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Nutritional status of rural Bengalee girls aged 10-18 years of Salboni, Paschim Medinipur, West Bengal, India

Kankana De[1], Subal Das[2], Kaushik Bose[3], Raja Chakraborty[4]*

1Research Scholar, Dept. of Anthropology, Vidyasagar University, Medinipur, W.B
2Assistant Professor (ad-hoc), Dept. of Anthropology, GGV, Bilaspur, C.G
3Associate Professor, Dept. of Anthropology, Vidyasagar University, Medinipur, W.B
4Assistant Professor, Dept. of Anthropology, Dinabandhu Mahavidyalaya, Bongoan, North 24 Parganas, West Bengal, India.

Corresponding author:Dr.Raja Chakraborty, E-mail : rajanth2003@yahoo.co.uk

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Abstract

A cross-sectional study of 749 rural adolescent girls of age 10-18 years of Salboni block Paschim Medinipur, West Bengal, India was undertaken to evaluate nutritional status. Anthropometric measurements including weight and height were taken following standard techniques. Body mass index (BMI) was calculated using international BMI cut-off point for children and adolescence from 2 to 18 years of age. Results revealed that girls of 10 years had highest (65.1 %) prevalence of undernutrition. The overall prevalence of undernutrition was (48.3 %). A significant age difference existed for weight ($F= 41.023$, $p< 0.001$), height ($F= 32.907$, $p< 0.001$) and BMI ($F= 17.979$, $p< 0.001$). Age difference was also evident ($\chi^2= 75.214$; $df= 32$; $p <0.001$) in nutritional status. It was concluded that the studied rural girls of Salboni block were suffering from very high (critical situation) rate of undernutrition. Urgent nutritional intervention programme should be given to them.

INTRODUCTION

Adolescence is one of the important stages of post-natal life in view of its significant transitional nature to biologically reach the highest growth potential to attain adulthood. It is the period of physical, psychological and social maturity from childhood to adulthood. Generally, the term "adolescents" refers to individuals between the ages of 10-19 years and the term "youth" refers to individuals between the ages of 15-24 years, while "young people" covers the entire age range, from ages 10-24 years[1]India's demographic and disease profile and developmental indicators show the disparity between the male and female, suggesting the existence of gender bias against the latter. Gender analysis in health care revealed that males and females had differential exposures to risk, access to benefits of technology, information, resources and health care, and the realization of rights[2]. Nutritional status is one of the strongest indicators of the standard of living in developing world[3]. Undernutrition among children and adolescents is a serious public health problem internationally, especially in developing countries[4].

Recently, Cole et al. [5] stated that undernutrition is better assessed as thinness (low body mass index for age) than as wasting (low weight for height) suitable age and sex specific thinness cut-off values for 2-18 years age groups. These new cut-off points were suggested to encourage direct comparison of trends of thinness in youngsters worldwide and offered a comprehensive classification of thinness for public health purposes. Although the adolescents are said to be the wealth of our country, their health has been neglected on the assumption that they are less vulnerable to disease than the young children or the adult. Until the last decade, the adolescent health had not attracted much attention globally as well as in India [6]. For an instance, assessment of nutritional status of adolescent girls has been the least investigated area of research particularly in rural and tribal areas of India. The findings of studies on school children can not be extrapolated to adolescent girls, as their school enrollment as well as sustenance are less than that of boys. It was likely that girls not attending schools belonged to disadvantaged section of society and contributed significantly in household activities, and thereby jeopardize their health [7]. With this backdrop this cross-sectional study was undertaken to assess the nutritional status of adolescent rural girls of an Eastern Indian village area.

MATERIALS AND METHOD

Data for the present cross-sectional study were collected from Salboni Rural Hospital, situated in a block (Salboni) of the district Paschim Medinipur, 25 km away from Medinipur district town. The sample size consisted of 749 adolescent girls aged 10-18 years. Subjects are Clients of ANWESHA Clinic (Adolescents Counseling Centre) functioning under Block Public Health Centers (BPHC) in rural areas of the West Bengal. Adolescent girls use to come from the local areas or sent from the other outpatient clinics of the BPHC to this clinic for counseling. The girls who were physically well and without any serious or prolonged physical illness were also measured for their weight and height through standard techniques [8] to evaluate their nutritional status. Technical errors of measurements (TEM) were within acceptable limits. The BMI was computed using the following standard equation: BMI = Weight (kg) / height (m^2).

Nutritional status was evaluated using new internationally accepted age and sex specific BMI cut-off point's[5]. Statistical analysis was made through Statistical Package for Social Sciences (SPSS-11). Technical errors of measurements (TEM) were within acceptable limits and thus not incorporated in data analysis. One way ANOVA was employed to test for age difference in weight, height and BMI. Chi-square analysis was done to observe the significance of difference in the prevalence of nutritional status among the studied subjects.

RESULTS

The mean age of the studied participants were calculated to be

Table 1: Age-specific mean height; weight and BMI of the subjects

Age (years)	N 749	Weight (kg)	Height (cm)	BMI (kg/m2)
10	43	27.60 (7.32)	134.62 (8.20)	15.21 (3.80)
11	38	31.72 (7.20)	142.33 (8.55)	15.58 (2.86)
12	70	32.53 (5.69)	143.40 (6.29)	15.80 (2.27)
13	89	35.93 (5.43)	146.74 (5.64)	16.70 (2.16)
14	104	39.25 (6.34)	148.84 (6.44)	17.70 (2.56)
15	119	40.18 (5.43)	149.31 (5.64)	18.0 (2.16)
16	106	40.18 (5.95)	149.31 (6.71)	18.0 (2.31)
17	93	42.04 (6.31)	149.93 (6.54)	18.67 (2.38)
18	87	41.23 (6.51)	149.60 (6.49)	18.39 (2.45)
ANOVA (N)	749	41.043*	32.907*	17.979*

*p< 0.0001

Table 2: Nutritional status (%) of the subjects based on BMI cut-off points

Age (Years)	Nutritional Status					
	Thinness-III	Thinness-II	Thinness-I	Overall Thinness	Normal	Overweight
10.00	14.0	16.3	34.9	65.1	23.3	11.6
11.00	21.1	13.2	13.2	47.4	50.0	2.6
12.00	12.9	11.4	31.4	55.7	42.9	1.4
13.00	4.5	13.5	32.6	50.6	48.3	1.1
14.00	11.5	9.6	18.3	39.4	60.6	0.0
15.00	15.1	3.4	22.7	41.2	58.0	0.8
16.00	16.0	9.4	26.4	51.9	47.2	0.9
17.00	15.1	7.5	17.2	39.8	59.1	1.1
18.00	13.8	14.9	28.7	57.5	41.4	1.1

χ 2= 75.214; df= 32 ; p <0.001)

14.6 years. It is clear from the *Table 1* that there is a steady increase in height and weight with age. However, 17 years aged girls were heavier (highest mean weight) (42.04 kg) and 10 years girls were lighter (lowest mean weight) (27.60 kg) with respect to other girls of the studied subjects. For height, again 17 years old girls were taller (highest mean height) (149.93 cm) and 10 years old girls were shorter (lowest mean height) (134.62 cm) than other age groups of the studied subjects. Similarly, it was clear from same table that as the weight and height were maximum for age 17 years, they poses the highest mean BMI (18.67 kg/m2) and 10 years girls havd the lowest (15.21 kg/m2) compared to all other age groups. There were significant age differences in weight (F= 41.023, p< 0.001), height (F= 32.907, p< 0.001) & BMI (F= 17.979, p< 0.001). Although the 18 years girls had little lower anthropometric values than age 17, Scheffe's post-hoc test revealed this difference was not statistically significant. The overall (age-combined) prevalence of thinness and overweight were 48.3 % and 1.6 %, respectively. The highest prevalence of thinness was observed at age 10 years. Grade-III thinness was highest at age 11 years; grade-II and grade-I thinness were the

highest at age 10. The highest prevalence of thinness was observed at age 10. Similarly, significant (χ^2=75.214; df= 32; p <0.001) age-group difference in the nutritional status of the studied girls was also observed.

DISCUSSION

Very few previous studies described the nutritional status of adolescent girls from West Bengal state as well as India. To the best of our knowledge, this is the first report on anthropometric assessment of adolescents from Salboni, Midnapore district, West Bengal. The newly developed internationally accepted anthropometric indicator (thinness) Cole et al., [5] has been utilized in the present study in view of its current worldwide acceptance as one of the most convenient ways of nutritional assessment in population.

In the present study, 100 (13.4 %) subjects suffered from grade-III thinness, 76 (10.1 %) suffered from grade-II thinness and 186 (24.8 %) suffered from grade-I thinness out of 749 subjects. Only 375 (50.1 %) had BMI within normal range (BMI; 18.5 to 24.9 kg/m2). And very few 12 (1.6 %) were overweight.

Figure 1 (a) showed the comparison of mean weight (kg) of the 10-18 years old adolescent girls of the present study with international [10, 11] and national [10] reference values. It was quite clear from the figure that rural adolescent girls of Salboni were lighter than the international reference [10, 11] values and national reference [12] values (except for ages 13 to 15 years). Figure 1 (b) showed the comparison of mean height (cm) of the 10-18 years old adolescent girls of present study with international reference values [10-12] and median national reference values [12] with present data. It was again clear from the figure 1 (b) that rural adolescent girls of present study were shorter than the international values [10-12] at all ages but taller

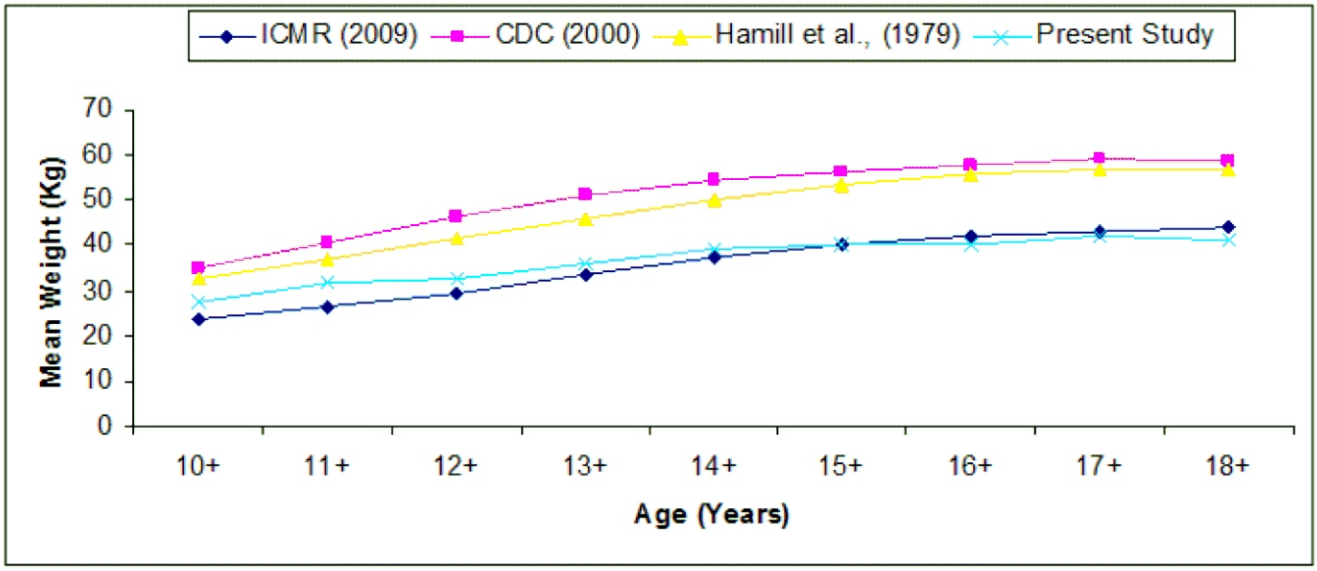

Figure 1 (a): Comparison of International (NCHS, 1977) & National (ICMR, 2009) weight with present study

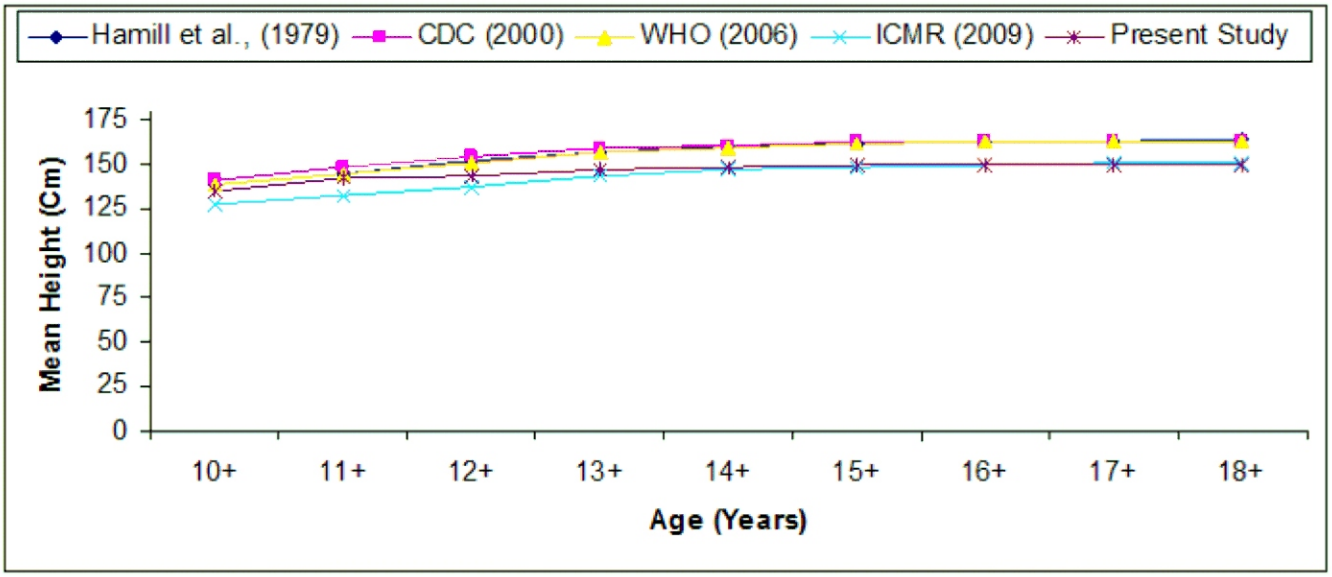

Figure 1 (b): Comparison of International (Hamill, 1979; CDC, 2002; WHO, 2006) & National (ICMR, 2009) height with present study

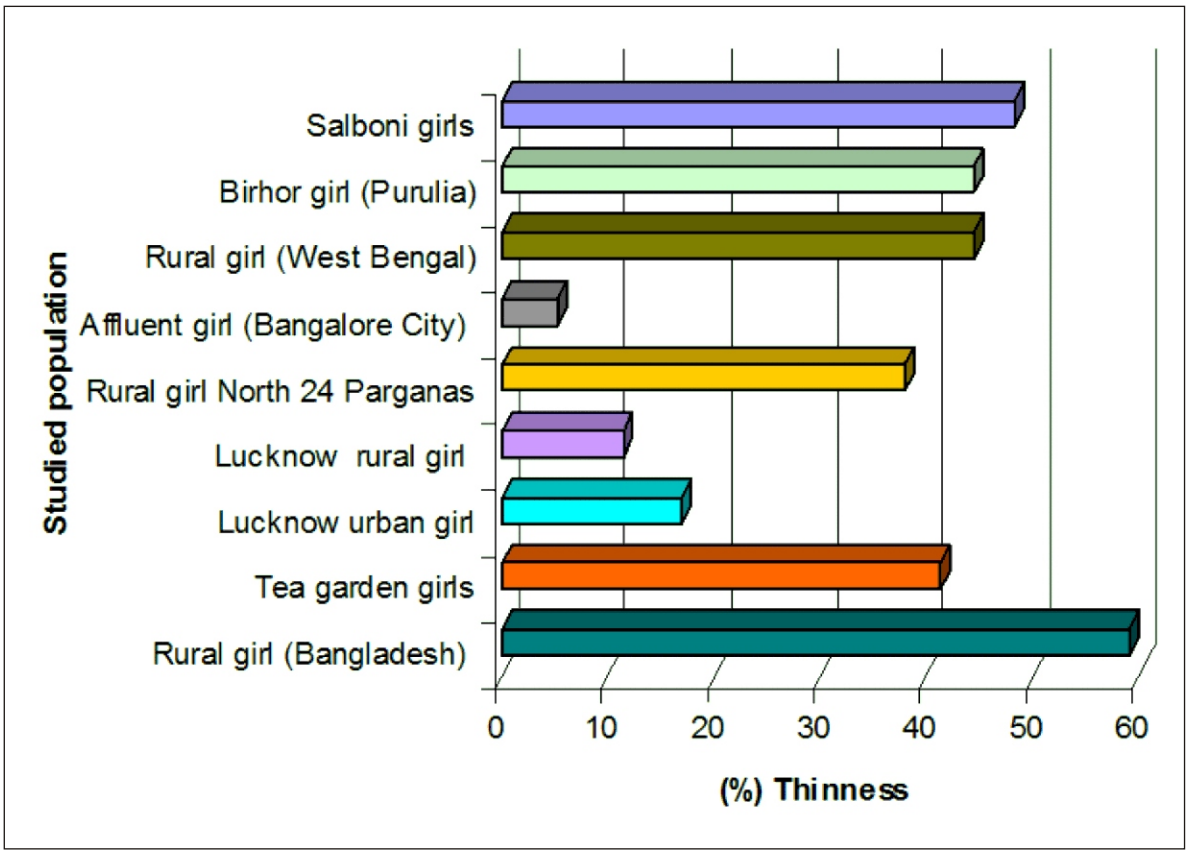

Figure 2: Comparative prevalence of thinness among studied population with present study.

than national reference [12] values except for ages 16 to 18 years.

Only a handful of studies were conducted using this new international thinness (BMI) cut-off point worldwide among the adolescent girls. The prevalence of thinness among studied adolescent girls was higher (48.3%) than previous studies conducted in Paschim Medinipur and Purulia districts of West Bengal (44.5%) [12], Lucknow urban girl (17.0%) [13], Lucknow rural girl (11.4%) [13], rural girls of North 24 Parganas, West Bengal (37.8%) [14], affluent girls (Bangalore City) (5.1%) [15], rural girl (West Bengal) (44.5%) [16], Birhor girl (Purulia) (44.4%) [17] and tea garden girls (41.3%) [18].The highest prevalence of thinness was observed among the rural Bangladeshi girls (59.0%) [19].

CONCLUSION

Thus, we can conclude that the rural adolescent girls of Salboni, Paschim Medinipur were suffering from very high rate of undernutrition (in terms of thinness) indicative of a very critical situation as per WHO guidelines. Health and nutrition intervention and monitoring programmes, apart from the psychological support and counseling, should be undertaken to overcome with the nutritional deprivation. Moreover, similar studies should be conducted state-wise using this new internationally accepted cut-off values which will definitely help to identify the community/population under such nutritional stress.

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REFERENCES

1. WHO/UNFPA/UNICEF. The Reproductive Health of Adolescent Strategy for Action. Geneva. 1989.

2. World Health Organisation. Strategies for adolescent health and development: South East Asia Region, Report of an inter-country consultation, WHO: Regional Office of South East Asia, New Delhi, December 1998; pp.1-4.

3. Nube, M., AsensoOkyere, W.K., van den Bloom, G.J.M., 1998. Body mass index as an indicator of standard of living in developing countries. Eur. J. Clin. Nutr, 77, 11861191.

4. El Ghannam AR. The global problems of child malnutrition and mortality in different world regions. J. Health Soc. Policy, 2003; 16(4):1-26.

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

6. Kalhan M, Vashisht B, Kumar V, Sharma S. Nutritional status of adolescent girls of rural Haryana. *Internet J. Epidemiol,* 2010; 8 (1).

7. Das S, Mahata M, Bose K. Age-trend in thinness among Birhor children and adolescents of purulia: a primitive tribe of West Bengal, India. Asian Journal of Biological and life Sciences, 2012; 1 (1): 58-60.

8. Hamill PV, Drizd TA, Johnson CL, Reed RB, Roche AF,

Moore WM. Physical growth: National Center for Health Staistics Percentiles. *Am.J. Clin.Nutr,* 1979; 32: 607-629.

9. CDC- 2000 growth charts for the United States: methods and development. p. cm.- (DHHS publication; no. (PHS) 2002-1696) (Vital and health statistics. Series 11, Data from the National Health Survey; no. 246) May, 2002.

10. Indian Council of Medical Research (ICMR). Nutrient Requirement and Recommended dietary Allowances for Indians: A Report of the Expert Group of the Indian Council of Medical Research. New Delhi: ICMR, 2009.

11. WHO. Multicentre Growth Reference Study Group. WHO Child Growth Standards. Length/Height for age, Weight for age, Weight for length and Body Mass Index for age. Methods and development. Geneva: World Health Organization. 2006.

12. Bose K, Bisai S. Prevalence of undernutrition among rural adolescents of West Bengal, India. *J. Trop. Pediatr,* 2008; 54: 422-423.

13. Sachan B, Idris MZ, Jain S, Kumari R, Singh A. Nutritional status of school going adolescent girls in Lucknow District. J Med Nutr Nutraceut, 2012; 1:101-5.

14. Das DK, Biswas R. Nutritional status of adolescent girls in a rural area of North 24 Parganas district, West Bengal. Indian J Public Health, 2005; 49:18-21.

15. Sood A, Sundararaj P, Sharma S, Kurpad AV, Muthayya S. BMI and body Fat percent: Affluent adolescent girls in Bangalore City. Indian Pediatr, 2007; 44:587-91.

16. Bose K, Bisai S. Nutritional status of rural adolescent school children in Paschim Medinipur, West Bengal. Indian Pediatr, 2008; 45:515-6.

17. Das Subal, Mahata Mileva, Bose Kaushik. Age-trend in thinness among Birhor children and adolescents of purulia: a primitive tribe of West Bengal, India. Asian Journal of Biological and life Sciences, 2012; 1 (1): 58-60.

18. Shahabuddin AK, Talukder K, Talukder MK, Hassan M, Seal A, Rahman Q, *et al*. Adolescent nutrition in a rural community in Bangladesh. Indian J Pediatr, 2000; 67:93-8.

19. Medhi GK, Hazarika NC, Mahanta J. Nutritional Status of Adolescents among Tea Garden Workers. Ind. J. Pediatr, 2007; 74- April: 343-347.