NUTRITIONAL STATUS OF GIRL CHILD A COMPARATIVE STUDY IN PRIMARY SCHOOL CHILDREN

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ABSTRACT

In order to determine the nutritional status of school children, 2585 students were examined clinically and a diet survey was carried out on a subsample of 200 children. Severe undernourishment, wasting and stunting were encountered in 8.93%, 0.90% and 1.35% of girls as against 8.78%, 0.32% and 1.20% of boys respectively. In girls, dietary inadequacy was more pronounced and signs of nutritional disorders were more frequent. Such a finding is a pointer towards disparity in nutrition.

MJAFI 1998; 54 : 311-314

KEY WORDS : Girl child; Nutritional status.

Introduction

Of late a growing concern towards improvement of the status of the women has been observed all over the world. United Nations declared the years 1975-84 as the decade for the women. At a meeting organised towards the end of the decade, several related issues were discussed at length. Participants acknowledged the existing discrimination against the girl child in all walks of life [1]. The situation in India, as viewed by UNICEF, is particularly poignant [2]. Various studies carried out in regard to any nutritional discrimination of girl child were equivocal. Studies conducted in three metropolitan cities of Bombay, Calcutta and Madras showed that there was higher proportion of girls as compared to boys in grade II and III of malnutrition [3]. Shanti Ghosh has found an overall higher prevalence of severe malnutrition among girls in a study carried out on children attending out patient department of Safdarjung hospital, New Delhi [4]. Verma et al in their study in rural areas of Jhansi, UP have demonstrated a higher prevalence of severe malnutrition in girls as compared to boys, though the difference was found to be not significant [5]. However studies carried out by NNMB stands out in sharp contrast where more boys in comparison to girls were found to be malnourished [6]. Studies by ICMR also ruled out any gender bias with reference to diet and nutrition [7].

In view of such varied findings, an attempt was made to find out whether the school going girls suffered malnutrition more often than boys.

Material and Methods

The present study based on a cross sectional study design was carried out on primary school children of Pune Cantonment from 01 Jun 94 to 31 May 95. Using cluster sampling technique, 7 schools out of 37 located in cantonment were selected for the purpose of study. Though the sample size was worked out to be 2100 , a total of 2858 children were studied in order to increase the precision and to include all the children of the selected schools.

Information pertaining to child family was obtained through a questionnaire addressed to the parents in the form of a letter. Information regarding the age, sex and class in which studying was obtained from school records. The age was recorded to the nearest completed years.

In order to detect the clinical signs of nutritional disorders, all children of the selected schools were examined in bright daylight by a medical officer who was adequately trained for the purpose. the height was recorded with the help of a steel detachable height measuring rod with an accuracy of 0.1 cm. The subjects after removing shoes, were made to stand by the side of the scale with the feet parallel and heels, buttocks, shoulders and back of head touching the steel rod. The metallic headpiece of the scale was gently lowered, crushing the hair and making contact with the top of the head. At this point the reading was recorded. The weight was recorded with platform type of beam balance with an accuracy of 0.1 kg. The subjects were weighed with uniform but without shoes. Later the weight of the uniform, averaging 200 gm, was deducted for correction of individual's weight. The weighing machine was checked with standard weights everyday before the start of the study. Nutritional indicators used for the purpose of assessment of nutritional status were weight-for-age, weight-for-height and height-for-age. Their values were compared against the published reference standards of National Centre for Health Statistics (NCHS). IAP classification was used to decide different grades of malnutrition.

Diet survey was carried out by house to house visit on subsample of 200 children, selected by stratified random sampling technique. previous 24 hrs recall method, using stainless steel containers standardized for weight and volume, was adopted for the

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TABLE I

Distribution of children according to mean body weight by age and sex

Male					Female			
No.	SD	Mean wt. (kg)	Standard wt. (kg)	Age (yrs)	Standard wt. (kg)	Mean wt. (kg)	SD	No.
9	2.71	15.7	18.7	5	17.7	15.5	2.20	7
122	3.03	16.7	20.7	6	19.5	16.0	2.01	153
241	2.75	17.6	22.9	7	21.9	17.5	2.99	241
261	2.76	19.6	25.3	8	24.8	19.1	3.08	309
245	3.74	21.9	28.1	9	28.5	21.5	4.07	254
188	3.89	23.3	31.4	10	32.5	23.7	3.99	197
91	4.93	25.1	35.3	11	37.0	24.9	4.68	107
50	4.78	27.7	39.8	12	41.5	27.7	6.49	43
37	5.39	29.5	45.0	13	46.1	30.8	4.40	16
5	10.03	27.2	50.8	14	50.3	33.8	6.83	3
4	11.82	29.3	56.7	15	53.7	31.6	3.89	2

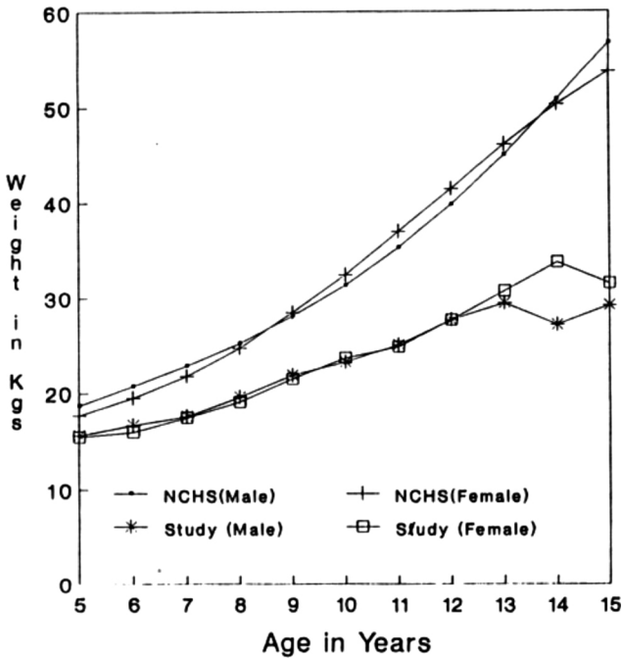

Fig. 1 : Body wt. of study population in comparison with NCHS

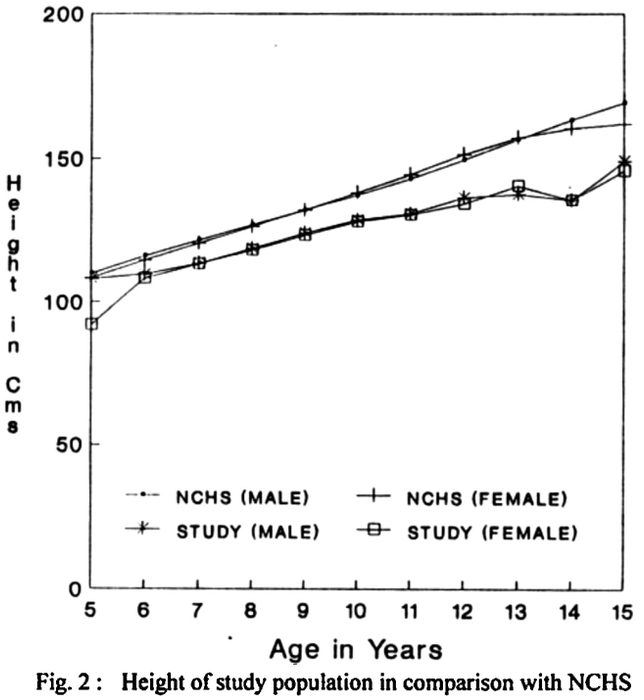

Fig. 2 : Height of study population in comparison with NCHS

purpose. The dietary intake of nutrients was compared with the Recommended Dietary Allowances (RDA) for indians as recommended by ICMR.

Results

The present study was carried out in seven randomly selected primary schools of Pune Cantonment. The study population consisted of 1253 (48.47%) boys and 1332 (51.53%) girls. Of these 85.08% of boys and 87.16% of girls were below 10 yrs of age. Children above 10 yrs constituted only 13.85% of the total. The distribution of children according to socio-economic status class was found to be homogeneous with respect to sex. Majority of the students came from upper middle class.

(a)Anthropometric Measurements

(I) BODY WEIGHT. The distribution of children according to mean body weight by age and sex is shown in Table 1 and a comparison with the weight-for-age of NCHS standard is shown in Fig. 1.

It is seen that though all children gained weight with increasing age, their mean body weight was lower than NCHS standard at respective ages. The body weight of the girls overtook that of boys at the age of 13 yrs in the present study instead of 9 years as per NCHS and thus showing a shift to the right.

(ii) HEIGHT- The distribution of children according to mean height by age and sex is shown in Table 2 and a comparison with NCHS standard is shown in Fig. 2.

It is seen that the mean height of all children in the present study was lower than the NCHS standards. The girls in the present study overtook the boys in height at the age of 13 yrs, 3 yrs later than the expected age. Boys again became taller than girls at the age of 15 yrs-a year later than the expected age.

(b)Indicators of Nutritional Status

(b) Weight-for-age. (Table 3). Nutritional status of 34.12% of

TABLE 2

Distribution of children according to mean body height by age and sex

Male				Age (yrs)	Female			
No. Exam	SD	Mean ht. (cm)	Standard ht. (cm)		Standard ht. (cm)	Mean ht. (cm)	SD	No. Exam
9	8.36	108.0	109.9	5	108.4	92.0	40.86	7
122	7.62	109.7	116.1	6	114.6	108.1	6.32	153
241	7.88	113.4	121.7	7	120.6	113.3	7.21	241
261	6.21	118.6	127.0	8	126.4	118.2	7.18	309
245	6.56	124.2	132.2	9	132.2	123.3	7.76	254
188	6.78	128.6	137.5	10	138.3	128.0	7.38	197
91	7.59	130.8	143.3	11	144.8	130.5	7.90	107
50	9.09	136.7	149.7	12	151.5	134.5	7.99	43
37	8.75	137.8	156.5	13	157.1	140.9	5.50	16
5	18.99	135.7	163.1	14	160.4	135.7	0.31	3
4	8.40	149.2	169.0	15	161.8	146.1	0.64	2

children was found to be normal, girls doing slightly better than the boys. Mild undernutrition was higher in boys i.e. 35.36% as against 30.93% found in girls. Moderate and severe undernutrition was higher in girls measuring 25.68% and 8.93% respectively while in boys it was 22.10% and 8.78% respectively. However the difference was found to be statistically non-significant.

TABLE 3

Nutritional grades of children using weight-for-age by sex

Sex	Wt-for-age as percentage of standard				Total
	≥ 80	80-70	70-60	< 60	
Boys	423	443	277	110	1253
(%)	(33.76)	(35.36)	(22.10)	8.78)	(100)
Girls	459	412	342	119	1332
(%)	(34.46)	(30.93)	(25.68)	(8.93)	(100)
Total	882	855	619	229	2585
(%)	(34.12)	(33.08)	(23.95)	(8.85)	(100)

$X^2 = 7.37$, df = 3, $p > 0.05$

(ii) Weight for height.(Table-4). Higher proportion of boys were found to have normal weight for their height. Girls on the other hand suffered from wasting more often than the boys-the difference being more marked in case of moderate and severe wasting. This difference was found to be statistically significant.

TABLE 4

Distribution of children by different nutritional grades using wt-for-ht by sex

Sex	Wt-for-ht as percentage of standard				Total
	≥ 80	80-70	70-60	< 60	
Boys	1058	183	8	4	1253
(%)	(84.44)	(14.60)	(0.64)	(0.32)	(100)
Girls	1084	205	31	12	1332
(%)	(81.38)	(15.39)	(2.33)	(0.90)	(100)
Total	2142	388	39	16	1881
(%)	(82.86)	(15.01)	(1.51)	(0.62)	(100)

$X^2 = 16.73$, df = 3, $p < 0.05$

(iii) Height-for-age. (Table 5).It is seen that 71.56% of children had adequte height for their age. Only 1.28% of children suffered from severe stunting. The difference between boys and girls was minimal and was found to be not significant statistically.

TABLE 5

Distribution of children by different nutritional grades using ht-for-age by sex

Sex	Ht-for-age as percentage of standard			Total
	≥ 90	90-80	< 80	
Boys	895	343	15	1253
(%)	(71.43)	27.37)	(1.20)	(100)
Girls	955	359	16	1332
(%)	(71.43)	(26.95)	(1.35)	(100)
Total	1850	702	33	2585
(%)	(71.56)	(27.16)	(1.2)	(100)

$X^2 = 16.73$, df = 3, $p < 0.05$

(c) Clinical examination:Signs of nutritional Disorders

(Table-6). All the signs of, nutritional disorders, except vit A deficiency and fluorosis were encountered more often in girls than in boys. However, the differences were statistically not significant.

(d)Diet Survey

Out of 2585 children, 658 (25.45%) were vegetarians and 1927(74.55%) were non-vegetarians. Diet survey carried out on a subsample of 200 children, elaborated the food and nutrient consumption pattern as shown in Table 7 and Table 8 respectively. The average daily intake of all nutrients and food stuffs except sugar/jaggery and flesh foods was less than those recommended by ICMR. Though boys and girls both consumed less of each and every food stuff except flesh foods and fats the deficiency was more marked in girls.

Discussion

In the present study the nutritional status of school going children was assessed by a combination of anthropometry, clinical examination and diet survey. Lab investigation were not carried out because of the large

TABLE 6
Prevalence of signs of nutritional disorders according to sex

Signs	Boys (%)	Girls (%)	Total (%)	X^2 value	p value
Pallor of conjunctiva	69 (5.51)	87 (6.53)	156 (6.03)	1.20	> 0.05
PEM	22 (1.76)	24 (1.80)	46 (1.78)	0.01	> 0.05
Vit A deficiency	82 (6.54)	72 (5.41)	154 (5.96)	1.49	> 0.05
Vit B deficiency	48 (3.83)	55 (4.13)	103 (3.98)	0.15	> 0.05
Vit C deficiency	2 (0.16)	8 (0.6)	10 (0.39)	—	—
Vit D deficiency	2 (0.16)	2 (0.15)	4 (0.15)	—	—
Fluorosis	47 (3.75)	39 (2.39)	86 (3.53)	1.36	> 0.05

TABLE 7
Average daily dietary intake of food stuffs

Food stuff	Amount consumed (in gms)	
	Boys	Girls
Cereals	256	238
Pulses	44	43
Fats and oils	24	24
Milk and milk products	242	213
Egg and flesh foods	49	54
Fruit, GLVs and other vegetables	71	68
Sugar and jaggery	35	34

TABLE 8
Average daily intake of few important nutrients by sex

Nutrients	Boys	Girls
Energy (Kcals)	1598	1520
Proteins (gms)	49	46
Vit A (micro gms)	474	471
Iron (mg)	12	11

sample size. All anthropometric measurements were compared with NCHS standards and dietary intakes with ICMR standards.

Lower mean body weight and lower mean height in all age groups in the present study may be because of poor nutrition. A shift to the right may indicate that the girls are poorly nourished in comparison to the boys. As far as height is concerned, role of genetic factors cannot be ruled out.

Further analysis revealed that majority of the children suffered from various grades of malnutrition. Though there was no statistically significant difference between boys and girls, undernutrition and stunting of severe grades were more prevalent in girls. similar results were obtained by Verma et al in rural areas of Uttar Pradesh [5] and Sundaram et al in urban areas of Delhi [8].

Wasting of all grades, in the present study was more often encountered among girls. such a higher prevalence may be because of poor dietary intake. Study on Tamilnadu children has shown that gender discrimination, with regard to nutrition increased with age [9]. But the study carried out by NNMB does not support this [6]. However this finding needs further investigation by a planned longitudinal study.

Clinical examination and diet survey depicts the disadvantageous situation of the girls. While clinical sign of nutritional disorders and less intake of food stuff and nutrients may be a manifestation of poverty syndrome, a higher prevalence among girls is a pointer towards nutritional disparity. Statistically not significant difference needs to be rechecked with the help of a larger study.

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