RESEARCH ARTICLE

Nutritional status of adolescent girls irrespective of socio-economic and ethnic background of Jorhat district, Assam

NILIMA NEOG AND BASANTI BAROOVA

ABSTRACT

A study was undertaken with an aim of assessing the nutritional status of Assamese adolescent girls from Jorhat district, Assam. A sample of 450 adolescent girls within 10-18 years was drawn proportionately at the ratio of 1:1.5:1.5:1 from tribal, non-tribal rural and urban and tea garden labourer groups. Background information was recorded with a standardized schedule. Assessment of nutritional status was done through standard anthropometric (height and weight), biochemical (haemoglobin estimation) and diet survey (24 h recall) procedures. Results showed that mean heights and weights of the girls ranged between 135.62 cm to 153.17 cm and 27.36 kg to 46.44 kg respectively and were lower than ICMR standards (138.90 cm to 157.5 cm and 33.58 kg to 49.92 kg, respectively). The average haemoglobin level was below the WHO standard (12 g/dl) and ranged between 9.60 g/dl to 10.65 g/dl indicating high prevalence of iron deficiency anaemia among this population. Average cereal consumption found to be "adequate" to excess level of BDR (322.5 g to 398.75 g against 320. g to 350 g of BDR), while intake of pulses and green leafy vegetables were "very low" (<80% BDR). Energy intake ranged from "fair" (>90% of RDA) to excess level of RDA and protein intake ranged between "low" (80-93% of RDA) to "fair" level while iron intake was "very low" (<80% of RDA) for all girls across all ages. Thus, it could be concluded that the nutritional status of adolescent girls was not at par with national standards.

Key words : Adolescent girl, Nutritional status, Anthropometry, 24h recall, BDR, RDA

INTRODUCTION

Adolescence is a period of profound and significant growth. Growth during adolescence contributes significantly to attainment of final body size of an individual comprising nearly half of the growing period in man. WHO (1986) defined adolescence a period in life rangeing from 10-19 years where a series of varied, rapid and extensive change occurs. Nearly 35% of adult weight and 11-18% of adult height is acquired during this period with a spurt of growth at about 10-12 years in adolescent girls. The girls attain menarche as a result of hormonal changes. Rapid growth, chronic under nutrition and onset of menstruation may likely develop iron deficiency anaemia. Iron deficiency anaemia among adolescent girls is now a major public health problem resulting reduced level of energy and productivity, impaired immune function, reproduction failure in adulthood and maternal death during child birth are well-established (Rao, 1985). Adolescent girls with height <145 cm and weight <38 kg are at risk for delivering low birth weight babies (Gopalan, 1989). They need nutritious diets to support these extensive changes. Achievement of optimal growth and development during adolescence is considered as the prime importance in improving the maternal nutrition and health, reducing the incidence of low birth weight babies and betterment of child survival and development.

Considering the above facts in view the present study was undertaken with an aim to assess the nutritional status of the adolescent girls within 10-18 years of age from Jorhat district of Assam.

MATERIALS AND METHODS

The present study was carried out in Jorhat district, Assam. The population trend was-Tribal: 12.08%, non-

tribal rural: 54.65%, urban: 15.27% and tea garden labourers: 18% (Statistical Hand Book of Assam, 1992). Purposive selection of sample was done following the standard procedure. Adolescent girls aged 10-18 years (9 groups) were drawn who attended schools with an exception to tea garden labourer samples which were covered by domiciliary visits. A total of 450 willing respondents were selected and drawn proportionately at the ratio of 1 : 1.5 : 1.5 :1 from tribal, non-tribal rural and urban and tea garden labourer group (each age group x 50 girls). Background informations were collected with the help of a standardized schedule. Nutritional status was assessed anthropometrically by taking height and weight following the standard procedures as recommended by Jelliffe (1962) and values were compared with National standards (ICMR, 1989) to verify the nutritional status of the subjects. Haemoglobin level was estimated for each girl by Cyanmethaemoglobin method (Oser, 1971). 30% of the respondent's household were taken for conducting diet survey. Dietary intake was assessed by 24 hour recall method (Swaminanathan, 1974). The mean food intake was computed and compared with ICMR balanced diet (1984) and individual nutrients were calculated using food composition table of ICMR (1993) and compared for adequacy with recommended dietary allowances (RDA, ICMR, 1993).

RESULTS AND DISCUSSION

The findings of the present study have been discussed in the following sub heads :

Socio-economic background of the studied population :

The socio-economic profile reflected that majority of the respondents belonged to Hinduism (95%). In tribal and non-tribal rural group, marginal and small farmers (land holding <2 hectares) constituted the bulk of the farming community. The urban parents were mostly in service.

The tea garden labourer families were of fixed income group (Rs. 700 –900 per month) and both husband and wife worked either as casual (20%) or permanent (80%) labourer. Majority of the respondents belonged to low income group. The overall literacy level was better in both non-tribal groups (rural 97.04%, urban 98.15%). The nuclear type of family was dominant in all four ethnic groups.

Nutritional status of the adolescent girls:

Table 1 shows the mean, height, weight and haemoglobin level of the adolescent girls within 10-18 years irrespective of socio-economic and ethnic backgrounds of Jorhat district, Assam.

Anthropometric measurements (height and weight) showed that all the girls across all ages were shorter and lighter when adjudged by height for age and weight for age parameters using corresponding National standards. However, the girls could attain about 97% of ICMR standard height ($\geq$95% of standard height is normal according to Waterlow (1976) and could be considered as normal. Similarly the mean weight of the girls were found lower than corresponding National standard but could attain about >80% of ICMR standard weight and could be categorized as normal (IAP, 1987) and healthy. None of the adolescent girls in the present study had recorded desirable levels of haemoglobin as suggested by WHO, 1989 (12 g/dl) and ranged from 9.60 g/dl to 10.65 g/dl indicating high prevalence of iron deficiency anaemia (mild to moderate) among this population (Table 1).

Food and nutrient adequacy pattern of the adolescent girls:

Table 2 shows the mean food intake of the adolescent girls within 10-18 years irrespective of socio-economic and ethnic background of Jorhat district, Assam.

Food consumption of the target population across different ages was not balanced as per ICMR norms. Almost all the food groups fell short of recommended

Table 1 : Mean height, weight and haemoglobin level of adolescent girls									
Parameters (Mean)	Age groups (yrs) N=450								
	10 N=50	11 N=50	12 N=50	13 N=50	14 N=50	15 N=50	16 N=50	17 N=50	18 N=50
Height (cm)	135.62	138.65	144.68	147.99	158.43	151.73	151.50	153. 56	153.17
	(138.90)	(145)	(150.98)	(153.44)	(155.04)	(155.98)	(156.0)	(156.5)	(157.5)
Weight (kg)	27.36	3040	35.10	38.68	41.10	43.28	44.74	45.75	46.44
	(33.58)	(37.17)	(42.97)	(44.54)	(46.7)	(48.75)	(49.75)	(49.92)	(49.92
Haemoglobin (g/dl)	9.69	9.60	9.84	9.76	9.69	10.57	10.17	10.64	10.65
	(12 g/dl)	(12 g/dl)	12g/dl)	(12g/dl)	(12g/dl)	(12g/dl)	(12g/dl)	(12g/dl)	(12g/dl)

Figures in parentheses indicate the standard (National standard) level of the parameters

Table 2 : Daily mean intake of food items of 10-18 years old adolescent girls

Food intake level	Age groups (yrs) N= 450								
	10 N=50	11 N=50	12 N=50	13 N=50	14 N=50	15 N=50	16 N=50	17 N=50	18 N=50
Cereals (g)	322.5 (320)	326.25 (320)	345.0 (320)	377.5 (350)	382.5 (350)	398.75 (350)	390.0 (350)	382.5 (350)	377.5 (350)
Pulses (g)	36.25 (60)	40.0 (68)	40.0 (60)	38.75 (50)	37.5 (50)	40.0 (50)	43.75 (50)	42.5 (50)	42.5 (50)
Green leafy vegetables (g)	47.5 (100)	51.25 (100)	70.0 (100)	62.5 (150)	90.0 (150)	95.0 (150)	90 (150)	92.5 (150)	100.0 (150)
Milk (g)	65.0 (200)	70.0 (200)	50.0 (200)	42.5 (150)	62.5 (150)	36.25 (150)	85.0 (150)	55.0 (150)	90 (150)
Sugar and jaggery (g)	25.0 (50)	23.75 (50)	26.25 (50)	25.0 (30)	21.25 (30)	22.5 (30)	25.0 (30)	25.0 (30)	22.5 (30)
Fruits (g)	30.0 (50)	22.5 (50)	15.0 (50)	15.0 (30)	23.75 (30)	22.5 (30)	40.0 (30)	22.5 (30)	47.5 (30)
Fat and oils (g)	25.0 (35)	25.0 (35)	23.75 (35)	28.75 (40)	27.5 (40)	31.25 (40)	31.25 (40)	25.75 (40)	30.0 (40)

Figures in parentheses indicate the standard (National standard) level of the parameters

Table 3 : Daily mean intake of nutrients of 10-18 year old adolescent girls

Nutrient intake level	Age groups (yrs) N= 450								
	10 N=50	11 N=50	12 N=50	13 N=50	14 N=50	15 N=50	16 N=50	17 N=50	18 N=50
Energy (kcal)	1860 (1950)	1855.25 (1950)	1893.0 (1950)	1985 (2050)	2037.25 (2050)	2115.5 (2050)	2166.5 (2050)	2150.75 (2050)	1901.75 (2050)
Protein (g)	46.5 (55)	48.38 (55)	51.75 (55)	53 (67)	62.88 (67)	62.25 (67)	58.75 (65)	59.75 (65)	62.13 (65)
Vitamin C (mg)	37.26 (40)	41.5 (40)	37.38 (40)	49.75 (40)	49.25 (40)	40.45 (40)	43 (40)	36.5 (40)	53 (40)
Iron (mg)	11.25 (20)	11.25 (20)	10.25 (20)	11.25 (28)	14.75 (28)	15.5 (28)	13.75 (30)	14.5 (30)	16 (30)
Calcium (mg)	403 (600)	453 (600)	430 (600)	395 (600)	698.25 (600)	718.75 (600)	631.75 (500)	758.25 (500)	689 (500)

Figures in parentheses indicate the standard (National standard) level of the parameters

allowances except cereals. Average cereal consumption was found to be "adequate" to excess level of BDR and ranged from 322.5 g to 398.75 g as against 320 g to 350 g of BDR. Consumption of pulse and green leafy vegetables were "very low" (<80% of BDR). Consumption of all income-elastic food items like milk, sugar and jaggery and fats and oils were "very low", out of which milk was a commodity of scarce. Thus, none of the food items consumed by the girls could met the allowances recommended by ICMR (Table 2).

Table 3 shows the mean daily nutrient intake level of the adolescent girls within 10-18 years irrespective of socio-economic and ethnic background.

It is evident from Table 3 that the diets of the studied population were deficient in almost all the major nutrients *i.e.* energy, protein, iron and calcium.

Among the macronutrients, the energy intake level of all girls ranged between "fair" (>90% of RDA) to excess level of RDA and protein intake ranged from 80-90% of RDA showing "low" to "fair" level intake by the girls. Among the micronutrients the intake of iron was far below RDA (<80% of RDA), largely due to consumption of cereal based diet with low amount of pulses, dark green leafy vegetables and iron rich foods etc. Adequacy of calcium was evident among 14-18 years girls. Personal likes and dislikes, faulty food habits, food beliefs, customs along with low purchasing power and food availability might be some of the contributing factors leading to poor intake of food and nutrients.

Thus, it could be concluded that the nutritional status of Assamese adolescent girls of Jorhat district was not at par with the National standards. There is an urgent need for improving the nutritional status of this important segment by undertaking right kind of nutrition intervention programmes. Such programmes could be undertaken to

sensitize not only the adolescent girls but the parents and the teachers as well. This sort of effort will surely contribute to safeguard the adolescent girls' health status in the realm of safe motherhood, the focal point of quality human resource development.

REFERENCES

Gopalan, C. (1989). Growth of affluent Indian girls during adolescence. Nutrition Foundation of India, Scientific Report- 10, Overview, p. 8.

ICMR (1984). Nutritive value of India foods. Gopalan, C., Remasastri, B.V., Balasubramanian, S.C. N.I.N., Hyderabad, India, pp. 29-32.

ICMR (1989). Heights and weights of well nourished Indian children. Vijayaraghavan, K., Singh, Darshan and Swaminathan, M.C. 1971. *Indian J. Med. Res.,* **59**: 643.

ICMR (1993). Nutritive value of Indian foods. Gopalan, C.; Ramasastri, B.V. Balasubramanian. S.C.Revised and updated by B.S. Narasinga Rao; Y.G. Deosthale and K.C. Pant. NIN, Hyderabad, India. pp. 47-67.

Indian Academy of Paediatrics (1987). *Nutrition monitoring and assessment*, Gopaldas, T. and Seshadri, S. (eds). Oxford University Press, New Delhi.

Jelliffe, D.B. (1966). The assessment of nutritional status of the community. WHO Monograph Series No. 53, p. 7, 10, 50, 78, pp. 221-228.

Oser, B.L. (ed.) (1971). *Hawk's physiological chemistry*. 14th ed. Tata McGraw Hill Publ. Co. Ltd., New Delhi.

Rao, B.S. N. (1985). Nutrition requirement of adolescents. *Proc. Nutr. Soc. India.,* **31**: 41-62.

Statistical Hand Book, Assam (1992). Directorate of Economics and Statistics, Govt. of Assam.

Swaminathan, M. (1974). *Essentials of food and Nutrition. Vol. 11,* Ganesh & Co., Madras, p. 330, 392, 393.

Waterlow, J.C. (1976). Classification and defination of protein energy malnutrition. In: *Nutrition of preventive medicines. The major deficiency syndromes, epidemiology and approaches to control.* Ed. G.H. Beaton and J.M. Benga, WHO, Geneva, pp. 530-550.

World Health Organization (1986). Adolescent nutritional status in developing countries. By Kathleen, M; Kurz, International Centre for Research on Women, 1717, Massachusetts Avenue, NW, Washington DC, 20036 USA. *Proc. Nutr. Soc.,* **55**:321-331.

Address for correspondence :
NILIMA NEOG
Department of Food and Nutrition,
Faculty of Home Science,
Assam Agricultural University, JORHAT (ASSAM), INDIA
E.mail : nilima.neog@gmail.com

Authors' affiliations :
BASANTI BAROOVA
Department of Food and Nutrition,
Faculty of Home Science,
Assam Agricultural University, JORHAT (ASSAM), INDIA