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Research Article

ANTHROPOMETRIC CHARACTERISTICS AND NUTRITIONAL STATUS OF PRIMARY SCHOOL CHILDREN IN FATEHABAD CITY IN HARYANA

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ABSTRACT
Under nutrition is a major public health problem among school going children. Adequate nutrition is critical for optimal growth, health and development of children. The objective of the present study was to assess the prevalence of underweight, stunting and wasting among school children of Government primary schools of Fatehabad city of Haryana. A total of 350 students were included in the study from primary schools in Fatehabad city of Haryana and nutritional status of the children was assessed by anthropometric measurements. Students aged 6 -12 years were included in the study. Weight and height of the children were measured and height-for-age (stunting), weight-for-height (wasting) and weight-for-age (underweight) were calculated. Out of 350 school children, 262 children (74.75 %) were found be malnourished. Grade I malnutrition was most common (44.47 %) followed by grade II (28.28 %) and grade III (2 %) malnutrition. Wasting was found in 61.43 % children (65.16 % girls and 58.46 % boys) out of which 0.58 % children showed severe degree of wasting. Stunting was found in 36.86 % children (37.44% girls and 36.13 % boys). This study provided evidence that school children in Fatehabad city were under acute and chronic nutritional stress. Promoting appropriate dietary habits through effective nutrition education is an effective preventive method. Main focus should be on qualitative and quantitative improvements on the diets (increased intake of energy, protein, micronutrients) with increased awareness on importance of preventing under nutrition.

Keywords: *Undernutrition, Underweight, Stunting, Wasting, Primary School Children*

INTRODUCTION
Under-nutrition continues to be a primary cause of ill health among children in developing countries. According to the most recent estimates (1996-2005), in India, approximately 57 million children are underweight (UNICEF, 1997). Over 1/5th of population in India comprises of children aged 5-14 years. The school age period is nutritionally significant because this is the prime time to build up body stores of nutrients in the preparation for rapid growth of adolescence (Awasthi, 2000). Research indicates that nutritional deficiencies and poor health in school age children are among the causes of low school enrolment, high absenteeism, early dropout and poor classroom performance (WHO, 1997). Anthropometry is the most useful tool for assessing the nutritional status of children. There are many anthropometric indicators that describe the nutritional status of children such as, height-for-age (stunting), weight-for-height (wasting) and weight-for-age (underweight). The height-for-age index is an indicator chronic illness and weight-for-height index is an indicator of acute illness. Weight-for-age is a composite index and it takes into account both acute and chronic malnutrition (Bose, 2007).
According to National Family Health Survey (2005-2006), in India the prevalence of wasted, stunted and underweight children was 19.8%, 48% and 42.5% respectively and in Haryana the prevalence of wasted, stunted and underweight children was 19.1 %, 45.7 % and 39.5 % respectively (NFHS-3, 2007). Most of the studies done earlier have assessed the nutritional status of infants and pre-school children only. Very little information is available on the nutritional status of school going children. So the present study was conducted to assess the nutritional status of school going children of Fatehabad city of Haryana.

MATERIALS AND METHODS

Study Area and Subjects: The present cross-sectional study was conducted on school going children in the age group 6-12 years from January 2014 to March 2014 in Fatehabad city of Haryana. Total 350 school going children i.e. 155 boys and 195 girls were selected for the study, from the Govt. Primary Schools of Fatehabad city, Haryana.

Subjective Parameters: Age was recorded from birthday by calendar to the nearest of year (<6 months and >6 months). Standing height was recorded without shoes and with light cloths on a wall mounted measuring tape to the nearest of centimeters (<5 mm and >5 mm). Weight was recorded without shoes and with light cloths on a Krups weighing machine with a least count of 500 grams.

Anthropometric Assessment for Undernutrition: After collection, the whole data was compiled; analyzed and appropriate statistical tests were applied. The nutritional status was assessed by the quantitative classification given by Indian Academy of Pediatrics (Ghai, 2005) and wasting and stunting were assessed according to Water low classification (Park, 2013).

RESULTS AND DISCUSSION

Results

Out of total 350 students (155 boys & 195 girls), Malnutrition was noted in 74.75% children. Grade I malnutrition was most common (44.47%) followed by grade II (28.28 %) and grade III (2.0%) malnutrition.

Table 1: Weight for age as per IAP classification

	Boys		Girls		Both Sex	
Grades	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Normal	41	26.45%	48	24.62%	89	25.25%
I	70	45.16%	85	43.59%	155	44.47%
II	40	25.81%	59	30.26%	99	28.28%
III	4	2.58%	3	1.53%	7	2.0%
IV	0	0%	0	0%	0	0%
Total	155	100%	195	100%	350	100%

Table 2 shows that 38.57 % children were found to be normal as per their weight for height, 61.43 % children were wasted and 0.58 % children showed severe degree of wasting. The children of 10 years and 11 years were found to be at the highest (75 %) risk of wasting. Boys (65.16%) were affected more than the girls (58.46%) (Table 3).

Table 2: Nutritional status of children

		Nutritional status of children									
				Wasted						Total	
Age	Total	Normal	Percent	Mild	Percent	Moderate	Percent	Severe	Percent	Number	Percent
6 yrs.	64	33	51.56%	29	45.32%	2	3.12%	0	0%	31	48.44%
7 yrs.	38	17	44.74%	18	47.37%	3	7.89%	0	0%	21	55.26%
8 yrs.	43	19	44.19%	19	44.19%	5	11.62%	0	0%	24	55.81%
9 yrs.	54	17	31.48%	21	38.89%	16	29.63%	0	0%	37	68.52%
10 yrs.	56	14	25%	28	50%	13	23.21%	1	1.79%	42	75%
11 yrs.	52	13	25%	27	51.92%	12	23.08%	0	0%	39	75%
12 yrs.	42	22	51.16%	16	37.21%	4	9.30%	1	2.33%	21	48.84%
Total	350	135	38.57%	158	45.14%	55	15.71%	2	0.58%	215	61.43%

Table 3: Nutritional status of children (wasting) as per sex

	Nutritional status of children										
				Wasted						Total	
Sex	**Total**	**Normal**	**Percent**	**Mild**	**Percent**	**Moderate**	**Percent**	**Severe**	**Percent**	**Number**	**Percent**
Boys	155	54	34.84%	73	47.10%	28	18.06%	0	0%	101	65.16%
Girls	195	81	41.54%	85	43.59%	27	13.85%	2	1.02%	114	58.46%
Total	350	135	38.57%	158	45.14%	55	15.71%	2	0.58%	215	63.48%

Table 4: Nutritional status of children (stunting) as per age

	Nutritional status of children										
				Stunted						Total	
Age	Total	Normal	Percent	Mild	Percent	Moderate	Percent	Severe	Percent	Number	Percent
6 yrs.	64	37	57.82%	26	40.62%	1	1.56%	0	0%	27	42.18%
7 yrs.	38	34	89.47%	4	10.53%	0	0%	0	0%	4	10.53%
8 yrs.	43	31	72.09%	12	27.96%	0	0%	0	0%	12	27.91%
9 yrs.	54	37	68.52%	16	29.63%	1	1.85%	0	0%	17	31.48%
10 yrs.	56	30	53.57%	25	44.64%	1	1.79%	0	0%	26	46.31%
11 yrs.	52	30	57.69%	22	42.31%	0	0%	0	0%	22	42.31%
12 yrs.	42	22	51.16%	18	41.86%	3	6.89%	0	0%	21	48.84%
Total	350	221	63.14%	123	35.14%	6	1.72%	0	0%	129	36.86%

Table 4 shows 63.14 % children were found to be normal as per their height for age, 36.86% children were stunted with 35.14% children showing mild degree and 1.72% children moderate degree of stunting. The children above 10 years were the most affected. Girls (37.44%) were affected more than the boys (36.13%) (Table 5).

Table 5: Nutritional status of children (Stunting) as per sex

	Nutritional status of children										
				Stunted						Total	
Sex	**Total**	**Normal**	**Percent**	**Mild**	**Percent**	**Moderate**	**Percent**	**Severe**	**Percent**	**Number**	**Percent**
Boys	155	99	63.87%	51	32.90%	5	3.23%	0	0%	56	36.13%
Girls	195	122	62.58%	72	36.92%	1	0.52%	0	0%	73	37.44%
Total	350	221	63.14%	123	35.14%	6	1.72%	0	0.00%	129	36.86%

Discussion

In the present study out of total 350 children 25.25% (89/350) children had normal nutritional status and 74.75% (261/350) children suffered from different grades of malnutrition. Grade I malnutrition status, grade II malnutrition status and grade III malnutrition status was observed in 44.47% (155/350), 28.28% (99/350) and 2% (7/350) children respectively. Grade IV malnutrition status was not seen in any child. Among the boys normal nutritional status, grade I grade II malnutrition status and grade III malnutrition status was reported in 26.45% (41/155), 45.16% (70/155), 25.81% (40/155) and 2.58% (4/155) respectively. Among the girls normal nutritional status, grade I malnutrition status, grade II malnutrition status and grade III malnutrition status was reported in 24.62%(48/195), 43.59%(85/195), 30.26%(59/195) and 1.53% (3/195) respectively. This may be due to improper dietary habits and unawareness of balanced diet in the children and their parents. A part from these boys suffered more from

malnutrition than girls in early age group. This may be due to high frequency of early age group paediatric diseases in boys than girls. Bakeries items also predispose to malnutrition as maximum of them provide only energy and are deficient in both macro and micronutrients, and boys are provided with these items preferably.

In the study conducted by Izharul *et al.,* (2011) in school children of Azad Nagar and Bangalore the prevalence of malnutrition was observed as 52.00%. In the same study normal nutritional status, grade I malnutrition status, grade II malnutrition grade III malnutrition status and grade IV malnutrition status was observed in 48%,21.60%, 26.60%, 3.80% and 0% children respectively. The prevalence of malnutrition among boys was more (53.85%) as compared to girls (49.25%).

Among the boys normal nutritional status, grade I malnutrition status, grade II malnutrition and grade III malnutrition status was observed in 46.15%, 18.39%, 30.78% and 4.68% respectively. Among the girls normal nutritional status, grade I malnutrition status, grade II malnutrition and grade III malnutrition status was observed in 50.75%, 26.37%, 20.40% and 2.49% respectively (Izharul *et al.,* 2011).

A study conducted by Sundaram et al in school children of Madras city reported prevalence of grade I malnutrition as 30.5%, of grade II malnutrition as 42.5%, and of grade III malnutrition as 21.5% (Sundaram *et al.,* 1978). Sharma *et al.,* (1984) reported malnutrition in 52.98% children with grade I malnutrition being the most common (59.96%) while Prakash *et al.,* (2002) observed 51.9% children having normal nutritional status followed by grade I (21.9%), grade II (18.57%) and grade III (6.60%) malnutrition Jhansi city (Sharma *et al.,* 1982; Prakash *et al.,* 2002).

In the present study, 38.57 % children were found to be normal as per their weight for height, 61.43 % children were wasted and 0.58 % children showed severe degree of wasting. These findings are higher than those reported by Panda *et al.,* (2000) (52.2%). (Panda *et al.,* 2000) Present study reported 71.08 % girls and 55.45 % boys as wasted with 0.50 % girls and 0.50 % boys showing severe degree of wasting ($p>0.05$) which is higher than that reported by Khalil *et al.,* (2004) who reported the prevalence of wasting in boys and girls 32.76% and 28.12% respectively (Khalil *et al.,* 2004).

Present study showed 63.14% children to be normal as per their height for age, 36.86 % children were stunted with 35.14 % children showing mild degree and 1.72 % children moderate degree of stunting. Panda et al in school children of Ludhiana city reported mild stunting in only 20.7% children and moderate and severe degree of stunting in 5.5% and 5.6% children respectively (Panda *et al.,* 2006). Present study reported stunting in 54.41 % girls and 42.49 % boys ($p>0.05$) which is lower than that reported by Khalil *et al.,* (2004) who observed stunting in 79.73% boys and 81.80% girls (Khalil *et al.,* 2004). In the study conducted by Izharul *et al.,* (2011) in school children of Azad Nagar and Bangalore the prevalence of stunting was 40.4%. The prevalence of stunting in boys was 41.47% while in girls it was 38.81% (Izharul *et al.,* 2011).

The prevalence of stunting was more in boys as compared to girls due to improper dietary habits, lack of knowledge of balanced diet in boys and their parents. In present study the prevalence of stunting was more compared to the above studies. This may be due to improper dietary habits, lack of knowledge of balanced diet in children, in parents and lack of availability of protein rich diets to the children.

Conclusion

This study provided evidence that school children of Fatehabad city were under acute and chronic nutritional stress. Promoting appropriate dietary habits through effective nutrition education is an effective preventive method. Main focus should be on qualitative and quantitative improvements on the diets (increased intake of energy, protein, micronutrients) with increased awareness on importance of preventing under nutrition.

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