Original Research Article

Nutritional Status of Rural Indian School Children of Maharashtra

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ABSTRACT

Background: It is rather unfortunate, that when compared to the developed countries, the children living in India disproportionately suffer from under nutrition, more so in the rural areas than their urban counterparts. This makes learning difficult, leads to low school enrolment, early dropouts, may seriously hamper the child's intellectual growth and may also handicap the child for life. So, a need was felt to carry out a survey of the nutritional status of school children (age 5-15yrs) in various Zilla Parishad Schools in rural health training centre field practice area.
Study period: Nov'13to Feb '14
Methodology: A school-based study with cross-sectional design was adopted. A total of 470school children (240 boys and 230 girls), aged 5-15 years were examined from 6 randomly selected Zilla Parishad schools from RHTC field practice area. Height and weight of the children were measured, from which wasting, stunting and thinness were assessed. The public health problem of under nutrition was classified according to the World Health Organization classification for severity of malnutrition.
Results: In the present study the prevalence of underweight, stunting and thinness were 36.2%, 23% and 32.1% respectively. The prevalence of underweight and stunting was more in girls whereas thinness was found to be more among boys.
Conclusion: This study provided evidence that these school children were under acute and chronic nutritional stress indicating the requirement of immediate and appropriate public health nutritional intervention programs and modification of the currently existing ones.

Keywords: Rural school children, anthropometry, BMI, malnutrition.

INTRODUCTION

Children are not only divine gifts but also mirror of a nation and hope of the world. The health and nutritional status of the children is an index of the national investment in the development of its future manpower. [1] It is rather unfortunate, that when compared to the developed countries, the children living in India disproportionately suffer from under nutrition, more so in the rural areas than their urban counterparts. [2] This makes learning difficult, low school enrolment, high absenteeism, early dropouts, unsatisfactory classroom performance, [3] may seriously hamper the child's intellectual

growth and may also handicap the child for life.

The Millennium Development Goal 1: Eradicate extreme poverty and hunger by the year 2015 has helped to decline the proportion of underweight children from 25% to 15% between 1990 and 2012, however improvements have been unevenly distributed between and within different regions. [4]

Most of the attempts of generating anthropometric profile have so far focused on pre-school children and a very few have dealt with the school-going and adolescent age groups. Keeping all these facts in view, a need was felt to carry out a survey of the health status of school children (age 5-15yrs) in Zilla Parishad Schools of Rural Health Training Centre field practice area, Pune.

Objectives

1. To assess nutritional status of Zilla Parishad school children Pune, using anthropometric measurements.
2. To compare age and gender wise prevalence of malnutrition amongst Zilla Parishad school children.

MATERIALS AND METHODS

A cross sectional study was carried out in randomly selected six Zilla Parishad Schools of field practice area of Rural Health Training Centre of a medical college in Pune. The study was carried out during Nov 2013 to Feb 2014.

Approval from Institutional Ethics Committee and permission from the school principals was obtained prior to the study.Total470 children were examined. After taking a verbal consent, anthropometric data consisting of age, sex, height and weight of the children was collected by trained interns, under the supervision of a team of faculty from the department of community medicine. Age of the child was confirmed from the school records.

Weighing scale was calibrated to the zero before taking every measurement. Body weight was taken to the minimum of 100 gram with minimum clothing (School uniform) with the subject standing motionless on the weighing scale and with the weight distributed equally on each leg. Height of all children was measured using standardised steel anthropometric rod with parallel bar. The accuracy of steel anthropometric rod was 0.1centimetre.With the subject standing in an erect position against a vertical scale and with the head positioned so that the top of external auditory meatus was level with the inferior margin of the bony orbit with eyes and head looking forward, a scale placed on the vertex of the head parallel to the floor.

Definitions used in the study: [5,6]

To evaluate the nutritional status of the subjects, the United States National Centre for Health Statistics (NCHS) age and sex specific – 2 z-scores were followed to define underweight, stunting and thinness. The following scheme was utilized:

Underweight: < - 2 WAZ (Z-score for weight-for age) is used as a composite indicator to reflect both acute and chronic under nutrition, although it cannot distinguish between them.

Stunting: < - 2 HAZ (Z-score for height-for age) indicator of chronic under nutrition, the result of prolonged food deprivation and/or disease or illness.

Thinness: < - 2 BMIZ (Z-score for BMI-for-age) indicator of acute under nutrition. BMI, which is expressed as a ratio of Weight (kg) to Height (m2) is an indicator of general obesity and also gives the magnitude of protein calorie malnutrition. It is inexpensive, non-invasive and suitable for large scale surveys. [7]

Where WAZ, HAZ and BMIZ refers to Z score for Weight for age, Z score for height for age and Z score for BMI for age respectively. As per NCHS it considered to be age and sex specific z scores respectively,

of NCHS. After conducting the survey awareness campaigns were organized to educate children and their parents about the role of proper nutrition in maintaining health status.

*Inclusion criteria***:** All 5-15 year old children from 6 Zilla Parishad schools of Rural Health Training Centre field practice area, Pune present on the day of the survey.

*Exclusion Criteria***:** Children absent on the day of examination were excluded from the study.

Statistical Analysis: Data was entered in the Microsoft Excel. Analysis was done with the help of SPSS Version 19.0 and test of significance. P-value, 2 independent sample t-test to compare height, weight and BMI with respect to gender.

RESULTS

There were a total of 470 children of which 240(50.1%) were boys and 230(48.93%) were girls.

There was no significant difference between mean Height, Weight and BMI of boys and girls except at 6yrs where height of boys and girls varies significantly. Boys were noticed to be taller and heavier than girls.

In the present study prevalence of underweight; stunting and thinness were found to be 36.2 %, 23% and 32.1 %, respectively.

In gender wise distribution, present study showed significantly higher prevalence of stunting in girls than boys.

Table1: Age and sex wise distribution of the school children.

Age (yrs)	Frequency	Males	Females	Percentage (%)
5	6	5	1	1.30
6	19	10	9	4.00
7	48	20	28	10.2
8	71	47	24	15.1
9	57	33	24	12.1
10	53	34	19	11.3
11	53	31	22	11.3
12	62	32	30	13.2
13	42	23	19	8.90
14	28	5	23	6.00
15	31	0	31	6.60
Total	470	240	230	100.0

Table 2: Age and sex-specific mean weight, height and BMI of the school children.

Age (yrs)	Weight (kgs)			Height (cms)			BMI (kg/m^2)		
	Male	Female		Male	Female		Male	Female	
	Mean	Mean	P value	Mean	Mean	P value	Mean	Mean	P value
5	23.20 (5.72)	26.00 (0.0)	0.00	120.00 (8.49)	110.00 (0.00)	0.00	14.18 (1.81)	21.5 (0.00)	0.00
6	20.40 (2.95)	18.00 (2.65)	0.079	121.30 (8.41)	113.78 (6.53)	0.043	13.96 (2.38)	13.85 (0.96)	0.895
7	21.60 (3.60)	20.07 (3.01)	0.130	119.70 (5.71)	117.64 (7.56)	0.289	15.08 (2.27)	14.71 (3.30)	0.647
8	21.76 (4.91)	21.12 (4.56)	0.584	124.83 (8.36)	123.75 (9.05)	0.574	13.84 (3.09)	13.90 (2.79)	0.931
9	22.45 (5.59)	20.54 (6.38)	0.245	125.85 (8.09)	126.33 (10.30)	0.849	14.10 (2.89)	13.01 (4.12)	0.273
10	26.63 (4.49)	26.33 (6.01)	0.856	135.56 (6.88)	133.72 (9.35)	0.529	14.54 (1.92)	14.54 (1.89)	0.988
11	28.58 (5.70)	29.36 (3.44)	0.537	137.29 (9.11)	135.36 (9.32)	0.458	15.11 (2.42)	16.14 (2.24)	0.119
12	31.13 (7.43)	29.90 (6.12)	0.480	138.91 (9.35)	134.27 (12.15)	0.099	16.28 (3.22)	16.80 (3.89)	0.574
13	34.17 (5.52)	35.58 (8.17)	0.528	143.91 (10.37)	144.53 (6.83)	0.820	16.61 (2.94)	16.97 (3.52)	0.723
14	35.40 (4.56)	36.52 (6.12)	0.654	153.20 (8.76)	149.61 (5.58)	0.422	15.10 (1.78)	16.31 (2.37)	0.235
15	00.00 (0.00)	42.00 (6.06)	0.00	00.00 (00.00)	152.39 (5.57)	0.00	0.00 (0.00)	18.10 (2.61)	0.00

(* P value <0.05=Significant; SD=Standard deviation is given in brackets)

Table 3: Age wise prevalence of underweight, stunting and thinness.

Age(yrs)	% Underweight	% Stunting	% Thinness
5	0.00	0.00	16.6
6	15.7	5.26	36.8
7	16.6	18.75	18.75
8	33.8	14.0	42.2
9	50.8	29.8	45.6
10	32.0	18.8	32.0
11	35.8	15.0	24.5
12	41.9	35.4	35.4
13	38.0	40.4	21.4
14	64.0	28.5	39.2
15	32.2	19.3	19.3

Table 4: Gender wise prevalence of underweight, stunting and thinness among children.

	Boys (n = 240)	Girls (n = 230)	Total (n= 470)	P Value
Underweight	77 (32.00 %)	93 (40.43 %)	170 (36.2 %)	0.060
Stunting	45 (18.75 %)	63 (27.39 %)	108 (23 %)	0.026
Thinness	82 (34.16 %)	69 (30.00 %)	151 (32.1 %)	0.334

DISCUSSION

In developing countries malnutrition happens to be one of the leading causes of underdevelopment and death of preschool and school children. Tackling this problem is one of the important steps a country must take in order to secure its future and development.

In the present study prevalence of underweight; stunting and thinness were found to be 36.2 %, 23% and 32.1 %, respectively.

In similar studies carried out on rural school children of Onda, Bankura District prevalence of underweight was 16.9% stunting was 17.2% and thinness was 23.1%. [8] In the rural school children of Ratnagiri district of Maharashtra underweight, stunting and thinness were found to be 19 %, 30.3 % and 16.8 %, respectively. [9] Among the Integrated Child Development Services (ICDS) scheme children of Chapra, West Bengal, India [10] the prevalence of underweight, stunting and thinness were 31.0%, 23.9% and 9.4%, respectively. In the children of Vietnam [11] only 13.1% of the students were found to be underweight. Thus the present study shows much higher prevalence of malnutrition in rural school children. On the other hand the tribal children [12] and urban slum children of Uttar-Pradesh, [3] showed higher prevalence of malnutrition compared to the present study,

In gender wise distribution, present study showed significantly higher prevalence of stunting in girls than boys. Percentage of underweight was also more in girls, but the difference was not statistically significant. In contrast to our study, school girls of Ludhiana [13] and Aligarh, [14] weighed significantly more than the boys. Similarly in the study conducted in Nigeria [15] the values of mean BMI and mean heights of females were consistently and significantly higher than their male counterparts. This shows gender disparity for nutrition.

CONCLUSION

This study provided evidence that these school children were under acute and chronic nutritional stress. Though the rates of under nutrition have decreased over the years because of the Millennium Development Goals and Mid-day Meal programmes which started in schools over a decade ago, the prevalence of malnutrition is still found to be very high in our school children indicating the requirement of immediate and appropriate public health nutritional intervention programs and modification of the currently existing ones.

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How to cite this article: Vaidya V, Gaware SD, Murarkar SK et. al. Nutritional status of rural Indian school children of Maharashtra. Int J Health Sci Res. 2015; 5(5):17-21.

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