropometric Measurement Of Adolescent Boys And Girls

| Variable (Boys) | Weight | Height | BMI |
|-------------------------|---------|-----------|---------------|
| | (Kg) | (cm) | (Kg/m2) |
| Range | 30-91 | 132 - 179 | 12.41-33.33 |
| Mean | 52.531 | 158.507 | 20.859 |
| Standard deviation (SD) | +11.588 | +9.152 | +3.946 |
| Variable (Girls) | Weight | Height | BMI (Kg/m2) |
| | (Kg) | (cm) | |
| Range | 30 - 89 | 132 - 178 | 12.41 - 33.33 |
| Mean | 50.24 | 155.857 | 20.597 |
| Standard deviation (SD) | +11.974 | +8.845 | +4.174 |

Mean height and weight of the boys was slightly higher as compared to girls of the same age.

Table 3 Shows Distribution Of Study Subjects On TheBasis Of BMI For Age Z Score Category According To WHOClassification(n=209)

| BMI for age Z score category | Number | Percentage (%) |
|------------------------------------|--------|----------------|
| Thinness (< -2 SD) | 67 | 32.09 |
| Normal (\geq -2 and $<$ +1 SD) | 103 | 49.24 |
| Overweight (\geq +1 and <+2 SD) | 34 | 16.28 |
| Obesity (≥+2 SD) | 5 | 2.39 |
| Total | 209 | 100 |

Table 4. Distribution Of Study Participants

| Variabl es | Thinne ss (%) | Norm al (%) | Overweig ht (%) | Obese (%) | Chi- squar e | p- value |
|---------------|---------------------|----------------|-----------------------|---------------|--------------------|-------------|
| Age | | | | | | |
| 10-13 | 26 (38.80) | 22 (21.36) | 05 (14.71) | 01 (20.00) | 47.189 5 | 0.0000 1 |

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|----------|----------|---------|------------|---------|--------|--------|
| | 37 | 59 | | 03 | | |
| 14-16 | (55.23) | (57.28) | 13 (38.23) | (60.00) | | |
| 17 10 | 04 | 22 | 16 | 01 | | |
| 11-19 | (5.97) | (21.36) | (47.06) | (20.00) | | |
| Religion | | | | | | |
| | 46 | 71 | 22 | 02 | 1.1412 | 0.95 |
| Hindu | (32.63) | (50.35) | (15.61) | (1.41) | | |
| | 15 | 21 | 08 | 03 | | |
| Muslim | (31.92) | (44.68) | (17.02) | (6.38) | | |
| | 06 | 11 | 04 | | | |
| Jain | (28.58) | (52.38) | (19.04) | 0 | | |
| Type of | Family | | | | | |
| | 32 | 53 | 31 | 04 | 20.943 | 0.0000 |
| Nuclear | (26.66) | (44.17) | (25.84) | (3.33) | 2 | 1 |
| | 35 | 50 | 03 | 01 | | |
| Joint | (39.33) | (56.18) | (3.37) | (1.12) | | |
| Physical | Activity | | | | | |
| | 48 | 74 | 07 | 02 | 32.849 | 0.0000 |
| Active | (36.65) | (56.49) | (5.34) | (1.52) | 4 | 1 |
| Less | 19 | 29 | 27 | 03 | | |
| active | (24.36) | (37.18) | (34.62) | (3.84) | | |
| Diet | | | | | | |
| Vegetar | 24 | 37 | 11 | 02 | 0.2017 | 0.977 |
| ian | (32.44) | (50.00) | (14.86) | (2.70) | 6 | |
| Non- | 13 | 66 | 22 | 3 | | |
| Vegetar | (31.86) | (48 89) | (17 03) | (2.22) | | |
| ian | (01.00) | (10.00) | (11.00) | (2.22) | | |

on the basis of BMI for age Z score category according to WHO classification and other variables



Chart 1. Distribution Of Study Subjects According To Consumption Of Different Food Items (n=209)

No significant relation was found between BMI and Religion of the students (P=0.95) as well as between BMI and diet habits (P=0.977).

DISCUSSION

(n=209)

In this study, it was observed that, overall prevalence of overnutrition (overweight 16.27% + obesity 2.40%) among adolescent students was similar to a study conducted by Mehta et al. and Sood et al., where the prevalence of overweight was 15.20% and 13.1% respectively.^[12,13] Similar finding was also noticed by Rohilla R. et al.^[14] where, the prevalence of overweight and obesity was 11.00% and 5.70%respectively. In contrast to the present study, the prevalence of overweight and obesity was found to be 5.9% and 2.7% respectively in a study conducted in North India.^[15] Average BMI was almost similar among boys and girls during early adolescence whereas average BMI of girls was higher in middle adolescence age group whereas in late adolescence, boys had a higher average BMI (Table 2). The average BMI of females was higher than that of males from 14 years to throughout adolescence by Ijarotimi et al.^[18] Ogechi et al^[17] and Mukhopadhyay et al.^[18]In the present study, it was noticed that thinness, overweight & obesity were related to religion, type of family, physical activity and dietary habits. Similar association was also seen in a study done by Prasad et al.^[19]in

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Hyderabad. Present study showed the prevalence of overweight (25.84%) and obesity (3.33%) was more in nuclear families similar to the study conducted by Rohilla R et al. $^{\rm [14]}$

STRENGTHS OF THE STUDY

This is a novel study on over nutrition among adolescents in eastern most district of Bihar. Standard methods like WHO-developed BMI age charts were used to assess the nutritional status. The outcome of the study has helped us to organise behaviour change communication and teaching modules for sustainable changes in cognitive domain of adolescents and their parents.

LIMITATIONS OF THE STUDY

Limitations often arise in a scientific study. However attempts were made to reduce those as far as possible. The following were some limitations, like the small sample size, socioeconomic status of the students could not be studied directly since most of the students might not provide relevant details. Family members could not be interviewed thoroughly because the study was carried out in the schools. Respondents answered about their food habits by recalling so there remains a possibility of recall bias.

CONCLUSION

This study showed high prevalence of overnutrition among school going adolescents. Even though the prevalence of overnutrition (overweight and obesity) has received much consideration in the recent years, there is a scarcity of data in India related to this. This study revealed that there is significant association of BMI and physical activity, diet habits, type of family and religion. There is a need to educate and create awareness among adolescent students and their parents through their school health programmes at individual as well as at the community level.

RECOMMENDATIONS

Measures which can be implemented in order to improve the nutritional status of school going adolescents includes, mass media support by restricting programmes which spoil their behavior and diet pattern, promote physical activity, regular health check-ups in schools and organize parent teacher meetings periodically regarding health education of the students for a better health future generation.

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CONFLICT OF INTEREST

None

REFERENCES

- World Health Organization, (1998). Nutritional status of adolescent girls and women of reproductive age. Report of regional consultation, Geneva; South East Asia/NUT/141;P-3.
- 2. United Nations, Department of Economic and social Affairs, Population division, World Population Prospects: The 2008 Revision,
- Vir, S. (1990). Adolescent growth in girls the Indian perspective. Indian Pediatrics, 27(12), 1249-1255.
- Rees, J.M., & Christine, M.T. (1989). Nutritional influences on physical growth and behavior in adolescence. Biology of adolescent behavior and development California: Sage Publications, 195A222.
- Key, J.D., & Key, L.L., Jr(1994). Calcium needs of adolescents. Current Opinion in pediatrics, 6(4):379-382.
- Ahmed, F., Zareen, M., Khan, M.R., Banu, C.P., Haq, M.N., & Jackson, A.A. (1998). Dietary pattern, nutrient intake and growth of adolescent school girls in urban Bangladesh. *Public health nutrition*, 1(2),83–92.
- Kurz, K.M., & Johnson-Welch, C. (1994). The Nutrition and Lives of Teenagers in Developing Countries: Findings from the Nutrition of Young Girls Research Program. International Center for Research on Women, Washington DC.
 Abdullah, M., & Wheeler, E. F. (1985). Seasonal variations, and the intra-
- Abdullah, M., & Wheeler, E. F. (1985). Seasonal variations, and the intrahousehold distribution of food in a Bangladeshi village. *The American journal* of clinical nutrition, 41(6), 1305–1313
- 9. Beghin, I., Cap, M., & Dujardin, B. (1988). A Guide to Nutritional Assessment.

 Ranjani, H., Mehreen, T. S., Pradeepa, R., Anjana, R. M., Garg, R., Anand, K., & Mohan, V. (2016). Epidemiology of childhood overweight & obesity in India: A systematic review. *The Indian journal of medical research*, 143(2), 160–174.

Adolescent Health. (2012). The Lancet, 379(9826), 1641-1652.

- Mehta, M., Bhasin, S. K., Agrawal, K., & Dwivedi, S. (2007). Obesity amongst affluent adolescent girls. *Indian journal of pediatrics*, 74(7),619–622.
- Sood, A., Sundararaj, P., Sharma, S., Kurpad, A. V., & Muthayya, S. (2007). BMI and body fat percent: affluent adolescent girls in Bangalore City. *Indian pediatrics*, 44(8), 587–591.
- Rohilla, R., Rajput, M., Rohilla, J., Malik, M., Garg, D., & Verma, M. (2014). Prevalence and correlates of overweight/obesity among adolescents in an urban city of north India. *Journal of family medicine and primary care*, 3(4), 404–408.
- Ahmad, S., Shukla, N. K., Singh, J. V., Shukla, R., & Shukla, M. (2018). Double burden of malnutrition among school-going adolescent girls in North India: A cross-sectional study. *Journal of family medicine and primary care*, 7(6), 1417–1424.
- Ijarotimi, O.S., Eleyinmi, A.F., & Ifesan, B.O.T. (2003). Evaluation of the nutritional status of adolescents in institutionalized secondary schools in Akure, Nigeria. Journal of Food, Agriculture and Environment. 3:64–68.
- Ogechi, U.P., Akhakhia, O.I., & Ugwunna, U.A. (2007) Nutritional status and energy intake in Umuahia, Urban, Nigeria. *Pakistan Journal of Nutrition*, 6(6):641-646.
- Mukhopadhyay, A., Bhadra, M., & Bose, K. (2005) Anthropometric Assessment of Nutritional Status of Adolescents of Kolkata, West Bengal. *Journal of Human Ecology*, 18(3):213-216.
- Prasad, V.G., Katta, H., & Malhotra, V.(2015) Risk Factors associated with obesity among adolescent students: A case control study. *International Journal of Health Sciences & Research*, 5(4):1-5