Available online at http://www.journalcra.com

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

International Journal of Current Research
Vol. 6, pp.011-013, July, 2010

ISSN: 0975-833X

RSEARCH ARTICLE

A COMPARATIVE STUDY OF ANTHROPOMETRIC AND NUTRITIONAL STATUS OF HIGH AND LOW SOCIO-ECONOMIC GROUPS OF ADOLESCENTS

Sankar Kumar Dey[1*], Nimai Chand Masanta[2] and Samiran Bisai[3]

[1]Department of Biomedical Laboratory Science & Management, Vidyasagar University, Midnapore-721 102, West Bengal, India
[2]Department of Physiology, Jhargram Raj College, Jhargram, India
[3]Department of Anthropology, Vidyasagar University, Midnapore-721 102, West Bengal, India

ARTICLE INFO

Article History:
Received 19th May, 2010
Received in revised form
28th May, 2010
Accepted 26th June, 2010
Published online 1st, July, 2010

Key words:
Anthropometry,
Nutritional status,
Thinness,
Adolescents,
West Bengal.

ABSTRACT

To assess the nutritional and anthropometric status, to compared the relationship between socioeconomic statuses (SES) of rural adolescents of West Bengal. A cross sectional survey was carried out among 80 rural adolescent in North 24-Parganas district. Dietary nutritional status was assessed following standard method. Anthropometric measurement like height and, weight and mid arm circumference was measured and the body mass index (BMI) was computed. The new international BMI-based cut-off points were utilized to identify thinness, overweight and obesity. The results reveal that children belonging to high socioeconomic status (HSES) consumed significantly higher amount of dietary nutrient compared to low socioeconomic status (LSES). Moreover, consumption of dietary fat among girls in both SES was similar. Overall, the prevalence of thinness was 47.5%. The prevalence of thinness was higher in LSES (21.3%) compared with HSES (1.3%). Overall, the prevalence of overweight was 16.3%. It was observed in HSES, especially among girls. Similarly, prevalence of thinness was higher among girls (30.0%) in LSES compared to boys (12.5%) from the same SES. The present study shows that nutrient intakes were lower among children with LSES in both sexes. Thus, mean anthropometric characteristics was lower in this group. Consequently, much more emphasis needs to be given to increase the nutrient of their diets especially among adolescents belonging to LSES.

INTRODUCTION

Adolescents are defined as those individuals aged between 10 – 19 years (WHO, 1995) and it is transitional phase between childhood and adulthood characterized by marked acceleration in growth (WHO 2005, Anand *et al.,* 1999). Adolescence is the second most important phase of growth in the life after first year. This is known to be a second phase for growth or catch-up growth for those children who have experienced a nutritional deficit in their early life (Rao, 2001). It is a phase of increased nutritional requirements because during this time they gain up to fifty percent of adult height and skeletal mass (WHO, 1995). It has been reported that the clinical and food composition data, anthropometric studies can provide reliable information needed by both nutrition planners and administrators (Shamssain, 1989). Studies on growth and nutritional status have been well documented in developed countries (Vimleshseth *et al.,* 1979; Jelliffe, 1966).

Several studies on diet and nutritional status including dietary intake have been carried out in different parts of India (Gupta and Saxena, 1977, Mittal and Srivasatava, 2006, Rao *et al.,* 2006, Venkaiah, 2002). Although these studies are worth mentioning, most of them focused on tribal adolescent (Mittal and Srivasatava, 2006; Rao *et al.,* 2006, Venkaiah, 2002).

***Corresponding author:** *sankar_dey@yahoo.co.in*

In general, information on nutritional status among adolescent in different socio-economic status in India are lacking. Hitherto, national representative data for adolescent nutritional status in India is unavailable. There is a dearth of information relating to the diet and nutritional status of Bengalee adolescents of West Bengal. In view of broader context, the present investigation was conducted to study the diet and nutritional status among adolescents in North 24-Parganas district of West Bengal.

MATERIALS AND METHODS

This cross sectional study was carried out of rural adolescents in the district of North 24-Parganas, West Bengal, India. A total of 80 adolescents, 40 were boys (high socio-economic status (HSES) = 20; low socio-economic status (LSES) = 20) and 40 were girls (HSES = 20; LSES = 20) measured and included in the present analyses. Subjects selected following simple random sampling method. Selected subjects were asked to stand on the platform of the human weighing machine exerting equal pressure on both feet to note the reading of weight and placed on the ground to measure the height. Weight and height were measured by using weighing scale and anthropometric rod to the precision of 0.1kg and 0.1cm, respectively. Mid upper arm circumference (MUAC) is measured mid point between olecranon and acromion process by using fibre tape to the nearest 0.1cm. All

anthropometric measurement was made and recorded following the standard methods described by Joshi (2002). Body mass index (BMI) is measured by using standard formula: BMI = Weight (kg) / Height (m^2). In different angle like questionnaire, interview and recall methods were used to assess the dietary intake of the selected subjects and calculated with local food consumption tables according to the methods described by Joshi (2002). Further, the nutritional (thinness, overweight and obesity) status was assessed based on anthropometry following international reference standards as suggested by Cole et al. (2000, 2007). The data were expressed as mean ± standard deviation. Comparisons of the means of two groups were made by student t-test. Chi-suqure test was employed to compared the nutritional status between groups. A $P<0.05$ is considered as significance.

dietary fat among girls. Moreover, there was significant sex difference of mean BMI exist in children belonging to HSES (boys=22.3, girls=18.8, t=3.606, $p<0.05$) and LSES (boys=15.0, girls=13.2, t=2.986, $p<0.05$).

Overall (sex and SES combined), the prevalence of thinness was 47.5%, out of 22.5%, 11.3% and 13.8% children were found to be thinness grade-I, II and III, respectively. The prevalence of thinness was higher in LSES group (21.3%) compared with HSES group (1.3%). Overall, the prevalence of overweight was 16.3%. It was observed in HSES group, especially among girls. Similarly, prevalence of thinness was higher among girls (30.0%) in LSES group compared to boys (12.5%) from

Table 1. Comparison of anthropometric characteristics, dietary nutrient and vitamin status among boys from high and low socio-economic status.

Characteristics	High SES (n = 20)	Low SES (n = 20)	t
Age (yrs)	13.7 (0.9)	13.6 (0.9)	0.367
Height (cm)	144.2 (5.6)	144.7 (5.39)	0.312
Weight (kg)	46.5 (4.8)	31.5 (4.7)	10.240*
MUAC (CM)	24.6 (2.3)	19.4 (1.3)	8.664*
BMI (kg/m^2)	22.3 (1.2)	15.0 (1.8)	14.960*
Dietary status:			
Carbohydrate (g)	2245.9 (153.9)	1970.7 (257.3)	4.105*
Protein (g)	71.4 (6.5)	61.8 (7.8)	4.230*
Fat (g)	65.4 (18.4)	38.8 (10.4)	5.619*
Energy (Kcal)	2340.5 (120.4)	2060.1 (269.5)	4.248*
Iron (mg)	59.7 (12.3)	26.2 (9.4)	9.650*
Ca (mg)	1028.8 (34.2)	433.1 (128.0)	13.362*
Vitamin – A (µg)	802.1 (117.3)	307.5 (108.5)	13.838*
Vitamin – C (mg)	57.8 (17.4)	43.4 (7.4)	3.390*

*$p < 0.05$, Standard deviation is present in parentheses.

Table 2. Comparison of anthropometric characteristics, dietary nutrient and vitamin status among girls from high and low socio-economic status.

Characteristics	High SES (n = 20)	Low SES (n = 20)	t
Age (yrs)	12.0 (0.9)	11.9 (1.0)	0.219
Height (cm)	143.6 (12.9)	139.5 (8.9)	1.163
Weight (kg)	38.0 (5.9)	25.6 (4.1)	7.669*
MUAC (CM)	21.6 (3.0)	17.3 (1.2)	5.926*
BMI (kg/m^2)	18.8 (4.2)	13.2 (1.9)	5.375*
Dietary status:			
Carbohydrate (g)	1890.5 (56.6)	1737.3 (36.9)	8.033*
Protein (g)	62.4 (5.5)	42.3 (9.1)	8.390*
Fat (g)	62.5 (16.7)	62.3 (16.0)	0.046
Energy (Kcal)	2040.2 (92.2)	1854 (69.7)	7.179*
Iron (mg)	23.0 (4.2)	14.6 (2.8)	7.418*
Ca (mg)	975.5 (155.1)	463.8 (67.5)	13.527*
Vitamin – A (µg)	739.5 (108.7)	289.9 (92.8)	14.064*
Vitamin – C (mg)	61.9 (17.7)	41.3 (6.1)	4.932*

*$p < 0.05$, Standard deviation is present in parentheses.

RESULTS

There was no significant differences in mean ages among boys between high (mean = 13.7 years, sd = 0.9) and LSES (mean = 13.6 years, sd = 0.9). Similarly, the mean ages among girls from high and LSES was 12.0 (0.9) and 11.9 (1.0) years, respectively. The mean (sd) in anthropometric characteristics, dietary nutrition and vitamin status among boys and girls are presented in Table 1 and 2. It was observed that all the variables were significantly higher among children belonging to HSES compared to LSES, except height and consumption of the same SES. It is important to note that, there exists no significant sex difference of nutritional status (Chi-square=5.49, df=4, $p>0.05$).

DISCUSSION

The data reveals that the nutritional status is largely influenced by the socioeconomic status. Numerous studies in India and abroad have been reported that children of lower socioeconomic background showed a lower intake of Carbohydrate, Protein, Fat, Energy, Iron, Ca, Vitamin-

A, Vitamin-C than children from families with a higher SES (Egger *et al.,* 1991). The present study observed significantly lower mean weight, MUAC and BMI in LSES compared to HSES.

Overall prevalence of thinness was 47.5%. However, these rates were higher than those reported from Sudan (Awad and Enayat, 2007) as assessed by same criteria and other parts of Rural West Bengal (Bose K and Bisai, 2008a, 2008b) by using WHO (1995) recommended method. In addition, prevalence of thinness was lower than that reported from other parts of India and neighboring countries as assessed by using WHO recommended method (WHO, 2005). It was important to note that micronutrient malnutrition and chronic energy deficiency resulting in thinness (low Body Mass Index for age) and stunting is primarily caused by poor diet. Moreover, excessive physical activity and infection may also contribute to undernutrition. Moreover, overall prevalence overweight was found to be 16.3%. An earlier study from Kolkata (Bose *et al.,* 2007) had reported the overall prevalence of overweight were 17.63% among affluent school girls. The global prevalence of obesity in children aged 5-17 years is approximately 10%, but this is unequally distributed, with the prevalence ranging from less than 2% in sub-Saharan Africa to over 30% in the Americas. Socioeconomic differences act as a risk factor through which differences contribute to morbidity and mortality. The existence of health differences among different socioeconomic classes in India has already been reported. A study from Karachi, Hakeem (2001) reported higher prevalence of undernutrition in LSES compared to HSES. In contrast, the prevalence of overweight in HSES was higher than their LSES counterparts. Result of the present study was consistent with the previous study.

In developing country, for many adolescents, inadequate quality and quantity of food are the most important determinants of nutritional problems. These nutritional problems may be due to household food insecurity, intra-household allocation of food that does not meet their full range of dietary needs, livelihoods insecurity, and lack of nutrition knowledge. In conclusion, the study shows that nutrient intakes were lower among children with LSES in both sexes. Thus, mean anthropometric characteristics was lower in this group. Consequently, much more emphasis needs to be given to increase the nutrient of their diets especially among adolescents belonging to lower socio-economic status.

REFERENCES

Anand, K., Kant, S. and Kapoor, SK. 1999. Nutritional status of adolescent school children in rural north *India. Ind. Pediatr.,* 36: 810-815.

Awad, SO., Enayat, AA. Underweight, overweight and obesity among Sudanese secondary school children of Khartoum State. (Report), Ahfad J, 01-JUN-2007, http://www.highbeam.com/doc/1G1-179315130.html (Last accessed on 12.05.2009).

Bose, K. and Bisai, S. 2008a. Nutritional status of rural adolescent school children in Paschim Medinipur, West Bengal. *Indian Pediatr.,* 6: 515 – 516.

Bose, K. and Bisai, S. 2008b. Prevalence of undernutrition among rural adolescents of West Bengal, *India. J. Trop. Pediatr.,* 54 (6): 422-423.

Bose, K., Bisai, S., Mukhopadhyay, A. and Bhadra, M. 2007. Overweight and obesity among affluent Bengalee schoolgirls of Lake Town, Kolkata, India. *Maternal and Chiild. Nutr.,* 3 (2): 141-145.

Cole, TJ. Flegal, KM., Nicholls, D. and Jackson, AA. 2007. Body mass index cut offs to define thinness in children and adolescents: international survey. *British. Med. J.,* 335: 194.

Cole, TJ., Bellizzi, MC., Flegal, KM. and Dietz, WH. 2000. Establishing a standard definition for child overweight and obesity worldwide: international survey. *British Med. J.,* 320: 1240–1243.

Egger, RJ., Hofhuis, EH., Sukonthanyakorn, B., Van der Ven, EM., Scriboonlue, P., Wedel, M., Saowakontha, S. and Schreurs, WH. 1991. Food intake and socioeconomic status in children in northeast Thailand. *Trop. Geogr. Med.,* 43 (1-2): 42-50.

Gupta, V. and Saxena, S. 1977. Nutritional Status of School Children in rural and urban areas of Bikaner West Rajasthan. *Ind. J. Pediat.,* 44: 301-308.

Hakeem, R. 2001. Socio-economic differences in height and body mass index of children and adults living in urban areas of Karachi, Pakistan. *Eur. J. Clin. Nutr.,* 55: 400-406.

Jelliffe, DB. 1996. The assessment of the Nutritional status of the community. World Health Organization Mimeograph Serial No. 53.

Joshi, SA. 2002. Nutrition and Dietetics. 2nd Edition, pp311-314.

Mittal, PC., Srivasatava, S. 2006. Diet, nutritional status and food related traditions of Oraon tribes of New Mal (West Bengal), India. Rural. Remote Health, 6: 385.

Rao, KM., Laxmaiah, A., Venkaiah, K. and Brahmam, GN. 2006. Diet and nutritional status of adolescent tribal population in nine states of India. *Asia Pac. J. Clin. Nutr.,* 15 (1): 64-71.

Rao, S. 2001. Nutritional status of Indian population. *J. Bio. Sci.,* 26: 481-489.

Shamssain, MH. 1989. Growth rate and Anthropometry of a Libyan Population. *J. Trop. Pediat.,* 35: 306 - 311.

Venkaiah, K., Damayanti, K., Nayak, MU. and Vijayaraghavan, K. 2002. Diet and nutritional status of rural adolescents in India. *Eur. J. Clin. Nutr.,* 56: 1119-1125.

Vimleshseth, MD., Sundaram, KR. and Gupta, M. 1979. Growth reference standards for developing countries. *J. Trop. Pediat.,* 25: 37-41.

World Health Organization. 2005. Adolescent Nutrition: A review of the situation in selected South-East Asian countries. Executive Summary. World Health Organization Regional Office for South-East Asia, New Delhi, 29 Dec.

World Health Organization.1995. Physical Status: The Use and Interpretation of Anthropometry. Technical Report Series No. 854. Geneva: World Health Organization.

****