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Dietary intake by adolescents from government and private school: A comparative assessment

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Abstract

Study was carried out on two hundred school going adolescents, aged between thirteen and seventeen years. Dietary intake of all the subjects was recorded for three consecutive days by '24 Hour Recall Method'. Study revealed that the daily mean intake of cereals, pulses, green leafy vegetables, roots tubers, other vegetables, fruits, milk & milk products, fats & oils, and sugar & jaggery was significantly lower ($p \leq 0.05$) than the recommended RDIs values in the daily diet of both males and females of both the age group (13-15 years and 16-17 years) of government and private schools. Furthermore, there was significant ($p \leq 0.05$) difference between the daily mean dietary intake of government and private school adolescents. Except cereals, pulses, roots & tubers and sugar & jaggery the adequacy ratio was below 50 per cent for all food groups in majority of government school respondents. However, majority of private school respondents met the adequacy by 75 -99.9 per cent of all food groups except green leafy vegetables which was below 50 per cent. In order to improve the current dietary pattern of school going adolescents there is an urgent need of imparting focused nutrition education programmes among the school going youth and their parents.

Keywords: food intake, Indian adolescent health, food adequacy ratio, 24 hour recall

Introduction

Adolescence is the phase of physical and psychological development that leads to transformation from puberty to legal adulthood. Adolescence is marked not only by physical and sexual maturation but also social and economic independence. After infancy, it has the most rapid pace of growth. Nutrition during adolescence is influenced by many factors, including peer influences, parental modeling, food availability, food preferences, cost, convenience, personal and cultural beliefs, mass media, and body image (Das *et al.*, 2017) ^[3].

Adolescence is called a window of opportunity to recover out of any nutritional deficiencies of childhood and achieve full biological potential. However, due to limited availability of resources and lack of awareness, many of the adolescents are not able to make full use of this period. As a result, they become more vulnerable to improper psychological and physical development, diseases and early death (Rathi *et al.*, 2017; Nithya and Bhavani, 2018) ^[8, 7]. This drastically affects both the adulthood of the subjects, and growth and development of the society and country (Sindhu, 2013; Santosh and Sindhu, 2016) ^[10, 9].

Keeping in mind the fact that studies on dietary habits and nutritional status provide useful data that can be instrumental in designing future policies, the present study was conducted to assess the food intake of school going adolescents

Materials & Methods

The study was carried out on two hundred school going adolescents, aged between thirteen and seventeen years, selected randomly; hundred each from Private school and Government school. Location of both the schools was urban Hisar (Haryana). Equal number of male and female subjects were selected from both the schools was equal and further they were equally categorized into the age group of 13-15 years and 16-17 years, respectively. Dietary intake of all the subjects was recorded for three consecutive days by '24 Hour Recall Method'.

The dietary survey was carried out during the months of November to mid-March. The mean daily food and nutrient intake by the subjects was calculated by taking average of the intake of three consecutive days and was compared with the recommended dietary allowances (RDA) of ICMR (2010) [4] for adolescents in age group of 13-17 years. Nine food groups were included namely cereals, pulses, milk and milk products, roots and tubers, green leafy vegetables, other vegetables, fruits, fats and oils and sugar and jaggery. Cooked food consumed was converted into their raw equivalents and the Food Adequacy Ratio (FAR) was calculated as:

$$\text{FAR}(\%) = \frac{\text{Intake}}{\text{Requirements}} \times 100$$

The statistical analysis was carried out using XLSTAT v.2018 and SPSS.

Results and Discussion

Comparative school wise daily mean food intake by total adolescents under study

The mean intake of cereals, pulses, milk & milk products, roots & tubers, green leafy vegetables, other vegetables, fruits, fats & oils, and sugar & jaggery were 292.62, 40.64, 193.07, 118.59, 36.30, 133.27, 27.09, 14.25 and 13.32g, respectively for government school going adolescents; among private school going adolescents the observed values for respective food groups were 338.32, 62.15, 462.48, 131.89, 47.94, 160.81, 107.35, 35.88 and 26.44g (Table 1).

Furthermore, it was observed that the mean intake of all the food groups were significantly ($p \leq 0.05$) higher by private school adolescents than the government school adolescents.

Comparative gender wise daily mean food intake by adolescents under study

An overall gender-wise comparison was done to assess the difference between the daily mean food intake by male and female adolescents (Table 2) and it was observed that mean intake of all food groups by male adolescents were significantly ($p \leq 0.05$) higher than that of female adolescents. Mean intake of cereals, pulses, milk & milk products, roots & tubers, green leafy vegetables, other vegetables, fruits, fats & oils, and sugar & jaggery were 358.378, 56.893, 333.561, 145.729, 45.600, 152.269, 71.622, 28.203, and 22.987, respectively for government school going adolescents whereas, for private school going adolescents, it were 272.573, 45.911, 321.986, 104.763, 38.653, 141.818, 62.825, 21.935, and 16.783, respectively.

Adequacy of Food intake among adolescents

Respondents from government school categories had cereal adequacy intake between 50 to 99.9 per cent of RDI (Table 3) while it ranged from 75-99.9 per cent for majority of private school respondents. Adequacy of pulse intake was lower among government school respondents (below 75 %) as compared to private school respondents where majority (75%) had adequacy ratio between 75 -99.9 per cent.

Adequacy ratio for milk and milk products, Green leafy vegetables, Other vegetables, Fruits and Fats & oils was below 50 per cent for all government school respondents while for majority of private school respondents it was between 75-99.9 per cent, 50-74.9 per cent, 75-99.9 per cent,

≥ 100 per cent and between 75-99.9 per cent respectively. Majority of government school respondents had adequacy ratio for roots & tubers between 50 to 74.9 per cent while it was between 75-99.9 per cent for private school respondents (Table 3).

Food adequacy gender wise among adolescents

The male respondents from both the schools had cereal intake adequacy between 50 to 99.9 per cent of RDI similarly, it ranged from 75 per cent to 99.9 per cent for female respondents. Only 3 female respondents from had cereal intake of more than 100 per cent. Adequacy of pulse intake was lower among male respondents (below 75 %) as compared to the female respondents where intake was observed above 100 per cent (Table 4).

A vast deviation was seen in the adequacy ratio of milk and milk products. Twelve of the female respondents has adequacy ratio of more than 100 per cent while only 5 male respondents had same adequacy ratio for milk & milk products. While majority of both male and female respondents had adequacy ratio lying below 50 per cent.

Majority of the male and female respondents had adequacy ratio of roots and tubers between 75-99.9 per cent. A very low adequacy ratio below 50 per cent for green leafy vegetables was observed for both males and females with majority lying in this ratio. The adequacy for other vegetables was above 50 per cent for both male and female respondents.

Majority of the respondents had fruit intake adequacy less than 50 per cent while 38 of the female and 35 of the male respondents had fruit adequacy of more than 100 per cent.

The fat intake was higher in the male respondents compared to the female respondents. Majority of the male respondents had fat intake adequacy of more than 100 per cent while majority of females has intake between 75-99.9 per cent. Only 5 males had fat adequacy intake of less than 50 per cent compared to 27 females lying in the same category.

The adequacy of sugar intake was less than 50 per cent in both the male and female respondents.

Food intake lower than RDI values and lower food adequacy among government college adolescents may be due to low purchasing capacity as most of them belonged to lower income groups. In addition to this, restricted food choices might be the playing factor in both government and private school respondents, particularly with respect to green leafy vegetables. These results are in line with many previous studies in relation to the food adequacy ratio among the adolescents of various age group and socio-economic backgrounds (BogI *et al.*, 2017; Mitra & Rao, 2017; Cunha *et al.*, 2018; Manz *et al.*, 2019) [1, 6, 2, 5]. Rathi *et al.*, 2017 [18] studied 1026 students (aged 14–16 years) attending private, English-speaking schools in Kolkata, India. They reported poor dietary intakes; over one quarter (30%) reported no consumption of vegetables and 70% reported eating three or more servings of energy-dense snacks, on the previous day. Nearly half of the respondents (45%) did not consume any servings of fruits and 47% reported drinking three or more servings of energy-dense beverages. The mean consumption of food groups in serves/day varied from 0.88 (SD = 1.36) for pulses and legumes to 6.25 (SD = 7.22) for energy-dense snacks. In general, girls had more nutritious dietary intakes than boys.

Table 1: Comparative school wise daily mean food intake by adolescents under study

Foodgroup (g)	Government School (n=100)	Private School (n=100)	Z value
Cereals	292.62±50.14	338.32±47.62	06.60*
Pulses	40.64±8.66	62.15±13.04	13.74*
Milk & milk products	193.07±20.83	462.48±53.37	47.02*
Roots & tubers	118.59±32.98	131.89±39.90	02.56*
Green leafy vegetables	36.30±3.63	47.94±11.67	09.51*
Other vegetables	133.27±8.80	160.81±16.90	14.45*
Fruits	27.09±4.90	107.35±27.07	29.16*
Fats & oils	14.25±2.60	35.88±6.65	30.25*
Sugar & Jaggery	13.32±2.38	26.44±5.09	23.33*

Values are Mean ±Standard Deviation
*Significant at 5% level

Table 2: Comparative gender wise daily mean food intake by total male and female adolescents under study

Foodgroup (g)	Male (n=100)	Female (n=100)	Z Value
Cereals	358.37±34.99	272.57±29.88	18.64*
Pulses	56.89±14.75	45.91±14.14	5.37*
Milk & milk products	333.56±137.00	321.98±145.26	0.58 ^{NS}
Roots & tubers	145.72±26.68	104.76±34.78	9.34*
Green leafy vegetables	45.60±11.49	38.65±7.82	4.99*
Other vegetables	152.26±19.28	141.81±17.86	3.97*
Fruits	71.62±46.35	62.82±42.69	1.39 ^{NS}
Fats & oils	28.20±12.81	21.93±10.16	3.38*
Sugar & Jaggery	22.98±8.49	16.78±5.19	6.22*

Values are Mean ±Standard Deviation
*Significant at 5% level

Table 3: Adequacy of food intake among adolescents

Foodgroup (g)	Food Adequacy ^a							
	Government School (n=100)				Private School (n=100)			
	≥100%	75-99.9%	50-74.9%	<50%	≥100%	75-99.9%	50-74.9%	<50%
Cereals	-	57	43	-	3	97	-	-
Pulses	-	-	78	22	5	75	20	-
Milk & milk products	-	-	-	100	20	66	14	-
Roots & tubers	7	16	70	7	-	85	4	11
Green leafy vegetables	-	-	-	100	-	-	41	59
Other vegetables	-	-	-	100	-	78	22	-
Fruits	-	-	-	100	72	11	16	1
Fats & oils	-	-	-	100	4	81	15	-
Sugar & Jaggery	-	-	66	34	49	51	-	-

^a Per cent of RDI (ICMR, 2010) [4]

Table 4: Food adequacy gender wise among adolescents

Foodgroup (g)	Food Adequacy							
	Male (n=100)				Female (n=100)			
	≥100%	75-99.9%	50-74.9%	<50%	≥100%	75-99.9%	50-74.9%	<50%
Cereals	-	80	20	-	3	75	22	-
Pulses	-	38	56	6	5	37	88	20
Milk & milk products	5	41	4	50	12	28	10	50
Roots & tubers	7	53	40	-	-	50	32	18
Green leafy vegetables	-	-	34	66	-	-	8	92
Other vegetables	-	41	59	-	-	40	60	-
Fruits	35	10	5	50	38	1	11	50
Fats & oils	48	2	43	7	1	50	22	27
Sugar & Jaggery	6	36	6	52	4	37	9	50

^a Per cent of RDI (ICMR, 2010) [4]

Conclusion

The food consumption pattern as observed in this study are poor. Food availability is not an issue in Haryana. However, there is need to design effective nutrition promotion strategies so as to encourage healthy eating practices.

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