Food consumption pattern and dietary adequacy among adolescent girls of Jorhat district, Assam

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A sample of 450 adolescent girls within 10-18 years belonging to Tribal, Rural, Urban and Tea Garden labourer group were drawn to study the food intake pattern and adequacy of the diet consumed. The 24-hr-recall method was followed to assess the food intake pattern. Food consumption was not balanced as per ICMR norms. A deficit consumption of almost all foodstuffs except cereals, fish and other vegetables by almost all the respondents. Intake of pulses and green leafy vegetables was very low for Tribal, rural and tea garden labourer groups (<80% of RDA). Nutrient intake was mostly deficient in energy, protein, vitamin C, iron and calcium for all girls except for urban girls who had sufficiency of about 95.15 to 106.78 per cent of energy across all age groups. Amongst the micronutrients, intake of vitamin C was insufficient and the mean iron intake of the girls irrespective of the groups were far below the RDA (ranging between 38.0 to 66.0% of RDA) ranging between 38.0 to 60.0 per cent. From the nutrient quality of the diet, tea garden labourer girls were found to be the most nutritionally deprived among all the groups studied.

INTRODUCTION

Adolescent, defined by World Health Organization (1986) as a person aged 10-19 years, comprises about 20 per cent of the global population and more than 25 per cent of the country's total population. Adolescence is a period of profound physical and mental development (Myron, 1980) which demand an increased nutritional requirements. Though the nutritional demand is high for both the sexes, here girls' demands weigh more as they shoulder the future generation. However, these potential mothers are likely to face the constraints of nutritional inadequacies due to socio-economic limitations. The assessment of their nutritional status as influenced by the diet is a relevant prerequisite to ensure not only healthy adolescent but also healthy motherhood. Adolescent girls are nutritionally vulnerable but have not received the proper attention and care they deserve. They have considered healthier than the young or the very old and hence their health problems are ignored (Ghosh, 1992). Adolescent health happens to be one of the most prioritized areas of research interest today. Changing dietary patterns among them have become an important cause of concern. A large segment of rural adolescent girls are suffering from chronic energy deficiency and iron deficiency anaemia, while on the other hand a good number of urban adolescents finding themselves 'at risk' to the problems of over weight and obesity. Unhealthy dietary practices, tend to skip breakfast, eat more meals outside the home, heavy emphasis on junk food, excessive TV exposure and sedentary life styles have affected the nutritional status of today's adolescents (Sadana *et al.*, 1997). However, there is paucity of research relating to food behavioural pattern of adolescent girls belonging to this region. The present study is an attempt to assess the food consumption pattern and dietary adequacy among the adolescent girls of Jorhat district, Assam.

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METHODOLOGY

A total of 450 adolescent girls aged 10-18 years were purposively selected from tribal, rural, urban and tea garden labourer groups from varied socio-economic background from Jorhat district, Assam. The subjects were drawn proportionately at the ratio of 1: 1.5: 1.5:1 from tribal, rural, urban and tea garden labourer (TGL) group, (each age groups x 50 girls). To ascertain the authenticity of the age, school records were consulted for Tribal, rural and urban girls but for Tea garden adolescents the office register of the manager was dealt. Background information was collected with the help of a standardized schedule and 30 per cent respondents were considered for conducting diet survey from each age group and each category of population *i.e.* tribal, rural, urban and tea garden (3:5:5:3) adolescent girls. Dietary intake was assessed by 24 h recall method. The mean food intake were computed and compared with ICMR balanced diet recommended (1984) and individual nutrients were calculated using food composition table of ICMR (1993) and compared for adequacy with Recommended Dietary Allowances (RDA, ICMR, 1989). The dietary adequacy was assessed with the help of a dietary scale (ICMR, 1989): [3] RDA – Adequate= 4, > 90% of RDA-Fair= 3, 80-90% RDA- Low=2 and < 80% of RDA – Very low= 1. The respondents were categorized into 10-12, 13-15 and 16-18 years for recording food and nutrient intake level.

OBSERVATIONS AND ASSESSMENT

The results obtained from the present investigation as have been presented under following heads :

Background information:

The background information of the subjects revealed that in tribal and rural group marginal and small farmers (land holding <2 hectare) constituted the bulk of the farming community. The urban parents were mostly in service and cent per cent TGL families were of fixed income group. Majority of girls belonged to low income group (Rs. 500 – Rs. 3000/ month) with an exception to urban group. The TGL group received all necessary commodities including food and firewood at subsidiary rate from tea garden ration shop. Overall literacy level of parents were better in both non-tribal groups (Rural 97.04% and Urban 98.15%). The nuclear type of family was dominant in all four groups.

Food consumption pattern:

The conventional meal pattern was comprised of 'Bhat-dail' with greens and other vegetables (cooked), fleshy foods, cooking oil particularly mustard oil with little condiments and spices. Rice was used extensively. The tribal and TGL girls had three meals, while the rural and urban girls followed a 4 meal pattern. 'Pointa-Bhat' a fermented rice along with roasted fish

and potatoes was a popular breakfast dish specially in tribal and rural areas along with ready-to-eat breakfast cereal dishes. Milk availability was meagre and fruit consumption was erratic for all girls except urban girls. Tea was a popular drink. A great varieties of food consumed by the urban group girls.

Food intake pattern:

The average intake of food by the respondents across different ethnic groups are presented in Table 1A, 1B and 1C. Food consumption was not balanced as per ICMR recommended allowances. Fish/meat and other vegetables were the food groups consumed adequately by all girls. The pulse consumption was "very low" (<80% of RDA) for all meeting only 50-78 per cent of RDA except for urban girls whose dietary adequacy was low (90% of RDA) and inspite of high cost, customary habit guided the consumption of pulses in major meals. The tribal and TGL group had a similar pulse consumption trend irrespective of land holding or no land status because pulses were always bought and TGL adolescents received ration at a subsidiary rate from garden management. Adequate to excess consumption of other vegetables might be due to food habits and seasonal availability acquired from their own field. The adequacy of fish and meat inspite of various socio-economic structures were due to availability of river and ponds around the houses and rearing of poultry at household levels. Consumption of all income-elastic food items like milk, sugar and jaggery and fats and oils were "very low" out of which milk was the commodity of scarce. Consumption of green leafy vegetables was "very low" (< 80% RDA) in most of the subjects in different groups inspite of its abundant availability might be due to ignorance about the importance and also aversion to greens among the respondents. On the whole food intake was greatly influenced by factors like purchasing power, local food habits and customs, availability of food, ignorance about 'quality foods' etc. Availability of usually consumed food stuff without much choice at household level and no discrimination towards girl child probably contributed the similar adequacy of food stuff among the studied population and is aptly applicable to the TGL adolescents, who had smaller family size and could eat adequately at least cereal, fish and other vegetables like their counterparts despite economic disparity.

Nutrient intake pattern:

Nutrient like energy, protein, iron, vitamin C and calcium are believed to influence growth and development and formation of blood. Table 2 highlight the intake and adequacy level of these nutrients by the target population.

The diets of the adolescent girls within 10-18 years in various groups were deficient in energy with an exception to urban girls who received an adequate to excess level of RDA (104-112%). The energy intake level ranged from 96-99.8 per cent, 91-99 per cent and 88-99.5 per cent for tribal, rural and

Table 1A. The daily average intake of food and dietary adequacy of adolescent girls (10-12 years) from various ethnic groups of Jorhat

Food groups	BDR (g)	Target population							
		Tribal (n=9)		Rural (n=15)		Urban (n=15)		Tea garden (n=9)	
		Intake (g)	% of RDA	Intake (g)	% of RDA	Intake (g)	% of RDA	Intake (g)	% of RDA
Cereals	320	370	115.6 (4)	320	100.0 (4)	317	99.0 (3)	337	105.0 (4)
Pulses	60	30	50.0 (1)	45	75.0 (1)	48	80.0 (2)	33	55.0 (1)
Green leafy vegetables	100	78	78.0 (1)	95	95.0 (3)	33	33.0 (1)	17	17.0 (1)
Roots and tubers + other vegetables	75	150	200.0 (4)	140	186.0 (4)	126	168.0 (4)	113	150.0 (4)
Fruits	50	0	0.0	33	60.0 (1)	60	120.0 (4)	0.0	0.0
Milk	200	70	35.0 (1)	20	10.0 (1)	150	75.0 (1)	10	5.0 (1)
Meat/Fish/Egg	30	50	166.0 (4)	33	110.0 (4)	50	166.0 (4)	36	120.0 (4)
Fats and oils	35	20	57.0 (1)	23	66.0 (1)	37	106.0 (4)	18	51.0 (1)
Sugar and jaggery	50	20	40.0 (1)	27	54.0 (1)	33	66.0 (1)	20	40.0 (1)

BDR : Balanced Diet Recommended for Indian (ICMR, 1989)

Figures in parentheses indicate the adequacy level: Dietary adequacy: ≥ RDA - Adequate = 4, > 90% of RDA – Fair = 3,
80-90% of RDA – Low = 2 and < 80% of RDA – Very low = 1

Table 1B. The daily average intake of food and dietary adequacy of adolescent girls (13-15 years) from various ethnic groups of Jorhat

Food groups	BDR (g)	Target population							
		Tribal (n=9)		Rural (n=15)		Urban (n=15)		Tea garden (n=9)	
		Intake (g)	% of RDA	Intake (g)	% of RDA	Intake (g)	% of RDA	Intake (g)	% of RDA
Cereals	350	416	119.0 (4)	351	100.2 (4)	350	100.0 (4)	426	122.0 (4)
Pulses	50	30	60.0 (1)	39	78.0 (1)	45	90.0 (2)	30	60.0 (1)
Green leafy vegetables	150	93	62.0 (1)	83	55.3 (1)	100	67.0 (1)	53	35.3 (1)
Roots and tubers	75	100	133.0 (4)	73	97.3 (3)	87	116.0 (4)	83	110.6 (4)
Other vegetables	75	85	113.0 (4)	75	100.0 (4)	78	104.0 (1)	83	110.6 (4)
Fruits	30	0	0.0	22	73.0 (1)	60	200.0 (4)	0	0.0
Milk	150	28	19.0 (1)	50	33.0 (1)	110	73.0 (1)	0	0.0
Meat/Fish	30	63	210.0 (4)	45	150.0 (4)	87	290.0 (4)	33	110.0 (4)
Egg	30	0	0.0	16	53.0 (1)	30	100.0 (4)	0	0.0
Fats and oils	40	20	50.0 (1)	28	70.0 (1)	40	100.0 (4)	23	58.0 (1)
Sugar and jaggery	30	15	50.0 (1)	25	83.3 (2)	35	116.6 (4)	16	53.0 (1)

BDR: Balanced Diet Recommended for Indian (ICMR, 1989)
Figures in parentheses indicate the adequacy level: Dietary adequacy: ≥ RDA – Adequate =4, > 90% of RDA – Fair = 3,
80-90% of RDA – Low = 2 and < 80% of RDA – Very low = 1

Table 1C. The daily average intake of food and dietary adequacy of adolescent girls (16-18 years) from various ethnic groups of Jorhat

Food groups	BDR (g)	Target population							
		Tribal (n=9)		Rural (n=15)		Urban (n=15)		Tea garden (n=9)	
		Intake (g)	% of RDA	Intake (g)	% of RDA	Intake (g)	% of RDA	Intake (g)	% of RDA
Cereals	350	386	110.0 (4)	351	100.2 (4)	356	102.0 (4)	438	125.0 (4)
Pulses	50	39	78.0 (1)	40	80.0 (2)	45	90.0 (2)	35	70.0 (1)
Green leafy vegetables	150	100	67.0 (1)	53	35.0 (1)	100	67.0 (1)	60	40.0 (1)
Roots and tubers	75	123	164.0 (4)	88	117.0 (4)	80	106.6 (4)	75	100.0 (4)
Other vegetables	75	80	106.6 (4)	92	122.6 (4)	80	106.6 (4)	75	100.0 (4)
Fruits	30	30	100.0 (4)	30	100.0 (4)	60	200.0 (4)	26	86.6 (2)
Milk	150	53	35.0 (1)	77	51.3 (1)	146	97.3 (3)	0	0.0
Meat/Fish	30	70	233.0 (4)	53	176.6 (4)	80	267.0 (4)	42	140.0 (4)
Egg	30	10	33.3 (1)	30	100.0 (4)	50	166.0 (4)	20	66.6 (1)
Fats and oils	40	22	55.0 (1)	37	93.0 (3)	47	118.0 (4)	20	50.0 (1)
Sugar and jaggery	30	18	60.0 (1)	28	93.3 (3)	35	117.0 (4)	15	50.0 (1)

BDR: Balanced Diet Recommended for Indian (ICMR, 1989)
Figures in parentheses indicate the adequacy level: Dietary adequacy: ≥ RDA – Adequate - 4, > 90% of RDA – Fair = 3,
80-90% of RDA – Low = 2 and < 80% of RDA – Very low = 1

Table 2. The percentage adequacy of average daily intake of nutrients *viz.*, energy, protein, iron, vitamin C and calcium in comparison with RDA for 10-18 years old girls in various ethnic groups

Nutrients	*RDA	Target population							
		Tribal (n=9)		Rural (n=15)		Urban (n=15)		Tea garden (n=9)	
		Intake (g)	% of RDA	Intake (g)	% of RDA	Intake (g)	% of RDA	Intake (g)	% of RDA
Age group 10-12 years									
Energy (kcal)	1950	187.30	96.0 (3)	1783.0	91.0 (3)	2097.0	108.0 (4)	1723.0	88.0 (2)
Protein (g)	50	48.0	96.0 (3)	47.0	94.0 (3)	57.0	114.0 (4)	43.0	86.0 (2)
Iron (mg)	20	9.6	48.0 (1)	13.0	65.0 (1)	13.0	65.0 (1)	9.6	48.0 (1)
Vitamin C (mg)	40	32.0	80.0 (2)	35.0	87.5 (2)	38.0	95.0 (3)	28.0	70.0 (1)
Calcium (mg)	600	348.0	58.0 (1)	473.0	79.0 (1)	600.0	100.0 (4)	240.0	40.0 (1)
Age group 13-15 years									
Energy (kcal)	2050	2047.0	99.8 (3)	1983.0	96.7 (3)	2135.0	104.0 (4)	1723.0	84.0 (2)
Protein (g)	67	56.0	83.5 (2)	55.0	82.0 (2)	68.0	101.0 (4)	58.0	86.5 (2)
Iron (mg)	28	10.6	38.0 (1)	12.0	42.8 (1)	18.5	66.0 (1)	13.0	46.0 (1)
Vitamin C (mg)	40	40.0	100.0 (4)	44.0	110.0 (4)	49.0	122.0 (4)	40.0	100.0 (4)
Calcium (mg)	600	566	94.0 (3)	594	99.0 (3)	887	147.8 (4)	268.0	45.0 (1)
Age group 16-18 years									
Energy (kcal)	2050	2047.0	99.8 (3)	2048	99.9 (3)	2298	112.0 (4)	2040	99.5 (3)
Protein (g)	65	61.0	93.8 (3)	60	92.0 (3)	64	98.46 (3)	56	86.0 (2)
Iron (mg)	30	17.0	56.6 (1)	13	43.0 (1)	15	50.0 (1)	16	53.0 (1)
Vitamin C (mg)	40	480	120.0 (4)	42	105.0 (4)	44	110.0 (4)	30	75.0 (1)
Calcium (mg)	500	665	133.0 (4)	683	136.6 (4)	939	187.8 (4)	397	79.4 (1)

* RDA = Recommended Dietary Allowances (ICMR, 1989)
Figures in parentheses indicate the adequacy level:
Dietary adequacy : ≥ RDA -Adequate = 4, > 90% of RDA – Fair = 3, 80-90% of RDA – Low = 2 and < 80% of RDA – Very low = 1

TGL girls, respectively. The adequacy of energy in urban girls was probably due to intake of fried foods, snacks and junk food loaded with fat. The deficient intake of energy in Tribal, Rural and TGL girls could be due to deficient consumption of concentrated energy sources like fats, sugar and jaggery. One important reason was probably due to ignorance about the daily requirement of nutrients.

The average protein adequacy ranged between 83.5-96 per cent, 82-94 per cent, 98.4-114 per cent and 86-86.5 per cent of RDA for tribal, rural, urban and TGL girls (10-18 years) respectively. Only urban girls could show a fair (> 90% of RDA) to adequate or excess level of protein intake across various ages and appeared to be due to adequate intake of pulses, fleshy foods and regular consumption of milk and milk products. Though fish was found to be consumed adequately, low consumption of pulses and inadequacy of milk and milk products deprived the rest of the adolescents from meeting the adequacy in protein requirement.

The mean iron adequacy of all the girls (10-18 years) were far below of RDA and could met 38-56.6 per cent, 42.8-65 per cent, 50-66 per cent and 46-53 per cent of RDA for tribal, rural, urban and TGL girls, respectively. Inadequacy was due to consumption of cereal based diet with low consumption of pulses, dark green leafy vegetables, fruits, eggs etc. Iron

inadequacy among adolescent girls was also reported from other parts of India and abroad (Nagi and Chawla, 1992; Aguilera *et al.*, 1994).

The average vitamin C intake was ranged between 80-120 per cent, 87.5-110 per cent, 95-122 per cent and 70-100 per cent of RDA for tribal, rural, urban and TGL girls (10-18 years) respectively showing either a 'very low', 'low' or 'fair' to adequate or excess level of RDA among the girls in different ages, mostly due to inadequate consumption of fruits and green leafy vegetables. Dietary inadequacy of important nutrients like iron and vitamin C are alarming and must be addressed with proper care and concern for these future mothers.

Adequacy of calcium intake was evident only in urban girls, attributable to the regular intake of milk, fruits, vegetables, eggs and fleshy foods. From the nutrient quality of the diet, the TGL, girls were found to be the most nutritionally deprived group.

Conclusion:

The present study reveals that the food and nutrient intake of the studied population was not at par with ICMR recommendation. Undernutrition and overnutrition, though not striking particularly among the affluent Urban girls is a matter of serious concern. Ignorance regarding the importance of

quantitative as well as qualitative aspects of food, traditional food habit, personal likes and dislikes, aversion to certain foods, slimming phobias, lack of physical exercise in terms of games and sports, more exposure to TV and sedentary life style were some of the causative factors to affect the nutritional status of these girls. There is urgent need to improve their health and nutritional knowledge through appropriate nutrition education programmes. All parents, communities, societies must emphasize the importance of this pivotal period of life for the betterment of the society and the nation as well.

LITERATURE CITED

Aguilera, F., Lupianez, L., Manga, D., Planells, E., Mataix, F.J. and Llopis, J. (1994). Iron status in a population of Spanish School Children. *Nahrung,* **38**(2): 192-198.

Ghosh, S. (1992). It is the time we thought of youth. *Indian Pediatr.,* **29**: 821-823.

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

ICMR (1989). Nutrient requirement and recommended dietary allowances for Indians. A Report of the Expert group of the ICMR, pp. 10-11, 53, 55, 56-60, 129.

ICMR (1993). Gopalan, C.; Ramasastry, B.V., Balasubramanian, S.C. Tables of food composition. Nutritive value of Indian foods. N.I.N., Hyderabad, India. pp. 47-67.

Myron, W. (1980). Nutrition in health and disease. Willey Interscience Pub, 1980.

Nagi, M. and Chawla, S. (1992). Dietary intake and iron status of school girls. *Nutr. Soc. India Ann. Meeting*, pp. 110-111.

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.

Statistical Hand Book, Assam (1992). Directorate of economics and statistics, Govt. of Assam.

Sadana, B., Khana,M. and Mann, S.K.(1997). Consumption pattern of fast foods among teenagers. *Appl. Nut.,* **22**(1): 14-17