



FOOD INTAKE OF RURAL SCHOOL GOING BOYS AND GIRLS OF HARYANA, INDIA: A COMPARATIVE STUDY

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Abstract: *The present study was conducted to determine food intake of 100 rural school going boys and girls (10-12 years) selected randomly from the two villages namely Khabra Kalan and Jandwala Baggar of Fatehabad district, Haryana, India. Food intake of children was assessed using methods of dietary survey (24 hr recall method). Among cereals wheat was consumed daily by all of the respondents as it was main cereal in the study area. About 50 per cent of the children's families were consuming consumed bengal gram (48%) and green gram (53%) on weekly basis, black gram was consumed on fortnightly basis by 49 per cent of families while red gram (43%), lentil (38%) and soyabean (41%) were consumed rarely by most of respondents. The mean daily cereal intake of the school boys was 63.04 per cent of RDI and girls was 63.29 per cent of RDI. Most of the respondents i.e., 51 and 29 per cent consumed fruits less than 50 per cent of RDI and 50 to 74.9 per cent of RDI, respectively. The mean daily intake of cereals, pulses, fats and oils, milk and milk products, green leafy vegetables, other vegetables, roots and tubers, sugar and jaggery and fruits by rural school going children was found to be lower than RDI and this may be due to lower agricultural production, low availability, lack of knowledge, higher price and low purchasing power of the respondents' families.*

Key words: *Food, intake, nutrient, rural, Recommended Dietary Intake, Recommended Dietary Allowance, low availability*

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INTRODUCTION

Developing countries like India, account for about 40 per cent of undernourished children in the world and it is largely due to food and nutrient inadequacy and lack of nutrition education among masses. School going children are an important segment of our society and in their well being nutrition plays a vital role, as intake of inadequate food and nutrients during growing years may lead to malnutrition, wasting, low resistance to infections, stunted growth retardation, reduced work capacity and poor mental and social development (2). The proper growth, development and body weight of children is of great significance and present the general health status of a community and nation as a whole (21). Micro-nutrient deficiencies referred to as hidden hunger are the most common forms of nutritional deficiencies among school children globally as well as in India. One of the major nutrient deficiencies among school children is that of iron, which is associated with retardation of growth, decreased immunity and poor cognitive development resulting in poor intelligence quotient and behavioural abnormalities (3). It is well established that the school age period is nutritionally significant and highly demanding because this is period of growth spurt and body stores the nutrients for future use (9). It had been established that school age is dynamic period of growth and development as children undergo physical, mental, emotional and social changes. Thus foundation of good health and sound mind is laid during this period, so, it is a basic milestone in the life of an individual (20) (14). Various workers have reported that the health problems due to miserable nutritional status in school age children are among the most common causes of low school enrolment, high absenteeism, early dropout and unsatisfactory classroom performance (18) (11). Adequate intake of food and nutrients by growing children specially school going ones is very crucial as it is the time when the development of body is taking place at high spurt and affects their physical fitness and mental well-being. Malnutrition among children is a complex phenomenon and remains the world's most serious health problem and the single biggest contributor to child mortality. Nutrition education also plays a significant role in bringing a permanent and favourable solution to the problem of malnutrition among school children (8). To combat malnutrition among children integrated approach is required that will include assessment of nutritional status, imparting nutrition education, improvement in the



socioeconomic conditions, easy access to health facilities and prevention of the gender discrimination (13).

In spite of so many nutrition intervention programs in the country, there has not been any decline in the prevalence of under nutrition, anemia, folic acid deficiencies and other micronutrients deficiencies among children. This may be due to lack of nutrition education among mothers and children about sources of locally available nutrient rich food items and their functions in the body. It has also been observed that sometimes lack of knowledge about proper cooking and processing methods, lack of hygiene and sanitation in kitchen and home surroundings also leads to infections among children and thus inadequate utilization of food they are consuming. Thus it is very important to educate mothers and children about the importance of balanced diet, regular intake of fruits and vegetables, food hygiene and sanitation for improved nutritional status. Assessment of the nutritional status of rural school going children is of high significance in today's scenario wherein there is prevalence of malnutrition inspite of the best efforts put in by Government agencies. Keeping this in view the present study was done to assess the nutritional status i.e. food intake of rural school going children in Haryana District. Efforts were also made to investigate the reasons for inadequate food and nutrient intake. The findings of this study would help the policy makers, nutritionists, scientists and doctors to plan for the well being of our future generations.

MATERIALS AND METHODS

Frequency of food consumption and food intake of rural school going children

The present study was conducted on 100 rural school going boys and girls in the age group 10-12 years which were selected randomly from the two villages viz. *Khabra Kalan* and *Jandwala Baggar*, Fatehabd district. Questionnaire-cum- interview method was used to study the food consumption pattern. Food intake of children was assessed by food frequency method. Children were asked whether they were using different foods daily, alternately, weekly, rarely or not consumed. Dietary intake of these 100 children was recorded using 24 hours recall method for three consecutive days. Food groups included were cereals, pulses, fruits, green leafy vegetables, roots and tubers, other vegetables, milk & milk products, sugar and jaggery and fat and oils. Standard measures including spoons, bowls and cups were shown to children's mothers so as to



help them in telling the amount of food consumed by children. Food intake was recorded in terms of standard sized utensils and weight of *chapaties*, *paranthatas*, vegetables, fruits etc. was taken. Mean food intake was calculated by taking mean of three days intake and compared with Recommended Dietary Intake (7).

Food Adequacy Ratio (FAR) was calculated as

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

Adequacy of diet intake

The adequacy of food intake of the respondents was categorized into the following four groups:

| Adequacy of food intake (% RDI) | Score |
|------------------------------------|-------|
| 100% and above | I |
| 75-99.9% | II |
| 50-74.9% | III |
| Below 50% | IV |

Statistical analysis

The data was analyzed with the help of percentage, mean and standard deviation, one sample t-test and two sample t-test using SPSS software.

RESULTS AND DISCUSSIONS

Dietary Assessment of rural school going children

Frequency of food consumption of rural school going children

Data on food frequency of rural school going children of Fatehabad district have been depicted in Table 1. In India, cereals are the main part of our diet. Among cereals, wheat was consumed daily by all the respondents. Rice was consumed by 4, 19, 30, 27 and 13 per cent families on daily, alternately, weekly, fortnightly and rarely basis, respectively. *Bajra* was consumed weekly by majority of respondents (34%) and 9, 27, 15 and 9 per cent of respondents were consuming it on daily, alternately, fortnightly and rarely basis, respectively, that too only in winter season. Maize was consumed rarely by 16 per cent of respondents and that too only in winter season. The results of present study are in agreement with those of other workers (17) who also reported that cereals were included in daily diet of almost all of children (99.5%). Pulses are the major source of protein in Indian diets. In the families surveyed, green gram *dal* and bengal gram *dal* were found to be



consumed commonly. Majority of the respondents' families (53%) consumed green gram *dal* on weekly basis followed by 17, 14 and 10 per cent who consumed it on alternately, rarely and fortnightly basis, respectively. Our findings corroborated with that of (16) (12) who also reported that majority of children were consuming green gram *dal* (68%), black gram *dal* (43%), bengal gram *dal* (52%) and soyabean (47%) on weekly basis.

Table 1: Frequency of food consumption of rural school going children

(n=100)

| Food Stuffs | Daily | Alternately | Weekly | Fortnightly | Rarely | Not consumed |
|-------------------------------|------------|-------------|----------|-------------|----------|--------------|
| Cereals | | | | | | |
| Wheat | 100(100.0) | - | - | - | - | - |
| Rice | 4(4.0) | 19(19.0) | 30(30.0) | 27(27.0) | 13(13.0) | 7(7.0) |
| <i>Bajra</i> | 9(9.0) | 27(27.0) | 34(34.0) | 15(15.0) | 9(9.0) | 6(6.0) |
| Maize | - | - | - | - | 16(16.0) | 84(84.0) |
| Pulses | | | | | | |
| Bengal Gram | - | 12(12.0) | 48(48.0) | 19(19.0) | 14(14.0) | 7(7.0) |
| Black Gram | - | - | 15(15.0) | 49(49.0) | 13(13.0) | 23(23.0) |
| Green Gram | - | 17(17.0) | 53(53.0) | 10(10.0) | 14(14.0) | 6(6.0) |
| Red gram | - | 2(2.0) | 7(7.0) | 32(32.0) | 43(43.0) | 16(16.0) |
| Lentil | - | 5(5.0) | 16(16.0) | 17(17.0) | 38(38.0) | 24(24.0) |
| Soyabean | - | - | 18(18.0) | 23(23.0) | 41(41.0) | 18(18.0) |
| Green Leafy vegetables | | | | | | |
| Amaranthus | - | - | 18(18.0) | 28(28.0) | 29(29.0) | 25(25.0) |
| <i>Bathua</i> leaves | - | - | - | - | 39(39.0) | 61(61.0) |
| Coriander leaves | 8(8.0) | 15(15.0) | 47(47.0) | 10(10.0) | 13(13.0) | 7(7.0) |
| Fenugreek leaves | 4(4.0) | 12(12.0) | 27(27.0) | 31(31.0) | 21(21.0) | 5(5.0) |
| Bengal gram leaves | - | - | 11(11.0) | 15(15.0) | 35(35.0) | 39(39.0) |
| Mustard | - | - | 14(14.0) | 37(37.0) | 46(46.0) | 5(5.0) |
| Spinach | 2(2.0) | 11(11.0) | 33(33.0) | 34(34.0) | 17(17.0) | 3(3.0) |
| Roots and Tubers | | | | | | |
| Radish | - | 25(25.0) | 37(37.0) | 31(31.0) | 7(7.0) | - |
| Carrot | 8(8.0) | 29(29.0) | 34(34.0) | 21(21.0) | 8(8.0) | - |
| Potato | 26(26.0) | 47(47.0) | 18(18.0) | 9(9.0) | - | - |
| Onion | 83(83.0) | 8(8.0) | 4(4.0) | - | - | 5(5.0) |
| Ginger | 6(6.0) | 12(12.0) | 23(23.0) | 37(37.0) | 14(14.0) | 8(8.0) |
| Garlic | 41(41.0) | 26(26.0) | 19(19.0) | 9(9.0) | 2(2.0) | 3(3.0) |
| Turnip | - | - | 14(14.0) | 16(16.0) | 39(39.0) | 31(31.0) |
| Other Vegetables | | | | | | |
| Tomato | 49(49.0) | 15(15.0) | 21(21.0) | 13(13.0) | - | 2(2.0) |



| | | | | | | |
|-------------------------------|----------|----------|----------|----------|----------|----------|
| Cauliflower | - | - | 47(47.0) | 31(31.0) | 12(12.0) | 10(10.0) |
| Cabbage | - | - | 46(46.0) | 33(33.0) | 12(12.0) | 9(9.0) |
| Green chillies | 79(79.0) | 10(10.0) | 6(6.0) | 5(5.0) | - | - |
| Lady finger | - | - | 45(45.0) | 31(31.0) | 19(19.0) | 5(5.0) |
| Peas (Green) | - | 11(11.0) | 29(29.0) | 53(53.0) | 7(7.0) | - |
| <i>Tinda</i> | - | 41(41.0) | 20(20.0) | 31(31.0) | 8(8.0) | - |
| Fruits | | | | | | |
| Guava | - | 7(7.0) | 31(31.0) | 47(47.0) | 9(9.0) | 6(6.0) |
| Apple | - | - | 5(5.0) | 28(28.0) | 61(61.0) | 6(6.0) |
| Banana | - | - | 21(21.0) | 38(38.0) | 41(41.0) | - |
| <i>Ber</i> | 4(4.0) | 15(15.0) | 33(33.0) | 48(48.0) | - | - |
| Lemon | 7(7.0) | 17(17.0) | 41(41.0) | 30(30.0) | 5(5.0) | - |
| <i>Kinoo</i> | 5(5.0) | 8(8.0) | 39(39.0) | 41(41.0) | 7(7.0) | - |
| Papaya | - | 8(8.0) | 43(43.0) | 33(33.0) | 16(16.0) | - |
| Mango | - | 9(9.0) | 39(39.0) | 48(48.0) | 4(4.0) | - |
| Watermelon | - | 2(2.0) | 35(35.0) | 22(22.0) | 41(41.0) | - |
| Milk and Milk Products | | | | | | |
| Cow's milk | 14(14.0) | 17(17.0) | 15(15.0) | 19(19.0) | 29(29.0) | 6(6.0) |
| Buffalo's milk | 41(41.0) | 28(28.0) | 12(12.0) | 19(19.0) | - | - |
| Curd | 32(32.0) | 37(37.0) | 15(15.0) | 13(13.0) | 3(3.0) | - |
| Buttermilk | 63(63.0) | 28(28.0) | 8(8.0) | 2(2.0) | - | - |
| Butter | 11(11.0) | 14(14.0) | 17(17.0) | 27(27.0) | 31(31.0) | - |
| Sweets | - | - | 15(15.0) | 25(25.0) | 60(60.0) | - |
| Fats and Oils | | | | | | |
| <i>Desi ghee</i> | 68(68.0) | 11(11.0) | 4(4.0) | 9(9.0) | 2(2.0) | 7(7.0) |
| Hydrogenated fat | 19(19.0) | 17(17.0) | 14(14.0) | 5(5.0) | 11(11.0) | 34(34.0) |
| Refined oil | 15(15.0) | 16(16.0) | 31(31.0) | 10(10.0) | 8(8.0) | 20(20.0) |
| Mustard oil | 64(64.0) | 12(12.0) | 13(13.0) | 11(11.0) | - | - |
| Meat products | | | | | | |
| Eggs | - | - | - | 8(8.0) | 6(6.0) | 86(86.0) |
| Meat | - | - | - | - | 2(2.0) | 98(98.0) |

Data regarding consumption of green leafy vegetables revealed that amaranthus was consumed on rarely and fortnightly basis by 29 and 28 per cent respondents, respectively, while 25 per cent respondents did not consume it at all. Sixty one per cent respondents did not consume *bathua* leaves and only 39 per cent respondents' families consumed it rarely. Most of the respondents (31%) consumed fenugreek leaves on fortnightly basis followed by 27 and 21 per cent respondents who were consuming it on weekly and rarely basis, respectively. Mustard leaves were consumed rarely by 46 per cent respondents and 35 per cent of respondents consumed it on fortnightly basis. It was also reported that green leafy



vegetables such as fenugreek leaves, amaranthus, *bathua* leaves and mustard leaves was consumed on fortnightly and rarely basis by the majority of respondents(6). It was found that other vegetables, tomato and green chillies were consumed more frequently by them as compared to cauliflower, cabbage, lady finger, peas and *tinda*. The frequency of consumption of fruits was weekly and fortnightly by most of respondents and commonly consumed fruit were guava, *ber* and *kinoo*. Lemon and papaya were consumed on fortnightly basis. Consumption of fruits was seasonal and less frequent might be due to high cost and low availability of fruits in rural areas. Similar findings have been reported by (5) that majority of respondents were consuming fruits once or twice a week. Buffalo's milk was consumed daily 41 per cent of the respondents' families and butter milk was consumed daily by 63 per cent of them. Majority of respondents were consuming *desi* ghee (68%) and mustard oil (64%) on daily basis followed by hydrogenated fat and refined oil. Results of the present study are also in agreement with those of (10). Eggs were consumed on fortnightly basis by 8 per cent of respondents; 86 per cent of respondents did not consume egg at all while 6 per cent of them consumed egg rarely. Majority of the respondents' families (98%) were vegetarian so did not consume meat and other meat products. Only 2 per cent of respondents consumed meat and that too rarely.

Food consumption pattern

Mean daily food intake of rural school going children

The information regarding mean daily food intake of rural school going children (10-12 years) has been depicted in Table 2 and Fig. 1. The intake of different food groups has been given as under:

Cereals and pulses

Cereals are the part and parcel of Indian diet and provide energy and several other nutrients at a very low cost. These are the cheapest and widely available sources of nutrients, particularly in developing countries like India. Mean daily cereals' intake of the boys and girls were 189.13 and 151.91g, respectively which were 63.04 and 63.29 per cent of RDI. The consumption of cereals was significantly ($p \leq 0.01$) lower in girls as compared to boys. The results of present study corroborated with that of (19) who also reported low intake of cereals by children. Pulses are the major source of protein in Indian diets. In the present study it was found that the daily mean intake of pulses among boys was 41.42 g and among



girls were 41.29 g which were 69.03 and 68.82 per cent of RDI, respectively. The consumption of pulses was also lower in girls as compared to boys. Lower consumption of pulses may be due to lower agricultural production, higher price and low purchasing power of the respondents' families.

Green leafy vegetables, roots and tubers, other vegetables and fruits

The daily mean intake of green leafy vegetables of boys and girls was significantly ($p \leq 0.01$) lower than the RDI; i.e. only 37.96 and 29.41 per cent of the RDI. The consumption of green leafy vegetables was significantly ($p \leq 0.01$) lower in girls as compared to boys. Less consumption of green leafy vegetables might be due to the reason that children did not like the taste of green leafy vegetables and moreover, their mothers were also not aware of the importance of consumption of green leafy vegetable in their diet. It was also reported by other workers that intake of green leafy vegetables was low among school children (4). The mean daily intake of roots and tubers by boys (57.16 g) and girls (55.26 g) were significantly lower than RDI. The intake of roots and tubers by girls was lower than boys but difference was not significant. The daily mean intake of other vegetables of boys and girls were 36.23 and 42.47 per cent of RDI, respectively. The intake of other vegetables among respondents was significantly ($p \leq 0.01$) lower than RDI. It was found that daily mean intake of other vegetables by girls (84.94 g) was higher than boys (72.47 g) but the differences in intake were non-significant. The mean daily intake of fruits of school going boys and girls were 40.57 and 33.93 per cent of RDI, respectively. The fruit intake among respondents was significantly ($p \leq 0.01$) lower than RDI. The mean intake of fruits was found to be significantly ($p \leq 0.05$) higher in boys than the girls. The intake of fruits was low and this might be due to the fact that their families could not afford fruits due to high cost, unavailability of fruits in villages and lack of awareness on importance of consumption of fruits. Though fruits were not a part of daily diet but they were eaten mostly when available locally and at the time of glut when cost was very low.

Table 2: Gender wise mean daily intake of food by rural school going children

(n=100)

| Food Stuffs | Mean daily food intake (g) | | | | | | t-value Boys vs. girls |
|-------------|----------------------------|----------------|----------|------------|--------------|----------|------------------------------|
| | RDI (g) | Boys (n=57) | t-value | RDI (g) | Girls (n=43) | t-value | |
| Cereals | 300 | 189.13±41.11 | -20.36** | 240 | 151.91±36.91 | -19.80** | 4.48** |



| | | (63.04) | | | (63.29) | | |
|---------------------------------|-----|--------------------------|----------|-----|-------------------------|----------|---------------------|
| Pulses | 60 | 41.42±7.16 (69.03) | -19.49** | 60 | 41.29±9.51 (68.82) | -19.54** | 0.12 ^{NS} |
| Green leafy vegetables | 100 | 37.96±14.27 (37.96) | -32.83** | 100 | 29.43±11.64 (29.43) | -39.77** | 3.29** |
| Roots & tubers | 100 | 57.16±16.84 (57.16) | -19.21** | 100 | 55.26±21.30 (55.26) | -13.77** | 0.48 ^{NS} |
| Other vegetables | 200 | 72.47±27.36 (36.23) | -30.56** | 200 | 84.94±37.47 (42.47) | -23.17** | -1.92 ^{NS} |
| Milk & Milk products | 500 | 273.79±106.06 (54.76) | -16.10** | 500 | 248.83±98.85 (49.77) | -16.66** | 1.21 ^{NS} |
| Fats & Oils | 35 | 17.84±8.68 (50.97) | -14.92** | 35 | 12.89±4.82 (36.83) | -30.09 | 3.62** |
| Sugar & jaggery | 30 | 18.37±5.88 (61.23) | -14.91** | 30 | 15.20±6.40 (50.67) | -15.15** | 2.54** |
| Fruits | 100 | 40.57±18.46 (40.57) | -24.31** | 100 | 33.93±14.46 (33.93) | -29.96** | 2.01* |

Values are mean ±SD

*Significant at 5% level

Figures in parentheses indicate percent RDI

**Significant at 1% level

RDI- Recommended Dietary Intake (ICMR 2010)

^{NS} = Non-significant

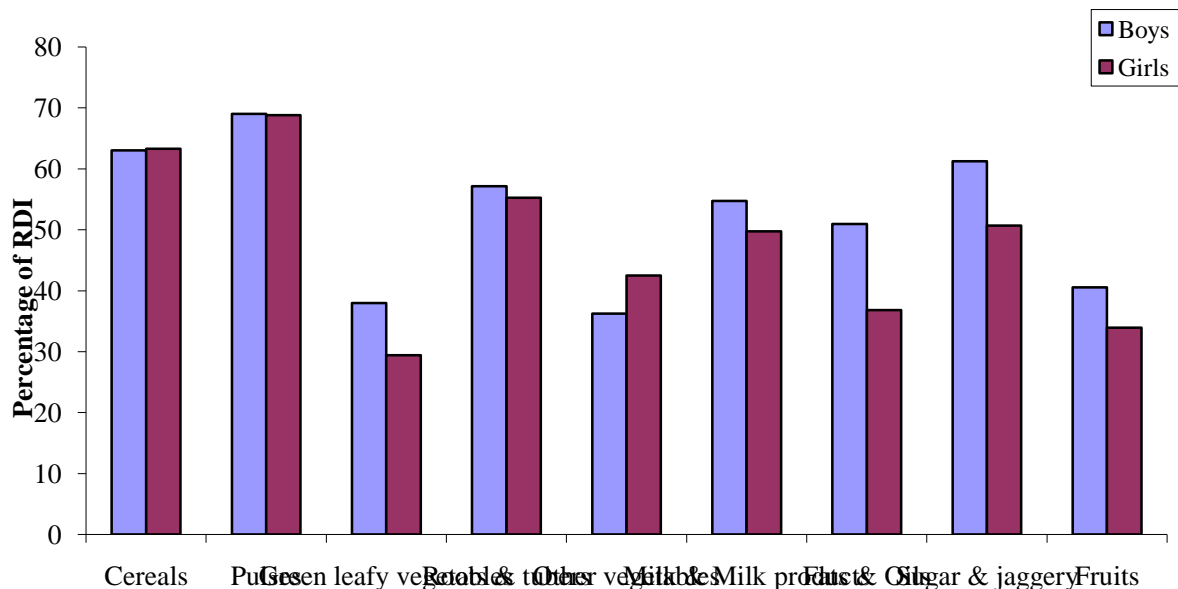


Fig. 1 : Gender wise mean daily intake of food by rural school going children

Milk and milk products, fats and oils and sugar and jaggery

The daily mean intake of milk and milk products of boys and girls were 273.79 and 248.83 g, respectively which was 54.76 and 49.77 per cent of RDI, respectively. The intake of milk and



milk products by respondents were significantly ($p \leq 0.01$) lower than RDI. It was found that the daily mean intake of milk and milk products by girls was lower than that of boys but the difference in intake were non-significant. The results of the present study are in agreement with those of other investigators (15) (4) who also reported less consumption of milk and milk products by rural school going children. The lower consumption of milk and milk products might be due to lower family income, higher cost of milk and milk products, low availability and may be due to the reason that milk was sold by their families in the nearby dairies and a small amount was kept for their own consumption. Daily mean intake of fats and oils of the boys and girls were 17.84 and 12.89 g, respectively which was 50.97 and 36.83 per cent of RDI, respectively. The intake of fats and oils among respondents was significantly ($p \leq 0.01$) lower than RDI. The consumption of fats and oils were significantly ($p \leq 0.01$) higher in boys than girls. The daily mean intake of sugar and jaggery of boys and girls were 18.37 and 15.2g, respectively which was 61.23 and 50.67 per cent of the RDI, respectively. The results indicated significantly ($p \leq 0.01$) higher consumption of sugar and jaggery among boys than girls. (1) also reported that intake of different food items were less by girls as compared to boys.

Adequacy of food intake by rural school going children

The results regarding adequacy of food intake have been shown in Table 3. It was observed that as many as 42 per cent of the rural school going children consumed 100 per cent and above the RDI of the cereals. The remaining 27 and 31 per cent of them took cereals 75 to 99.9 and 50 to 74.9 per cent of RDI, respectively. Data related to adequacy of pulses determined that 36 per cent of rural school going children (36%) consumed pulses 50 to 74.9 per cent of RDI. Thirty four and 25 per cent of children consumed 75 to 99.9 per cent and less than 50 per cent of RDI of pulses, respectively. Only 5 per cent of respondents consumed 100 per cent and above the RDI of pulses.

Table 3: Adequacy of food intake by rural school going children

(n=100)

| Adequacy of food intake | Cereals | Pulses | Milk & milk products | Roots & tubers | Green leafy veg. | Other veg. | Fats and oils | Sugar and jaggery | Fruits |
|-------------------------|---------|--------|----------------------|----------------|------------------|------------|---------------|-------------------|--------|
| I | 42 | 5 | 14 | 12 | 3 | 11 | 2 | 28 | 8 |
| II | 27 | 34 | 17 | 11 | 5 | 24 | 15 | 27 | 12 |
| III | 31 | 36 | 29 | 39 | 39 | 28 | 26 | 30 | 29 |
| IV | - | 25 | 40 | 38 | 53 | 37 | 57 | 15 | 51 |



- I 100 per cent and above the RDI
- II 75 to 99.9 per cent of RDI
- III 50 to 74.9 per cent of RDI
- IV Less than 50 per cent of RDI

The intake of milk and milk products was less than 50 per cent of RDI by 40 per cent of respondents. Twenty nine, 17 and 14 per cent of the respondents were taking milk and milk products 50 to 74.9 per cent of RDI, 75 to 99.9 per cent of RDI and 100 per cent and above the RDI, respectively. As far as intake of roots and tubers was concerned, thirty eight per cent of majority of the respondents had daily inadequate intake i.e., less than 50 per cent of RDI. Twenty nine, 12 per cent and 11 per cent of the respondents had 50 to 74.9 of RDI, 100 per cent and above the RDI and 75 to 99.9 per cent of RDI, respectively, of roots and tubers in their daily diet.

Fifty three per cent of the children consumed less than 50% of RDI and only 3 per cent of children consumed 100 per cent and above the RDI of green leafy vegetables in their daily diet. Thirty nine per cent and 5 per cent were consuming roots and tubers 50 to 74.9 per cent and 75 to 99.9 per cent of the RDI, respectively. Thirty seven per cent of total respondents consumed other vegetables less than 50 per cent of RDI, while 28, 24 and 11 per cent of respondents took other vegetables 50 to 74.9 per cent, 75 to 99.9 per cent and 100 per cent and above the RDI, respectively. Only 2 per cent of respondents consumed fats and oils 100 per cent and above the RDI in their diets. Remaining 15, 26 and 57 per cent children consumed fats and oils 75 to 99.9 per cent, 50 to 74.9 per cent and less than 50 per cent of RDI, respectively. Only 28 per cent of the respondents consumed adequate amount of sugar and jaggery while 30, 27 and 15 per cent of the children took sugar and jaggery 50 to 74.9 per cent, 75 to 99.9 per cent and less than 50 per cent of RDI, respectively. Most of the respondents i.e., 51 and 29 per cent consumed fruits less than 50 per cent of RDI and 50 to 74.9 per cent of RDI, respectively. Twelve and 8 per cent of the respondents consumed fruits 75 to 99.9 per cent of RDI and 100 per cent and above the RDI, respectively.

CONCLUSIONS

The data on food frequency intake of children indicated that wheat was consumed daily by all of the respondents as it was main cereal in the study area. *Bajra* was consumed by majority of respondents in winter season depending on availability. Main pulses consumed



were bengal gram, green gram and black gram while red gram, lentil and soyabean were consumed rarely by most of respondents. Among green leafy vegetables, amaranthus, *bathua* leaves, bengal gram leaves and mustard leaves were consumed on rarely basis. Most of the respondents were consuming coriander leaves and spinach on weekly and fortnightly basis, respectively. The daily consumption of green leafy vegetables was less frequent due to disliking of taste by children and lack of awareness on importance of these food items. Onion (83%), garlic (41%), tomato (49%) and green chilli (79%) were consumed by majority of the respondents on daily basis while raddish (37%) and carrot (34%) were consumed on weekly basis. The frequency of consumption of fruits was weekly and fortnightly by most of respondents and commonly consumed fruits were guava, *ber* and *kinoo*. Lemon and papaya were consumed on fortnightly basis. Consumption of fruits was seasonal and less frequent and this might be due to high cost and low availibility of fruits in rural areas. Milk and butter milk were found to be the essential part of daily diet of majority of school going children. Majority of respondents were consuming *desi* ghee (68%) and mustard oil (64%) on daily basis followed by hydrogenated fat and refined oil. The mean daily intake of cereals, pulses, fats and oils, milk and milk products, green leafy vegetables, other vegetables, roots and tubers, sugar and jaggery and fruits by rural school going children was found to be lower than RDI. The consumption of green leafy vegetables, fats and oils, sugar and jaggery and fruits were significantly lower among girls as compared to boys which also indicated gender biasness. The food intake was less among children because they were missing their breakfast and were dependent on the mid-day meal for their lunch. It was also noted that some of them were not even consuming their mid-day meal properly because of disliking of food cooked in school.

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