Prevalence of undernutrition among Telaga adolescents: An endogamous population of India

B Das, S Bisai

Citation

B Das, S Bisai. *Prevalence of undernutrition among Telaga adolescents: An endogamous population of India*. The Internet Journal of Biological Anthropology. 2008 Volume 2 Number 2.

Abstract

Undernutrition among adolescents is of public health importance in developing countries including India. However, there is little information on nutritional status of adolescents in urban West Bengal. In view of this present study was conducted to ascertain the level of undernutrition among Telaga adolescents in Kharagpur town. A total of 930 (472 boys and 458 girls) children were measured. The mean BMI of children had shown a consistently increasing trend in both sexes from age of 13 years onwards. Moreover, there is a gender bias in favour of girls in higher mean BMI at all ages except 10 and 13 years. The overall prevalence of undernutrition was 28.60%. The rates were significantly higher among boys (37.59 %) compared with girls (19.43%). In conclusion, nutritional status of the studied children is not impressive especially among early adolescent and boys, respectively. There is urgent need intervention strategy through community based nutrition awareness.

INTRODUCTION

Undernutrition among adolescents is of public health importance in developing countries including India. It is generally accepted worldwide that anthropometry is highly sensitive to undernutrition [1] . In fact, anthropometry has been used during adolescence in many contexts related to nutritional status [2,3] . The basic intention, according to World Health Organization (WHO), of nutritional assessment is to improve human health [4] . Body mass index (BMI) has been found the most appropriate, noninvasive and cost effective variable for determining nutritional status among adolescents [2,5] . In India, data are available on nutritional status of children and adolescents in rural [6,7,8,9,10,11] , urban areas [12] , slum [13] and tribal communities [14,15] . On the other hand, prevalence of undernutrition among adolescents varies [12] in different parts of India. But these studies have been mainly conducted in composite geographical populations which is heterogeneous in nature. There is little study on nutritional status among adolescents considering homogenous nature of population. To bridge the knowledge gap, the present study is an attempt to assess the status of undernutrition among the adolescents of endogamous population in Kharagpur, West Bengal, India.

MATERIALS AND METHODS

This cross sectional study had been undertaken among the Telagas, an endogamous population of Kharagpur town, West Bengal, India, in a Telugu-speaking migrant population whose ancestors came to Kharagpur town from Srikakulum, Vishakhapatnam and East Godavari districts of Andhra Pradesh to lay the railway lines of Bengal Nagpur railways since late 1880s. From that time they have been working in the railways [16] . The bulk of these peoples have permanently settled here as a result of succession of employment through generation in course of expansion of the local railway workshop, which has become one of the largest of its kind in India. A few families have still retained their kinship links with their ancestral home especially due to railway facilities and reduction of employment opportunities at Kharagpur in recent times.

Extensive pedigrees had been collected from families having at least one growing child from the local endogamous population, Telaga [17] . Senior member of the household was employed as low grade skilled workers in the workshop at Kharagpur or in the open lines of the South Eastern Railways [18] . Thus, house hold socio-economic status was equal. The people lived in the same type of railway quarters. Their food consumption pattern was similar [19] . The children aged five to twenty years were measured in anthropometric and physiometric traits. But for this purpose, we have analysed only height and weight of adolescents of aged 9 - 20 years. Measurements were taken on the basis of consent of the subjects. The study protocol was approved by the institutional ethical committee.

Anthropometric measurements of weight and height were taken following the standard techniques [20] using weighing scale and anthropometer rod to the nearest 0.5kg and 1mm, respectively. The subjects were requested to remove their shoes and put on light clothes during taking measurements. Age estimation of all individuals had been aided by usual genealogical checks, horoscopes where available, birth or school certificates, and reference to the important events.

BMI was calculated as weight in kg divided by the square of height in meter. Nutritional status is estimated using the WHO [2] recommended age-sex specific cut-off points of BMI based on the National Health and Nutrition Examination Survey (NHANES) percentile values [21] . Undernutrition (thinness) was defined as BMI<5th percentile values as recommended by WHO [2] . This cutoff point has been utilized by several recent studies worldwide on undernutrition among adolescents.

Data entry and statistical analyses were performed using SPSS version-10.0 software. Differences in means of BMI were tested by students't-test (equal variances assumed) between sexes. Proportion tests were undertaken to test for sex differences in overall undernutrition in each age group and age combined, respectively. Statistical significance was considered at $p < 0.05$.

RESULTS

A total of 930 children, out of 472 (50.75%) boys and 458 (49.25%) girls were included in the present analysis. Table I presents age-sex distribution of BMI (sd) of the studied population.

Figure 1

Table 1: Mean (SD) BMI (kg/m) by age and sex.

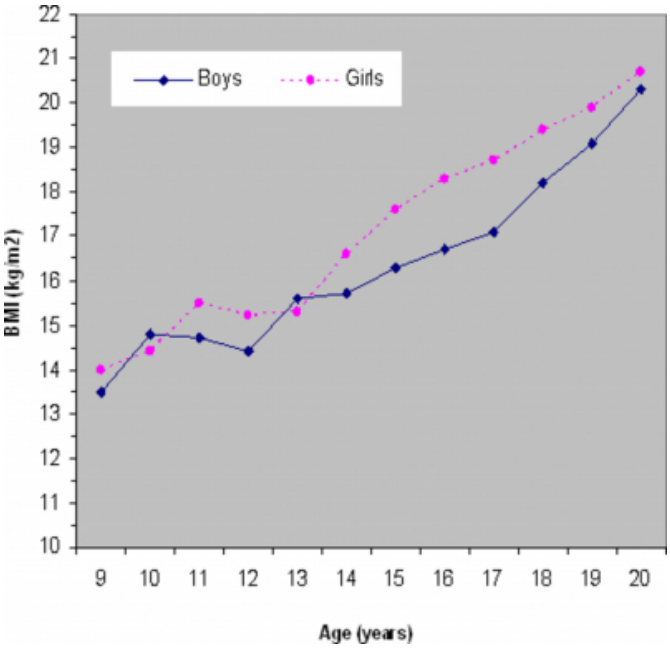
Age (yrs)	Boys (n=472) n	Boys (n=472) Mean (SD)	Girls (n=458) n	Girls (n=458) Mean (SD)	t -value
9	47	13.5 (1.5)	40	14.0 (1.7)	1.43
10	43	14.8 (1.7)	43	14.4 (1.6)	1.02
11	42	14.7 (1.3)	44	15.5 (1.2)	2.86*
12	42	14.4 (1.1)	39	15.2 (1.2)	2.71*
13	42	15.6 (1.4)	42	15.3 (1.6)	1.10
14	43	15.7 (1.4)	40	16.6 (1.8)	2.51*
15	39	16.3 (1.4)	37	17.6 (1.6)	3.70**
16	40	16.7 (0.9)	35	18.3 (1.4)	6.15**
17	37	17.1 (1.0)	36	18.7 (1.6)	5.13**
18	37	18.2 (1.2)	34	19.4 (1.8)	3.34*
19	31	19.1 (1.4)	35	19.9 (1.5)	2.23*
20	29	20.3 (0.9)	33	20.7 (2.5)	0.65

*P<0.05, **P<0.001

The mean BMI of Telaga children had shown a consistently increasing trend in both sexes from the age of 13 years onwards. There is a gender bias in favour of girls in higher mean BMI at all ages except 10 and 13 years (Figure 1). Moreover, mean BMI of girls were significantly higher than boys at age 11, 12 and 14 to 19 years, respectively.

Figure 2

Figure: 1. Comparison of mean BMI by age and sex.



The overall (age-sex combined) rate of undernutrition was 28.60 % among studied population. Present study reveals

that rate of undernutrition was significantly higher among boys (37.59 %) than girls (19.43%) counterpart (Table 2). They had 2.5 (OR=2.49; 95%CI: 1.83 - 3.39) times greater chance to be an underweight compared to girls. A trend of reduction in the rate of undernutrition can be observable in boys from age 11 to age 13 years and then sudden rise in age 14 and age 15 and thereafter, a consistent deceleration from age 15 onwards. On the other hand, prevalence of undernutrition among girls decreases with increasing age from 13 years onwards with a little exception in age 16.

Figure 3

Table 2: Prevalence of undernutrition (thinness) based on BMI.

Age (years)	n		Prevalence of undernutrition (%)	
	Boys	Girls	Boys	Girls
9	47	40	63.83	50.00
10	43	43	48.84	44.19
11	42	44	69.05	25.00**
12	42	39	78.57	41.23**
13	42	42	47.62	57.14
14	43	40	58.14	35.00*
15	39	37	61.54	10.81**
16	40	35	60.00	11.43**
17	37	36	51.35	5.56**
18	37	34	18.92	2.94
19	31	35	12.90	2.86
20	29	33	6.89	9.09
Total	**472**	**458**	**37.59**	**19.43****

Overall undernutrition (age and sex combined) = **28.60 %**. *P<0.05, **P<0.01.

DISCUSSION

Adolescence is an important stage of growth and development that requires increased nutrition and adolescent anthropometry varies significantly worldwide [2,22]. But it has often failed to get increased attention as observed in childhood with regards to health related uses and interpretation of anthropometry [21].

This study highlights the level of undernutrition among the adolescents in an endogamous population as opposed to earlier studies considering heterogeneous population. Present study reveals that mean BMI is consistently increasing in both sexes. There is a gender bias in favour of girls in higher mean BMI at all ages as reported earlier by Medhi et al [23]. The results of this study reveal that about 29 % of the adolescents are thin as against high percentage of thinner adolescents in rural areas [10,11,24,25]. On the other hand, percentage of undernourished adolescents is significantly less in late adolescence than early adolescence as observed in other studies [24,25,26].

A significant sex differences in undernutrition can be observable in favour of boys as observed in other findings [23,24,27]. It is important to note that boys had 2.5 times higher risk being an undernourished compared to girls. Moreover, the level of undernutrition is drastically lowered from the age 15 onwards among the girls and from age 18 for boys. So, the variation in proportion and severity of undernutrition is of obvious importance for the formulation of health and development policies at the community level. In conclusion, nutritional status of the studied children is not impressive especially among early adolescent and boys, respectively. There is urgent need intervention strategy through community based nutrition awareness.

CORRESPONDENCE TO

Dr. Bidhan Kanti Das Lecturer in Anthropology Institute of Development Studies Kolkata Calcutta University Alipore Campus 1, Reformatory Street Kolkata – 700027. Email: bidhan_d@rediffmail.com bidhand@gmail.com

References

1. Martorell R, Ho TJ. Malnutrition, morbidity and mortality. Popul. Dev. Rev. 1984; 10 (suppl.): 49-68.
2. World Health Organization. Physical Status: The use and interpretation of anthropometry. Technical Report series no. 854. Geneva: World Health Organization, 1995.
3. Bose K and Mukhopadhyay A. Nutritional status of adolescent Bengalee boys. Indian Pediatr 2004; 41: 633.
4. Beghin, I, Cap M, Dujardin B. A guide to nutritional assessment. Geneva: World Health organization, 1988.
5. Rolland-Cachera, MF. Body composition during adolescence: methods, limitation and determinants. Hormone Research 1993; 39: 25-40.
6. Kanade AM, Joshi SB, Rao S. Undernutrition and adolescent growth among rural Indian boys. Indian Pediatr . 1999; 36:145-156.
7. Venkaiah K, Damayanti K, Nayak MU, et al. Diet and nutritional status of rural adolescents in India. Eur J Clin Nutr 2002; 56: 1119-1125.
8. Vashisht RN, Krishan K, Devlal S. Physical growth and nutritional status of Garhwali girls. Indian J Pediatr 2005; 72 (7): 573-578.
9. Bose K, Bisai S, Mukherjee S. Anthropometric characteristics and nutritional status of rural school children. The Internet J Biological Anthropology. 2008. Volume 2 Number 1.
10. Bose K and Bisai S. Nutritional status of rural adolescent school children in Paschim Medinipur, West Bengal. Indian Pediatr 2008; 45: 515 - 516.
11. Bose K and Bisai S. Prevalence of undernutrition among rural adolescents of West Bengal, India. J Trop Pediatr 2008; 11 June, doi:10.1093/tropej/fmn044 (Online).
12. Mukhopadhyay A, Bhadra M, Bose K. Anthropometric assessment of nutritional status of adolescents of Kolkata, West Bengal, J Hum Ecol 2005; 18(3):213-216.
13. Singh N, Misra CP. Nutritional status of adolescent girls of a slum community of Varanasi. Indian J Public Health 2001; 45:128-134.
14. Mitra M, Kumar PV, Chakrabarty S, Bharati P. Nutritional status of Kamar tribal children in Chhatisgarh.

Indian J Pediatr 2007; 74 (4): 381-4.
15. Tiwari MK, Sharma KK, Bharati S, Adak DK, Ghosh R, Bharati P. Growth and nutritional status of the Bharia - a primitive tribe of Madhya Pradesh. Coll Antropol 2007; 31 (1): 95-101.
16. Das BK. Types and Trends of Consanguinity and Inbreeding among Telugu-speaking populations of Kharagpur, West Bengal, India and some biological consequences. Ph.D.thesis, Vidyasagar University, India, 2000.
17. Das BK. Incidences of consanguineous marriages among Telugu-speaking populations of Kharagpur, West Bengal. J Hum Ecol 2003; 14 (5): 361-365.
18. Das BK. 2006 The effect of Inbreeding on mortality and morbidity among Telugu-speaking populations of Kharagpur , West Bengal, India, Int J Anthropol 2006; 21: 151-163.
19. Das BK, Mukherjee DP. Inbreeding effects on the growth in stature among Telaga boys and girls of Kharagpur, West Bengal, India. Anthrop Anzeiger 2007; 65(1): 87-95.
20. Weiner JS, Lourie JA (eds). Practical Human Biology. Academic Press, 1981.
21. World Health Organization. Measuring change in nutritional status. Geneva: World Health Organization, 1985.
22. Himes JH, Bouchard C. Validity of anthropometry in classifying youths as obese. Int J Obes 1989; 13: 183-193.
23. Medhi GK, Hazarika NC, Mahanta J. Nutritional status of adolescents among tea garden workers. Indian J Pediatr 2007; 74(4): 343-347.
24. Shahbuddin AK, Talukdar K, Talukdar MK, et al. Adolescent nutrition in rural community in Bangladesh. Indian J Pediatr 2000; 67(2): 93-98.
25. Deshmukh PR, Gupta SS, Bharambe MS, et al. Nutritional status of adolescents in rural Wardha. Indian J Pediatr 2006; 73: 139-141.
26. National Nutrition Monitoring Bureau. Diet and nutritional status of rural population. NNMB Technical Report No.21. Hyderabad: National Institute of Nutrition, Indian Council of Medical Research, 2002.
27. de Onis M, Dasgupta P, Saha S, et al. National centre for Health Statistics reference and the growth of Indian adolescent boys. Am J Clin.Nutr 2001; 74(2): 248-253.

Author Information

Bidhan Kanti Das, M.Sc., Ph.D.
Institute of Development Studies Kolkata (IDSK)

Samiran Bisai, M.Sc., Ph.D.
Department of Anthropology, Vidyasagar University