

Original Research Article

Nutritional status and morbidity pattern among school children in an urban slum of Kolkata, India

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ABSTRACT

Background: Sickness and morbidity rates in Indian school going children are among the highest in the world. Poor health and sickness absenteeism results in school dropouts and it is more among the female children as compared to male children. Present study was conducted to study the nutritional status and morbidity pattern among children attending the school health clinics in an urban area of West Bengal India.

Methods: A cross-sectional study was conducted in the field practice area of urban health centres (UHC) of AIHH and PH Kolkata, West Bengal. Children enrolled in class 1-10 were included in the study by using systematic random sampling technique. Data was collected by using semi-structured questionnaire, clinical history and physical examination was done.

Results: Out of total 254 students, 129 (50.8%) were boys and 125 (49.2%) were girls. Dental caries and skin diseases like ringworm infection, cuts and fungal infection were most common types of morbidity found in school children. Dental caries and skin diseases both were more common in girls as compared to the boys. Underweight was found in more than 70% of the children and their BMI was significantly low as compare to the ICMR standard.

Conclusions: The proportion of malnutrition is very high in the school children of the field practice area of UHC Chetla and there is need to create opportunities to increase the family income and awareness programme to increase the nutritive values of foods prepared at household level.

Keywords: BMI, ICMR, Morbidity, School Health, Undernutrition, West Bengal

INTRODUCTION

Healthy childhood is the basis for healthy and productive adult life. School is a place where apart from formal education children also learn behavioural, lifestyle and moral values.¹ Malnutrition, a public health problem increases the vulnerability of child to a variety of diseases in later life.² Majority of available health services, including school health services, are delivered through a network of primary health centres. The school health programme has low priority among national health programmes.^{3,4} Extensive surveys have been carried out in different parts of the country and the finding shows

that sickness and morbidity rates in Indian schools are among the highest in the world.³⁻⁵ Poor health and sickness absenteeism may result in school dropouts. The dropout rate is more among the female children as compared to male children.^{5,6} With this background the present study was conducted to study the nutritional status and morbidity pattern among children attending the school health clinics in an Urban area of West Bengal India.

Objectives

To measure the height and weight of school children. To measure the BMI among school children. To study the

morbidity of dental caries and skin diseases among school children. To study the age and sex wise distribution of malnutrition among school children.

METHODS

A cross-sectional study was conducted during the period of March 2021 to June 2021, among 10 government schools located in field practice area of urban health centres (UHC) of AIHH and PH Kolkata, West Bengal. Children enrolled in class 1-10 were included in the study. From the attendance register every 5th child wise selected for the study by using systematic random sampling technique. Data was collected by using semi-structured questionnaire, clinical history and physical examination was done for provisional diagnosis. Anthropometric measurements and physical examination were done within the school premise. Height was measured to the nearest 0.5 cm. Weighing scale was used to measure weight to the nearest 1 kg. BMI was calculated by using the formula body mass index = weight in kg/(height in metre)².

Data on following variables was collected by using a semi structured proforma: age in completed year, weight in kilograms, height in centimetres, finding of physical and clinical examination.

Study was conducted after taking permission from the appropriate authority. Data extracted from individual was anonymised. No data on personal information like name and religion was collected.

Age and gender specific cut-off points for BMI recommended previously was applied.⁷ The mean BMI of the children according to age and sex was compared with the mean BMI for age and sex as per Indian Council of Medical Research (ICMR) standards.⁸ Childrens having weight less than the standard/expected weight for the age was considered as underweight child.

Data analysis

Data thus generated was entered and analysed using Microsoft excel. BMI for age was used for classifying the nutritional status. ICMR reference was used to assess the nutritional status. 't' test was used for testing statistical significance and p<0.05 was considered as significant.

RESULTS

During the study period data was collected from 254 school children in the age group of 6 to 18 years. Out of total 254 children 129 were boys and 125 were girls. Out of total 129 boys, 52 (40.31%) were in the age group of 6-10 years, 54 (41.86%) were in the age group of 11-15 years and 23 (17.83%) were in the age group of 16-18 years. Out of total 125 girls, 49 (39.2%) were in the age group of 6-10 years, 52 (41.6%) were in the age group of 11-15 years and 24 (19.2%) were in the age group of 16-

18 years. Difference in the age wise distribution of boys and girls was statistically insignificant (p=0.96) (Table 1).

Table 1: Age wise distribution of boys and girls.

Age group	Boys N (%)	Girls N (%)	Total
6-10	52 (40.31)	49 (39.2)	101 (39.76)
11-15	54 (41.86)	52 (41.6)	106 (41.73)
16-18	23 (17.83)	24 (19.2)	47 (18.5)
Total	129 (100)	125 (100)	254 (100)

$\chi^2=0.085$, Df=2, p=0.96.

Out of total 254 school children, 31 (12.2%) had dental caries and 50 (19.7%) had skin disease. Out of total 129 boys 10 (7.8%) and out of 125 girls 21 (16.8%) had dental caries and this difference was statistically insignificant (p=0.06). Out of total 129 boys 22 (17.1%) and out of 125 girls 28 (22.4%) had skin diseases and this difference was statistically insignificant (p=0.14) (Table 2).

Table 2: Morbidity pattern among boys and girls.

Sickness	Boys N (%)	Girls N (%)	P value
Dental caries	10 (12.2)	21 (19.7)	0.06
Skin disease	22 (17.1)	28 (22.4)	0.14

Table 3: Age group wise dental caries among boys and girls.

Age group	Boys N (%)	Girls N (%)	P value
6-10 years	03 (5.8)	07 (14.3)	0.07
11-15 years	02 (3.7)	06 (11.5)	0.06
16-18 years	5 (21.7)	8 (33.3)	0.16

In the age group of 6-10 years, out of total 52 boys 3 (5.8%) and out of 49 girls 7 (14.3%) had dental caries. In the age group of 11-15 years out of total 54 boys 2 (3.7%) and out of 52 girls 6 (11.5%) had dental caries. In the age group of 16-18 years out of total 23 boys 5 (21.7%) and out of 24 girls 8 (33.33) had dental caries. Dental caries was found to be more in the age group of 16-18 years as compare to the other age groups. In the age group of 6-10 years, 11-15 years and 16-18 years the proportion of dental caries was more in girls as compare to boys and the difference was statistically insignificant (p>0.05) (Table 3).

Table 4: Age group wise skin disease among boys and girls.

Age group	Boys N (%)	Girls N (%)	P value
6-10 years	10 (19.2)	12 (24.5)	0.71
11-15 years	07 (12.9)	11 (21.2)	0.13
16-18 years	5 (21.7)	5 (20.8)	0.52

In the age group of 6-10 years, out of total 52 boys 10 (19.2%) and out of 49 girls 12 (24.5%) had skin diseases. In the age group of 11-15 years out of total 54 boys 7

(12.9%) and out of 52 girls 11 (21.2%) had skin diseases. In the age group of 16-18 years out of total 23 boys 5 (21.7%) and out of 24 girls 5 (20.8%) had skin diseases. Skin diseases was found to be more in the age group of 6-10 years as compare to the other age groups. In the age group of 6-10 years and 11-15 years the proportion of

skin diseases was more in girls as compare to boys however in the age group of 16-18 years the skin disease was found to be more in boys as compare to the girls and the difference was statistically insignificant ($p>0.05$) (Table 4).

Table 5: Underweight in boys and girls according to BMI for age.

Age group (yrs)	Sex	Under weight N (%)	Normal N (%)	Overweight N (%)	Obese N (%)	P value
6-10	Boys (n=52)	43 (82.7)	9 (17.3)	0	0	0.67
	Girls (n=49)	42 (85.7)	7 (14.3)	0	0	
11-15	Boys (n=54)	39 (72.2)	13 (24.1)	2 (3.7)	0	0.88
	Girls (n=52)	36 (69.3)	15 (28.8)	1 (1.9)	0	
16-18	Boys (n=23)	9 (39.1)	11 (47.8)	2 (8.7)	1 (4.4)	0.92
	Girls (n=24)	10 (41.7)	12 (50.0)	1 (4.15)	1 (4.15)	

Table 6: Age wise comparison of mean weight of boys and girls.

Age in years	Weight in kg (Mean±SD)		P value
	Boys	Girls	
6-10	23.1±13.6	22.4±13.7	0.79
11-15	35.7±13.6	35.6±13.8	0.97
16-18	54.9±14.1	43.8±13.7	0.0001

Table 7: Age wise comparison height of boys and girls.

Age in years	Height in cm (Mean±SD)		P value
	Boys	Girls	
6-10	120±16	125±18	0.14
11-15	145±18	147±17	0.57
16-18	169±18	154±18	0.0001

Out of total 254 school children 179 (70.1%) were underweight. In the age group of 6 to 10 years of age group, out of total 52 boys 43 (82.7%) were underweight while out of 49 girls 42 (85.7%) were underweight and the difference was statistically insignificant ($p=0.67$). In the age group of 11 to 15 years of age, out of total 54 boys 39 (72.2%) were underweight while out of 52 girls 36 (69.3%) were underweight and the difference was statistically insignificant ($p=0.88$). In the age group of 16 to 18 years of age, out of total 23 boys 9 (39.1%) were underweight while out of 24 girls 10 (41.7%) were

underweight and the difference was statistically insignificant ($p=0.92$) (Table 5).

In the age group of 6 to 10 years, mean weight of boys and girls was 23.1 kg (SD=13.6) and 22.4 (SD=13.7) respectively. In the age group of 11 to 15, mean weight of boys and girls was 35.7 kg (SD=13.6) and 35.6 kg (SD=13.8) respectively while in the age group of 16 to 18 years, mean weight of boys and girls was 54.9 kg (SD=14.1) and 43.8 kg (SD=13.7) respectively. In the age group of 16 to 18 years, the difference in the mean weight of boys and girls was highly significant ($p=0.0001$) (Table 6).

In the age group of 6 to 10 years, mean height of boys and girls was 120 cm (SD=16) and 125 cm (SD=18) respectively. In the age group of 11 to 15, mean height of boys and girls was 145 cm (SD=18) and 147 cm (SD=17) respectively while in the age group of 16 to 18 years, mean height of boys and girls was 169 cm (SD=18) and 154 (SD=18) respectively. In the age group of 16 to 18 years, the difference in the mean height of boys and girl was highly significant ($p=0.0001$) (Table 7).

Mean BMI for boys in the age group of 6 to 10 years, 11-15 years and 16-18 years were 14.9 kg/m², 16.7 kg/m² and 19.49 kg/m² respectively. Mean BMI of boys in each age group was significantly lower than the ICMR reference BMI in same age group (Table 8).

Table 8: Comparison of mean BMI of boys with ICMR standards.

Age in years	Number	Mean BMI in kg/m ²	SD	ICMR reference BMI in kg/m ²	Deficit	Z score	P value
6-10	52	14.9	3.84	16.11	1.21	2.27	0.001
11-15	54	16.7	3.82	18.66	1.96	3.77	0.0001
16-18	23	19.49	3.94	21.11	1.62	1.97	0.04

Table 9: Comparison of mean BMI of girls with ICMR standards.

Age in years	Number	Mean BMI in kg/m ²	SD	ICMR reference BMI in kg/m ²	Deficit	Z score	P value
6-10	49	15.27	3.86	16.25	0.98	1.52	0.08
11-15	52	16.3	3.88	19.35	3.05	6.04	0.001
16-18	24	18.56	3.87	21.66	3.1	4.53	0.001

Mean BMI for girls in the age group of 6 to 10 years, 11-15 years and 16-18 years were 15.27 kg/m², 16.3 kg/m² and 18.56 kg/m² respectively. Mean BMI of girls in the age group of 6-10 years was less as compared to the ICMR reference BMI in the same age group however the difference was statistically insignificant. Mean BMI of girls in the age group of 11-15 years and 16-18 years was less as compared to the ICMR reference BMI in the same age group and the difference was statistically significant (Table 9).

DISCUSSION

Out of total 254 students, 129 (50.8%) were boys and 125 (49.2%) were girls. The ratio of boys to girls enrolled for the primary education was little less for girls however the difference was statistically insignificant. In the age group 6-10 years, 11-15 years and 16-18 years also the ratio of boys to girls was almost same. According to published statistics of West Bengal state, the total gross enrolment ratio of students from the 1st to 8th grade across the state of West Bengal during year 2022 was around 108.5%. The enrolment ratio for boys and girls was 107.8% and 109% respectively.⁹ Gender wise difference in enrolment ratio was found to be statistically insignificant which is consistent with the findings of the present study.

Dental caries and skin diseases like ringworm infection and fungal infection were most common types of morbidity found in school children. Dental caries and skin diseases both were more common in girls as compared to the boys however the difference was statistically insignificant. In year 2018 Kar et al reported skin diseases in 34.5% of the school children while dental caries in 23.2% of school going children in Odisha.¹⁰ Kar et al also reported pallor, pain in abdomen, URTI and ear discharge as common morbidity pattern in school children. However, in present study the scope of collection of data on other morbidity pattern was not available as it was secondary data extracted from the records available in the school health programmes of the health centre. Bhattacharya et al reported skin diseases and dental caries in 38.9% and 40.33% of school going adolescents in urban area of West Bengal.¹¹ In present study the morbidity of dental caries and skin diseases was found to be in 12.2% and 19.7% of the school going children. Dental caries and skin disease is reported less in present study as compare to the previous study. The possible reason for less proportion of children reported dental caries and skin disease could be due to better hygiene practices taught in schools and also may be because of

increased awareness due to Pradhan Mantri Swachh Bharat Abhiyan.

In present study underweight was found in more than 70% of the children which is very high as compare to the underweight reported by other studies. Proportion of underweight was marginally high in girls as compare to the boys in the age group of 6-10 years and 16-18 years while in the age group of 11-15 years it was marginally high in boys as compared to girls. The difference in proportion of underweight in boys and girls was insignificant. Bhattacharya et al reported underweight in 53.3% of the school going adolescents. In present study the underweight in the age group of 16 to 18 years was found to be 40.4% which is similar to the findings of the other reported studies.¹⁰⁻¹²

Overall, for boys and girls the BMI was significantly low as compared to the ICMR standard. Except in the age group of 16 to 18 years, in boys and girls through the weight and height was less as compare to the ICMR standard however the difference among themselves was statistically insignificant. The reason for high level of malnutrition is because of poor socioeconomic condition of the study population. The field practice area of UHC Chetla is predominantly a low socioeconomic group. Most of the families are earning their family income by working as domestic help in nearby houses. More than 75 percent of households have average family income less than Rs 5000 per month and around 43 percent of the people are below poverty line.¹³

CONCLUSION

The proportion of malnutrition is very high in the school children of the field practice area of UHC Chetla. Level of malnutrition is same in both boys and girls. Though the burden of malnutrition is high, the morbidity is less in children. Less morbidity among children may be due to implementation of Pradhan Mantri Swachh Bharat Abhiyan in community as well as schools.

To tackle the malnutrition there is a need to increase job opportunities at household level to increase the family income and create awareness programme to increase the nutritive values of foods prepared at household level.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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