

## Gender comparison of nutritional status of school going children consuming mid-day meal

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■ **ABSTRACT** : The present study was undertaken in Hisar district of Haryana state. Govt. Primary School of Hisar city and Govt. Primary School of Mangali village of Hisar I block were selected as per the demand of study. A sample of 100 rural and 100 urban respondents of 5-10 year age were taken, thus, to make a total sample of 200 school going children. Anthropometric measurements and dietary intake (24-h recall method) were used to assess the nutritional status of rural and urban school going children who were consuming mid-day meal. Their intake of pulses and green leafy vegetables was significantly lower than RDI. Differences were found in cereals ( $t=3.17^*$ ), roots and tuber ( $t= 3.51^*$ ), other vegetables ( $t= 10.64^*$ ), green leafy vegetables ( $t=5.49^*$ ), milk and milk products ( $t=9.65^*$ ) and sugar and jaggery ( $t=6.03^*$ ) intake in the daily diets of rural and urban respondents. Out of 200 school going children, 32.5 per cent were underweight, 27.5 per cent stunted while 17 per cent children were wasted; out of them 5.5, 8 and 3.5 per cent were severely underweight, stunted and wasted, respectively. Magnitude of wasting (26.5%) and underweight (42.1%) was higher in girls in comparison to boys (10.2 % wasted and 25.6 % underweight).

■ **KEY WORDS** : Food intake, Gender- difference, Anthropometric measurements

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India has the highest prevalence of malnutrition as 42 per cent children are underweight, 31 per cent children under five are stunted; 74 per cent children are anaemic. The situation of child malnutrition is also grave in Haryana state as according to National Family Health Survey, 2005-06 (Anonymous, 2007) the prevalence of wasted, stunted and underweight children in this state was found to be 19,38 and 46 per cent, respectively.

Malnutrition not only affects physical appearance and energy levels, but also directly affects many aspects of the children's mental functions, growth and development which have adverse effects on children's ability to learn, poor cognitive development, lower Intelligence quotient (IQ), behavioural abnormalities, reproduction, and physical work capacity. Undernourishment also impairs immune function leaving them more susceptible to infections; children with infections are more susceptible to malnutrition and increase the risk of infection and infectious disease.

In Haryana state, National Programme of Nutritional

Support to Primary Education, commonly known as mid-day meal (Modified Scheme) was launched as a Centrally Sponsored Scheme on 15th August, 2005. Under the scheme, school children are being provided cooked food viz., *mitha rice*, vegetable *pulav*, *dalia*, *paushtic khichri* and *bakli* during different days of a week. Earlier, mid-day meal used to provide 300 kcal and 8-12 g protein but from the year 2008-09, Govt. of India has decided to provide 450 kcal and 12 g protein per child per day. The Central assistance has been increased from Re 1 to Rs. 1.50 and state share from Rs. 0.43 to Rs. 0.57 i.e. total Rs 2.07 per child per school day from January 2007. The main objective of the scheme is to increase enrollment, retention and attendance of children in primary schools and to improve the nutritional level of such children through supplementary nutrition. It is an incontrovertible fact that mid-day meal programme exerts a positive influence on the enrolment and attendance in schools. However, still there is a question mark: Does the mid-day meal improve the nutritional status of children too? Keeping these facts in consideration,

the present study has been structured to compare the effect of mid-day meal programme on nutritional status of rural and urban school going children (5-10 yrs.).

## ■ RESEARCH METHODS

The present study was undertaken in Hisar district of Haryana state. Govt. Primary School of Hisar city and Govt. Primary School of Mangali village of Hisar I block were selected purposively. A sample of 100 rural and 100 urban respondents of 5-10 year age were taken randomly, thus to make a total sample of 200 school going children.

### Dietary intake (24-h recall method) :

The 24-h recall method was used to assess the dietary intake of the respondents. The mean daily diet intake was calculated taking mean of two days intake. Average daily diet intake was compared with the recommended dietary intake of NIN (1998).

### Anthropometric measurement :

Prior to the anthropometric measurements, all procedures were explained to the child and the mother of child or care taker of the child. Weight, height, waist circumferences, BMI and MUAC were measured in duplicate using standards procedures. Age was recorded from the school attendance register.

### Statistical analysis :

Data coding, entry and validation was done using appropriate software mainly SPSS/PC and Epi info software (version 2002); 't'-test was used for analyzing the data. Frequency and percentages were also calculated.

## ■ RESEARCH FINDINGS AND DISCUSSION

The results of the present study as well as relevant discussions have been presented under following sub heads:

### Food intake of school going children :

The results revealed that overall children's intake of pulses and green leafy vegetables was significantly lower than RDI. Significant differences were found in cereals ( $t=3.17^*$ ), roots and tuber ( $t= 3.51^*$ ), other vegetables ( $t= 10.64^*$ ), green leafy vegetables ( $t=5.49^*$ ), milk and milk products ( $t=9.65^*$ ) and sugar and jaggery ( $t=6.03^*$ ) intake in the daily diets of rural and urban respondents (Table 1).

Boys were taking slightly higher amount of cereals than the girls but no significant ( $t=0.77$ ) differences were observed between the two. Mean intake of pulses was approximately the same among boys (49.8% of RDI) and girls (50.6% of RDI). It was significantly ( $P<0.05$ ) lower than the RDI in both the sexes and it needs attention of the policy makers. Lower consumption of pulses may be due to lower agricultural production, higher price and low purchasing power of poor households. According to Manu and Khertarpaul (2006) and Dudi and Punia (2008), lower intake of pulses was found in pre-school children of Haryana.

The consumption of root and tubers among boys and girls was 53.2g and 58.5g/day, respectively which was 53 and 58 per cent of RDI. No significant ( $t=1.31$ ) difference was observed for the intake of roots and tubers among boys and girls. No significant ( $t=0.73$ ) differences were observed in the intake of other vegetables among boys and girls; however, boys were consuming comparatively more amount (59.5g) of other vegetables than girls (55.4g) daily. Intake of green leafy vegetables by boys was 52.2g/day (52.2% of RDI) (Table 2). While girls were consuming 42g/day green leafy vegetables and it was significantly ( $t=2.25^*$ ) lower than the RDI.

Consumption of roots and tubers and other vegetables was half of the recommended dietary intake among the children. The findings of the study were similar to those of previous workers (Manu and Khertarpaul 2006; Dudi and Punia, 2008). They observed less consumption of vegetables by pre-schoolers of Haryana. In contrast to finding of present study it was found that consumption of these vegetables was

**Table 1: Mean daily food intake of school going children (5-10Y)**

Foodstuffs (g)	Recommended dietary intake (RDI)	Mean food intake (n=200)	't' value	% (RDI)
Cereals	270	279.5±51.74	-0.18	103.5
Pulses	60	30.1±11.65	2.56*	50.2
Roots and tubers	100	55.4±28.07	1.57	55.4
Others vegetables	100	57.8±38.76	1.09	57.8
Green leafy vegetables	100	46.3±25.78	2.08*	46.3
Milk and milk products	500	212.1±154.22	1.86	42.4
Fats and oils	25	15.4±7.97	1.21	61.6
Sugar and jaggery	30	41.2±16.03	-0.7	137.3
Fruits	100	117.8±152.22 <sup>a</sup>	-0.12	117.8

Values are mean ±SD, \* Indicate significance of value at  $P=0.05$ , 't' values showing comparison of mean daily food intake and RDI, a= Daily intake of 26 children who were consuming fruits

more than RDI in school children of Hisar district (Subhadra, 2000). Hioui *et al.* (2008) studied that the contribution of green leafy vegetables in the diet of school children was lower as found in the present investigation (46.3 % of RDI); it may be because of the fact that children did not like the taste of green leafy vegetables, or awareness about the importance of green leafy vegetables and their less availability during summer season.

Mean intake of milk and milk product and fats and oils was higher among boys than that of the girls but the difference was not ( $t=1.29$ ) significant. The lower consumption may be due to lower family income and higher cost of milk and milk products. Results of the current study did not parallel previous finding of Haryana state. Subhadra (2000) reported higher

intake (119.8% of RDI) of milk and milk products by the school children of Hisar city. Similarly, higher milk intake (110.3% of RDI) of pre-schoolers of Haryana was observed by Dudi and Punia (2008). These variations might be because of varying socio-economic status of the subjects. Respondents of the present study consumed lower amount of fats and oils in their daily diets. Present finding corroborates to that of other finding reported earlier (Shannaz *et al.*, 1996; Subhadra, 2000).

Boys and girls were taking almost similar amount (40.5 and 42.3g/day) of sugar and jaggery. Average consumption of sugar and jaggery was higher than RDI (137% of RDI). A total no. of 17 boys consumed fruits (146g/day) while only 9 girls took fruits (93.6g/day) in their daily diet. Most of the children could not afford to take fruit in their daily diet because

**Table 2: Sexwise comparison of daily mean food intake of school going children (5-10Y)**

Food stuffs (g)	Recommended dietary intake (RDI)	Actual food intake				<sup>t</sup> <sup>a</sup> value	<sup>t</sup> <sup>b</sup> value (P<0.05)
		Boys (n=117)	<sup>t</sup> <sup>a</sup> value	Girls (n=83)	<sup>t</sup> <sup>a</sup> value		
Cereals	270	281.9±50.53 (104.4)	-0.23	276.2±53.51 (102.3)	-0.11	0.77	
Pulses	60	29.9±11.53 (49.8)	2.61*	30.4±11.88 (50.6)	2.49*	0.29	
Roots and tubers	100	53.2±25.20 (53.2)	1.86	58.5±31.59 (58.5)	1.31	1.31	
Other vegetables	100	59.5±38.67 (59.5)	1.05	55.4±39.01 (55.4)	1.14	0.73	
Green leafy vegetables	100	52.2±24.76 (52.2)	1.93	42.0±25.77 (42.0)	2.25*	2.82*	
Milk and milk products	500	228.9±159.1 (45.78)	1.70	200.2±151.4 (40.0)	1.98	1.29	
Fats and oils	25	16.1±9.19 (64.4)	0.97	14.3±5.71 (57.2)	1.87	1.57	
Sugar and jaggery	30	40.5±15.34 (135)	-0.68	42.3±16.99 (141)	-0.72	0.76	
Fruits	100	146.0±221.42 <sup>c</sup> (146)	-0.21	93.6±41.33 <sup>d</sup> (93.6)	0.15	0.87	

Values are mean ±SD, \* Indicate significance of value at P=0.05, Values in parentheses indicate percentage <sup>t</sup><sup>a</sup> values showing comparison of mean food intake and RDI <sup>t</sup><sup>b</sup> value showing comparison among boys and girls, c= Daily intake of 17 boys who were consuming fruits, d= Daily intake of 9 girls who were consuming fruit

**Table 3: Sexwise comparison of anthropometric measurements of school going children (5-10Y)**

Anthropometric measurements	Sex		<sup>t</sup> value (P<0.05)
	Boys	Girls	
Height (cm)	114.9±9.47	115.3±9.31	0.21
Weight (kg)	18.5±3.21	18.2±3.35	0.69
Mid-upper arm circumferences (cm)	14.8±1.46	14.5±1.48	1.26
Waist circumference (cm)	52.6±3.77	52.0±4.44	0.99
Body mass index (BMI)	13.9±1.29	13.6±1.21	2.27

Values are mean ±SD, \* Indicate significance of value at P=0.05

**Table 4: Sexwise prevalence of underweight, stunting and wasting among school going children (5-10Y)**

	Boys (n=117)	Girls (n=83)	Total (n=200)
WAZ<-2SD	25 (21.4)	29 (34.9)	54 (27)
WAZ<-3SD	5 (4.3)	6 (7.2)	11 (5.5)
HAZ<-2SD	24 (20.5)	15 (18.1)	39 (19.5)
HAZ<-3SD	9 (7.7)	7 (8.4)	16 (8)
WHZ<-2SD	10 (8.5)	17 (20.5)	27 (13.5)
WHZ<-3SD	2 (1.7)	5 (6.0)	7 (3.5)

Values in parentheses indicate percentage

of low purchasing power of their households, less fruit production in their areas, higher prices of fruits, less awareness, lower trend of kitchen gardening and disliking towards fruits of some children and their preference toward snacks items *i.e.* biscuits, chips and *kurkure* etc. These findings are consistent with those reported by Handa *et al.* (2008). They reported that only 6 per cent children consumed fruits daily.

#### Anthropometric measurement of school going children :

There were no significant differences in the height, weight, MUAC, waist circumference and BMI values of boys and girls (Table 4). Out of 200 school going children, 32.5 per cent were underweight, 27.5 per cent stunted while 17 per cent children were wasted; out of them 5.5, 8 and 3.5 per cent were severely underweight, stunted and wasted, respectively. Magnitude of wasting (26.5%) and underweight (42.1%) was higher in girls in comparison to boys (10.2 % wasted and 25.6 % underweight).

The results of present study were almost similar to results reported by Singh and Sengupta (2007). Kumari (2005) also reported similar range of height, weight and MUAC in school children of Patna. Handa *et al.* (2008) studied that girls were slightly taller than boys and their findings were similar to that of the present investigation.

#### Conclusion :

Consumption of pulses and green leafy vegetables was found to be significantly lower than RDI of total respondents. Intake of root vegetables, other vegetables, milk and milk products and oil intake by boys and girls was lower than the RDI but not significantly. Out of 200 school going children, 32.5 per cent were underweight, 27.5 per cent stunted while 17 per cent children were wasted. It can be concluded that the mid-day meal reduces the severe form of malnutrition but the mild form of malnutrition among school going children still exists.

These finding can be brought to the notice of Ministry of Education so as to improve the implementation of mid-day meal. There is a further scope to evaluate the nutritional quality of mid-day meal recipes in laboratory and their contribution in the daily diet. Other nutritious recipes incorporating local rich

sources of protein, iron and vitamin A can be developed and included in the mid-day meal programme so as to ameliorate these nutrient deficiencies among school going children.

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