

Food intake and food adequacy of rural school children in the age group of 7-9 years

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A present study was carried out to assess the information regarding food intake and food adequacy of the school children (7-9 year) of the two villages viz., Alakhpura and Barsi in Bawani Khera blocks of Bhiwani district. A sample of 100 school children was randomly selected. Data on dietary intake was collected by 24 hour recall method and analysed for food intake which was calculated and compared with recommended dietary intake. It was observed that food stuff like pulses, milk and milk products, roots and tubers, green leafy vegetables, other vegetables, fruits, sugar and jaggery, and fats and oils were lower than RDI in respondent of both the villages. Adequacy of food intake revealed that the intake of roots and tubers, green leafy vegetables, other vegetables and fruits milk were inadequate (50% of RDI) among majority of school going children. The intake of pulses and fats and oils were marginally inadequate and milk and milk products were marginally adequate. On the other hand, most of the children were taking cereals and sugars adequately.

Key Words : School children, Food intake, Adequacy, Recommended dietary intake

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INTRODUCTION

School going children form an important vulnerable segment of the nation's population. The school age is one of the crucial period of life, as about 40% of physical growth and 80% of mental growth is believed to take place during this age. At this age, they have special nutritional needs because of the rapid growth and development which is dependent on the adequacy of diet consumed by them. The nutritional needs of children are unique and demand special attention. Good nutrition is an indispensable component of healthy life. It is a determinant of healthy growth of mind and body. It plays a vital role in the physical, mental and emotional development of

child. School age is a dynamic period of growth and development as children undergo physical, mental, emotional and social changes (UNICEF, 2011; Kanjilal *et al.*, 2011 and Sant *et al.*, 2013).

The deficit in food intakes particularly due to low intake of protective foods resulted in micronutrient deficiencies. School children are generally occupied with academic work, games and are under emotional stress coupled with unbalanced diets resulting in poor health and nutrition. Hence, the importance of good nutrition is realized in the maintenance of health of human being especially of children (Malhotra and Passi, 2007 and Amuta *et al.*, 2012). School children are generally occupied with academic work, games and are under emotional stress coupled with unbalanced diets resulting in poor health and nutrition. Hence the importance of good nutrition is realized in the maintenance of health of human being especially of children.

Keeping this in view the present investigation was

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planned to assess the food consumption pattern of selected school children (7-9 years) of two villages of Bhiwani district in Haryana.

METHODOLOGY

To accomplish the objectives of the study a total of 100 school children of 7-9 years were selected randomly from two villages of Bhiwani district in Haryana. A well structured interview schedule was prepared in accordance with the methodological procedure keeping in view the objectives of the investigation. The interview schedule was pretested initially, based on the responses obtained and difficulties realised, suitable amendments were made to make it more functional.

The data was collected with the help of interview schedule by paying repeated visits to the study area and the responses were obtained on independent and dependent variables to meet the requirements of the study.

Food intake :

The mean daily food intake was calculated by taking mean of three consecutive days intake. The food groups included cereal, pulses, milk and milk products, roots and tubers, green leafy vegetables, other vegetables, fruits, sugar and jiggery and fats and oils. Average intake of the subjects was compared with the Recommended Dietary Intake ICMR (2010). Food adequacy ratio (FAR) was calculated as.

$$\text{FAR \%} = \frac{\text{Intake}}{\text{RDI}} \times 100$$

Adequacy of food intake :

The adequacy of food and nutrient intakes of the respondents were categorized into four groups (Table A).

Category	Range	Score
Adequate	100% and above	I
Marginally adequate	75-99.9%	II
Marginally inadequate	50-74.9%	III
Inadequate	Below 50%	IV

Statistical analysis :

The qualitative data were quantified according to the standard methods. The qualitative and quantitative data were tabulated to draw meaningful inferences. The

data was analysed with the help of percentage, mean and standard deviation, analysis of variance by using complete randomised design, z- test and t- test.

OBSERVATIONS AND ASSESSMENT

Data regarding mean daily food intake of the school children (7-9 yrs) of age as well as comparison of mean daily food intake of boys and girls are presented in Table 1 and 2.

Cereals :

The mean daily cereal intake of the school going children both (boys and girls) was 161.43 g (89.68% of RDI) which was significantly ($P \leq 0.01$) lower than recommended dietary intakes (Table 1). The mean daily cereals intake of boys and girls was 164.34 g and 158.52 g which correspond to 91.30 and 88.07 per cent, respectively (Table 2). It was found that the intake of cereals by boys and girls did not differ significantly. Similarly, other workers (Kaur, 2006; Subjwari *et al.*, 2009 and Rajbala, 2010) also revealed that the dietary intake of cereals was lower in children than RDI.

Pulses :

The data presented in Table 1 indicates that daily mean intake of pulses among school going children (7-9 years) was 41.22 g which was only 68.70 per cent of RDI. The mean daily pulses intakes of boys and girls were 42.42 g and 40.02 g which correspond to 70.70 and 66.70 per cent, respectively (Table 2). Consumption of pulses was lower than RDI in school going children and has also been noticed by Shahnaz *et al.* (1998) and Mishra and Tiwari (2007). According to Manu and Khertarpaul (2006) and Dudi and Punia (2008), lower intake of pulses was found in preschool children of Haryana.

Milk and milk products :

The mean daily intake of milk and milk products of school going children was 159.57 g which was 31.91 per cent of the RDI (Table 1). On comparison basis, mean daily intake of milk and milk products was 162.28 and 156.86 ml by the boys and girls which was only 33.06 and 31.37 per cent, respectively and the differences between mean intake and RDI were significant ($P \leq 0.05$) (Table 2). Less consumption of milk and milk products by children has also been supported by previous workers (Dudi and Punia, 2008 and Devaki *et al.*, 2009).

Roots and tubers :

The intake of roots and tubers by school going children was 51.78 g/day which was 51.78 per cent of the RDI and significantly ($P \leq 0.01$) lower than the RDI (Table 1). It was observed that intake of roots and tubers were lower in girls (50.76 g) than in boys (52.80 g) however, the differences were non-significant (Table 2). Similarly, other workers like Singh and Raghuvanshi (2003) and Grammatikopoulous *et al.* (2009) also reported low intake of vegetables by school children.

Green leafy vegetables :

Table 1 showed the mean daily intake of green leafy vegetables of school going children and it was 37.15 g (37.15% of RDI) and it was significantly ($P \leq 0.01$) lower than the RDI. The consumption of green leafy vegetables was lower in girls as compared to boys however, the differences were non-significant (Table 2). Kumari and Singh (2001) in their study on nutritional status of 6-12

years old children reported similar pattern of low intake of green leafy vegetables.

Other vegetables :

The daily mean intake of other vegetables of school going children was 46.58 g (46.58 % of RDI) was significantly ($P \leq 0.01$) lower than RDI (Table 1). It was found that daily mean intake of other vegetables by girls was lower than boys but the differences were non-significant (Table 2).

Fruits :

Data in Table 1 revealed that the mean daily intake of fruits of school going children were 49.46 g. The fruits intake was significantly ($P \leq 0.01$) lower than RDI. The mean intake of fruits was found to be higher in boys (50.66 g) than the girls (48.26 g) (Table 2). These findings are consistent with those reported by Handa *et al.* (2008), Rajbala (2010) and Neha (2011). Similarly, other workers

Table 1 : Mean daily food intake of school going children

(n=100)

Food stuffs (g)	RDI (g)	Mean daily food intake	z value	Overall intake %age of RDI
Cereals	180	161.43±19.69	9.43**	89.68
Pulses	60	41.22±14.82	12.67**	68.70
Fats and oils	30	16.60±2.47	54.25**	55.33
Sugars and jaggery	20	16.06±2.13	18.49**	80.30
Green leafy vegetables	100	37.15±16.15	38.92**	37.15
Roots and tubers	100	51.78±17.19	28.05**	51.78
Other vegetables	100	46.58±17.52	30.49**	46.58
Fruits	100	49.46±17.09	29.57**	49.46
Milk and milk products	500	159.57±35.66	95.46**	31.91

Values are mean ± SD

RDI- Recommended Dietary Intake (ICMR, 2010)

Z value shows comparison of nutrients intake with RDI

**indicates significance of value at $P=0.01$

Table 2: Comparison between mean daily food intake of school going boys and girls

(n=100)

Food stuffs	RDI (g)	Mean daily food intake of children		'Z' ^a value		'Z' ^b value
		Boys (n=50)	Girls (n=50)	Boys	Girls	
Cereals	180	164.34±16.56 (91.30)	158.52±22.18 (88.07)	6.68**	6.84**	1.36 ^{NS}
Pulses	60	42.42± 14.14 (70.70)	40.02 ± 15.24 (66.70)	8.79**	9.27**	0.77 ^{NS}
Fats and oils	30	17.08±2.05 (56.93)	16.12±2.57 (53.73)	44.56**	35.43**	2.04*
Sugar and jaggery	20	15.74±1.98 (78.70)	16.38±1.28 (81.90)	12.93**	13.44**	2.06*
Milk and milk products	500	162.28±33.86 (33.06)	156.86±36.83 (31.37)	69.89**	65.87**	0.77 ^{NS}
Green leafy vegetables	100	38.22 ± 18.84 (38.22)	36.08 ± 13.04 (36.08)	23.18**	3.65**	0.66 ^{NS}
Roots and tubers	100	52.80 ± 18.34 (52.80)	50.76 ± 16.08 (50.76)	18.19**	21.65**	0.59 ^{NS}
Other vegetables	100	47.82 ± 17.09 (47.82)	45.34 ± 17.45 (45.34)	21.58**	22.14**	0.72 ^{NS}
Fruits	100	50.66 ± 18.44 (50.66)	48.26 ± 15.73 (48.26)	18.95**	23.25**	0.68 ^{NS}

Values are mean ±SD

* and ** indicate significance of values at $P=0.05$ and 0.01 , respectively

Figures in parentheses indicate percent RDA

RDI- Recommended Dietary Intake (ICMR, 2010)

NS=Non-significant

'Z'^a values showing comparison of mean food intake and RDI

'Z'^b value showing comparison between boys and girls

Table 3: Adequacy of food intake by school going children

(n=100)

Category of adequacy	Cereals	Pulses	Milk and milk products	Roots and tubers	Green leafy veg.	Other veg.	Fruits	Sugar and jaggery	Fats and oils
I	65	3	13	15	4	15	3	51	12
II	27	27	36	22	16	19	18	29	19
III	8	39	24	29	31	27	24	16	38
IV	-	31	27	34	49	39	55	4	31
I	100 per cent and above (Adequate)								
II	75 to 99.9 per cent of RDI (Marginally adequate)								
III	50 to 74.9 per cent of RDI (Marginally inadequate)								
IV	Below 50 per cent of RDI (Inadequate)								

(Golder *et al.*, 2001; Manu and Khetarpaul, 2006 and Dudi and Punia, (2008) also reported low intake of fruits in the diet of children (4-5 years).

Sugar and jaggery :

The data in Table 1 revealed that the daily mean intake of sugar and jaggery of school going children (7-9 years) was 16.06 g which was 80.30 per cent of the RDI. The results highlighted significantly ($P \leq 0.05$) higher consumption of sugar and jaggery among girls (81.90% of RDI) than boys (78.70% RDI) (Table 2). Prekshi (2003) reported that diets of children were deficient in sugar and jaggery. In contrast, Rajbala (2010) and Neha (2011) reported higher intake of sugar than RDI among children.

Fats and oils :

Daily mean intake of fats and oils of the school going children was 16.60 g which was 55.33 per cent of RDI (Table 1). The intake was significantly ($P \leq 0.01$) lower than RDI. The consumption of fats and oils was higher in boys (56.93%) than girls (53.73%), however, the differences were non-significant (Table 2). Present finding corroborates to that of other finding reported earlier (Shahnaz *et al.*, 1998 and Subhadra, 2000). They also reported that daily intake of fats and oil of school children was significantly lower than recommended level.

Adequacy of food intake by school going children :

Adequacy of food intake revealed that the intake of roots and tubers, green leafy vegetables, other vegetables and fruits milk were inadequate (50% of RDI) among majority of school going children (Table 3). The intake of pulses and fats and oils were marginally inadequate and milk and milk products were marginally adequate. On the other hand, most of the children were taking cereals and sugars adequately. The results are in line with those

of Mishra and Tiwari (2007) who reported that majority of the subjects were at inadequate level for pulses, green leafy vegetables, roots and tubers and milk and milk products. Khosla *et al.* (2000) reported inadequate consumption of cereals, pulses, milk and milk products and green leafy vegetables by the school going children of Ludhiana, Punjab.

Conclusion :

It may be concluded from the present study that mean daily food intakes by the rural school children were found significantly lower than their respective RDIs. Consumption of all the food stuffs except sugar and jaggery were significantly ($P \leq 0.01$) higher in boys than girls. Adequacy of food intake revealed that the intake of roots and tubers, green leafy vegetables, other vegetables and fruits milk were inadequate (50% of RDI) among majority of school going children. The intake of pulses and fats and oils were marginally inadequate and milk and milk products were marginally adequate. On the other hand, most of the children were taking cereals and sugars adequately. Hence, there is need to create awareness among children and their parents to include more locally available green leafy vegetables and fruits to improve their nutritional status.

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