Prevalence of underweight among school children of government Urdu higher primary schools of Azad Nagar and its surrounding areas of Bangalore

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ABSTRACT

Health and nutritional status among school children of government Urdu higher primary schools was studied with the help of clinical examination, and height and weight measurements. A total of 500 children, 299 (59.80%) boys and 201 (40.20%) girls, formed the study group. With clinical symptoms and measurements of height and weight, the prevalence of underweight was estimated. A close proximation was observed in the appearance of deficiency symptoms and undernutrition between boys and girls, depicting their poor state of health and nutrition. In the present study, nutritional status and underweight was found highly related to the personal hygiene and socio-economic status. Main emphasis may be given to nutrition education, personal hygiene education and health education, apart from the regular educational activities in the community.

Keywords: Underweight, school children, nutrition education.

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INTRODUCTION

The children up to the ages of 5 to 14 years are vulnerable from the nutritional standpoint. The main reason for this vulnerability is the easy susceptibility to malnutrition, underweight and infection (Whitney and Sharon, 2008). For assessing health and nutritional status of a community, clinical examination has always been and remains an important practical method. The method is based on the examination for changes believed to be related to inadequate nutrition that can be seen or felt in superficial epithelial tissues, especially skin, eyes, hair and buccal mucosa.

47 percent of India's children below the age of three years are underweight (Shiva, www.littlemag.com/hunger). The World Bank puts the number probably conservatively at 60 million (worldbank.org) out of a global estimated total of 146 million.

With this recommendation in mind, prevalence of underweight of children of government Urdu higher primary schools of Azad Nagar and its surrounding area was carried out. The area contained three schools

offering higher primary education, that is, 1st to 8th class standard.

MATERIALS AND METHODS

One time observational cross-sectional study was carried out on 500 children (299 boys and 201 girls) between the age group of 5 to 14 years from government Urdu primary higher schools of Azad Nagar and its surrounding area of Bangalore. All the subjects were examined clinically for the presence of signs of nutritional deficiency. Permission was obtained from BSA as well as from headmasters of respective schools for conducting the study. The schools were visited once a week and the data was collected using readymade pro forma. The pro forma comprised of personal history, personal hygiene aspects and all aspects of clinical examination of the children. The data were collected by interviewing and examining the children with the help of their class teacher. The absentees were examined by visiting the school in the next consecutive week. The children were assessed for nutritional status by clinical examination and anthropometry. Weight and height of children were measured *in situ* at the time of interview according to guidelines of W.H.O. The results were analyzed statistically. The age of the children was calculated by referring to the school records or

registers. The age of the children was recorded to the nearest completing month.

Study period

The study was carried out between January 2010 and December 2010.

Physical examination for nutritional status

A complete physical examination of children from head to toe was done, and deviations from normal were recorded. The children were examined for clinical signs of any nutritional deficiency. Anaemia was diagnosed by presence of pallor on tongue, nail bed and palpebral conjunctiva. Ear infections were diagnosed on the basis of symptoms, signs and ear discharge on examination. Oedema of feet and thyroid abnormality were also examined.

Height

The height of children was measured using a 200 cm Stature Meter manufactured by BIOCON. The children with bare foot were made to stand on a flat floor with feet parallel and with heels, shoulders and back of head touching the wall. The head was kept erect so that the orbit was in the same horizontal plane as the external auditory meatus. The scale then was brought down making a firm contact with vertex and was parallel to the floor, reading were recorded to the nearest 0.5 cm.

Weight

The weight was measured in kilograms using electronic digital weighing machine to the nearest measure of 0.1 kg. The children were weighed with minimal clothing, without foot wear and the children were asked to empty the bladder before weighing.

Underweight

The children with the Body Mass Index (BMI) less than the 5th percentile BMI standards of the National Centre for Health Statistics (NCHS) were considered as underweight (Elizabeth, 2004).

Statistical analysis

The data was entered in windows excel and analysis was done for mean and standard deviations. Statistical tests like t test and chi square test were applied. The data entered in excel was imported into epi info package and z score were derived by the CDC standards for undernutrition. Z score by WHO standards were derived by Anthro + package of WHO. All the tests were considered significant at $p < 0.05$ level.

RESULTS AND DISCUSSION

Age

The present study includes 500 children from government higher primary Urdu school. They belong to 5 to 14 age group. Out of 500 children, 52 (10.40%) children belong to 5+ age group, 63 (12.60%) belong to 6+ age group, 43
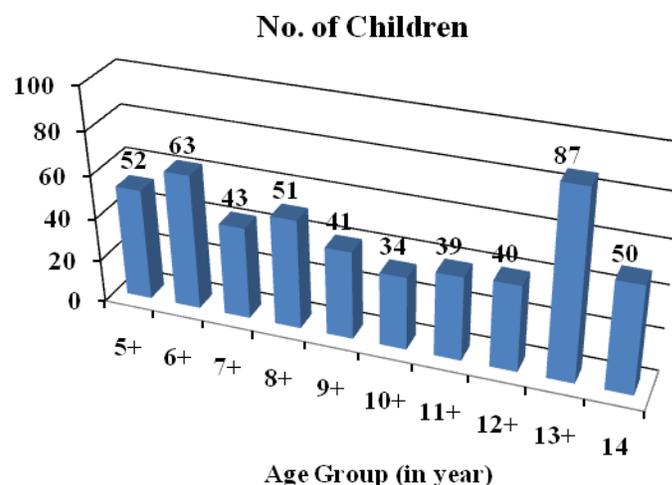

Figure 1. Distribution of school children according to age.

(8.60%) belong to 7+ age group, 51 (10.20%) belong to 8+ age group, 41 (8.20%) belong to 9+ age group, 34 (6.80%) belong to 10+ age group, 39 (7.80%) belong to 11+ age group, 40 (8.00%) belong to 12+ age group, 87 (17.40%) belong to 13+ age group, and 50 (10.00%) belong to 14 age group. The results are summarized in Figure 1.

Sex

In the present study, both boys and girls were included. Out of total 500 children, 299 (59.80%) were boys and 201 (40.20%) were girls. The ratio of Girls: Boys was 1:1.49. The difference may be due to the more inclination of parents towards boy education. The report of the Directorate of Economics and Statistics, Bangalore (2000 to 2001) revealed less literacy rate in females as compared to males in Bangalore (77% in females vs. 88% in males). This data supports that the findings of the present study revealed the enrolment of less number of females in comparison to males in schools in Bangalore (Anonymous, Govt. of India, 2001).

Height and weight

The agewise means and standard deviation (Mean ± S.D) of height of the girls showed that the height in 5+ age group was 100.69 ± 2.12, in 6+ age group was 105.46 ± 1.72, in 7+ age group was 110.35 ± 2.83, in 8+ age group was 117.39 ± 3.14, in 9+ age group was 127.28 ± 7.14, in 10+ age group was 132.21 ± 7.42, in 11+ age group was 137.65 ± 6.42, in 12+ age group was 138.97 ± 5.09, in 13+ age group was 149.67 ± 5.36, and in 14 years age group was 152.7 ± 6.24.

The agewise means and standard deviation (Mean ± S.D) of height of the boys revealed that the height in 5+ age group was 100.12 ± 2.21, in 6+ age group was

Table 1. Means and standard deviations of height and weight of school children according to age and sex.

Age (in year)	Girls (n = 201)		Boys (n = 299)	
	Mean ± SD of Height (cm)	Mean ± SD of Weight (kg)	Mean ± SD of Height (cm)	Mean ± SD of Weight (kg)
5+	100.69 ± 2.12	12.30 ± 1.09	100.12 ± 2.21	12.68 ± 1.09
6+	105.46 ± 1.72	14.31 ± 0.83	104.28 ± 2.80	13.62 ± 1.10
7+	110.35 ± 2.83	15.27 ± 1.03	111.22 ± 1.71	15.65 ± 0.81
8+	117.39 ± 3.14	18.90 ± 1.71	117.64 ± 1.60	18.97 ± 1.69
9+	127.28 ± 7.14	23.20 ± 3.28	126.08 ± 6.62	21.82 ± 3.05
10+	132.21 ± 7.42	25.92 ± 4.36	133.48 ± 5.73	25.56 ± 3.84
11+	137.65 ± 6.42	27.97 ± 3.00	144.91 ± 5.66	29.13 ± 2.76
12+	138.97 ± 5.09	30.04 ± 2.43	140.61 ± 3.95	31.83 ± 2.48
13+	149.67 ± 5.36	39.02 ± 5.06	149.08 ± 6.06	37.72 ± 6.54
14	152.70 ± 6.24	41.35 ± 4.98	155.16 ± 7.7	41.35 ± 5.82

104.28 ± 2.80, in 7+ age group was 111.22 ± 1.71, in 8+ age group was 117.64 ± 1.60, in 9+ age group was 126.08 ± 6.62, in 10+ age group was 133.48 ± 5.73, in 11+ age group was 144.91 ± 5.66, in 12+ age group was 140.61 ± 3.95, in 13+ age group was 149.08 ± 6.06, and in 14 years age group was 155.16 ± 7.7.

In the age groups 5+, 6+, 9+, and 13+, girls appeared to be taller than boys. While in the 7+, 8+, 10+, 11+, 12+, and 14 years age group, boys appeared to be taller than girls.

The agewise means and standard deviations (Mean ± S.D) of weight of the girls showed that the weight in 5+ age group was 12.30 ± 1.09, in 6+ age group was 14.31 ± 0.83, in 7+ age group was 15.27 ± 1.03, in 8+ age group was 18.90 ± 1.71, in 9+ age group was 23.20 ± 3.28, in 10+ age group was 25.92 ± 4.36, in 11+ age group was 27.97 ± 3.00, in 12+ age group was 30.04 ± 2.43, in 13+ age group was 39.02 ± 5.06 and in 14 years age group was 41.35 ± 4.98.

The agewise means and standard deviations (Mean ± S.D) of weight of the boys showed that the weight in 5+ age group was 12.68 ± 1.09, in 6+ age group was 13.62 ± 1.10, in 7+ age group was 15.65 ± 0.81, in 8+ age group was 18.97 ± 1.69, in 9+ age group was 21.82 ± 3.05, in 10+ age group was 25.56 ± 3.84, in 11+ age group was 29.13 ± 2.76, in 12+ age group was 31.83 ± 2.48, in 13+ age group was 37.72 ± 6.54 and in 14 years age group was 41.35 ± 5.82.

In the age group 6+, 9+, 10+ and 13+, girls looked heavier than boys; while in age group of 5+, 7+, 8+ 11+ and 12+, boys appeared to be heavier than girls; whereas, in age group of 14 years, weight of boys and girls appeared to be the same. The results are summarized in Table 1.

Underweight

In the present study, the prevalence of underweight in the age group 5+ was 86.54% (45); in 6+ age group, the prevalence was 85.71% (54); in 7+ age group, the prevalence was 86.05% (37), in 8+ age group, the prevalence was 35.29% (18); in 9+ age group, the prevalence was 51.22% (21); in 10+ age group, the prevalence was 44.12% (15); in 11+ age group, the prevalence was 79.49% (31); in 12+ age group, the prevalence was 37.50% (15); in 13+ age group, the prevalence was 29.89% (26); and in 14 years age group, the prevalence was 58.00% (29).
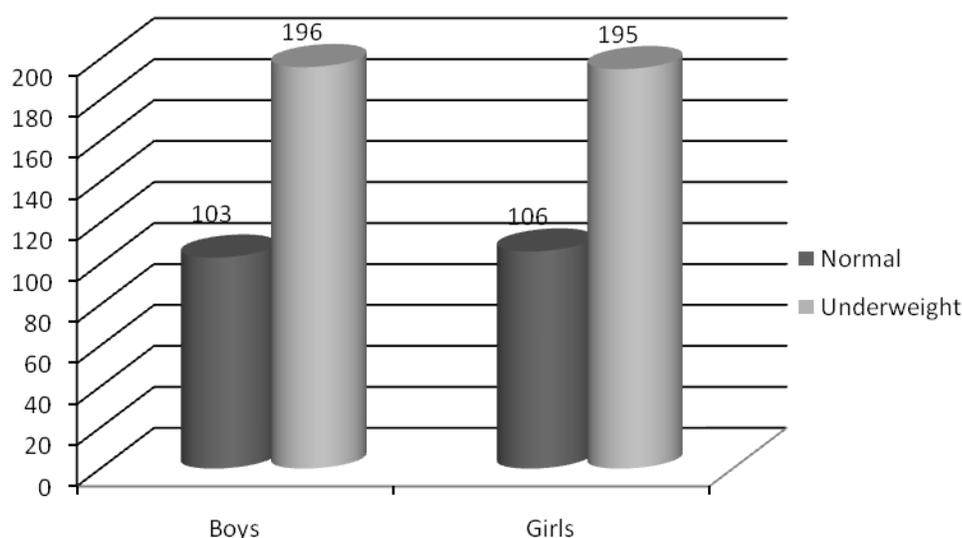
Among the boys, the prevalence of underweight in the age group 5+ was 86.49% (32); in 6+ age group, the prevalence was 97.16% (41); in 7+ age group, the prevalence was 87.50% (21); in 8+ age group, the prevalence was 50.00% (10); in 9+ age group, the prevalence was 62.50% (20); in 10+ age group, the prevalence was 50.00% (10); in 11+ age group, the prevalence was 81.82% (18); in 12+ age group, the prevalence was 24.14% (7); in 13+ age group, the prevalence was 41.86% (18); and in 14 years age group, the prevalence was 63.34% (19). The prevalence was highest in the age group of 6+ (97.16%).

Among the girls, the prevalence of underweight in the age group 5+ was 86.67% (13); in 6+ age group, the prevalence was 61.90% (13); in 7+ age group, the prevalence was 84.21% (16); in 8+ age group, the prevalence was 25.81% (8); in 9+ age group, the prevalence was 11.11% (1); in 10+ age group, the prevalence was 35.71% (5); in 11+ age group, the prevalence was 76.47% (13); in 12+ age group, the prevalence was 72.73%(8); in 13+ age group, the prevalence was 18.18% (8); and in 14 years age group, the prevalence was 50.00% (10). The prevalence was highest in the age group of 5+ (86.67%). The results are summarized in Table 2.

The overall prevalence of underweight in the studied school children was 58.20% (291). The prevalence of underweight in boys was 65.55% (191) and in the girls, it was 47.26% (95). The prevalence of underweight was more among boys compared to girls (65.55% vs. 47.26%). This may be due to improper dietary habits,

Table 2. Prevalence of underweight according to age and sex in school children.

Age (in years)	Boys (n = 299)			Girls (n = 201)			Total (n = 500)	
	No. of children		Percentage	No. of children		Percentage	No. of children	Percentage
	UW	Total		UW	Total			
5+	32	37	86.49	13	15	86.67	45	86.54
6+	41	42	97.16	13	21	61.90	54	85.71
7+	21	24	87.50	16	19	84.21	37	86.05
8+	10	20	50.00	8	31	25.81	18	35.29
9+	20	32	62.50	1	9	11.11	21	51.22
10+	10	20	50.00	5	14	35.71	15	44.12
11+	18	22	81.82	13	17	76.47	31	79.49
12+	7	29	24.14	8	11	72.73	15	37.50
13+	18	43	41.86	8	44	18.18	26	29.89
14	19	30	63.34	10	20	50.00	29	58.00

Figure 2. Prevalence of underweight according to sex in school children.

lack of knowledge of importance of balanced and nutritious diets in boys and their parents. Inclination of boys towards the snacks may be a factor. The results are summarized in Figure 2.

A study conducted by Patwari reported the prevalence of underweight as 60.4% from study population (Patwari et al., 1979). In another study by Joseph, from rural areas of Karnataka state, prevalence of underweight was reported as 60.4% (Joseph et al., 2002). A study Sundaram in Chennai city reported prevalence of malnutrition as 79% (Sundaram et al., 1978).

A study conducted by Rachana Bhoite in the rural area of Vadodara district, Gujarat, reported highly prevalence with 70% of children being underweight (Rachna and Iyer, 2011).

The prevalence of underweight in the present study was lower as compared to reference studies. Both the reference studies were conducted in private as well as government school with a huge sample size as compared to sample size of the present study. Apart from sample size difference, underweight may be attributed to the increasing knowledge and consciousness about overweight. High social class tries to maintain weight at minimum.

Conclusion

All the above indicators reflect that prevalence of underweight is very high among school children of government Urdu higher primary schools of Azad Nagar and its surrounding areas of Bangalore despite the ongoing school meal program. We feel that simple messages like regular consumption of Mid Day Meal (MDM) along with food at home should be advocated. Parents and teachers should be made aware that without

meals at home like breakfast, lunch and dinner, the effort of providing MDM will be futile. There is a need to strengthen the present school meal program along with monitoring at ground level. Regular clinical examinations by government physicians in all schools may help to prevent the worsening of the problem and to take corrective action.

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