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ICD-10 health profiling of school-attending children in the field practice area of a medical college in south India: A Cross-sectional study

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ABSTRACT

Background

The health of school children is crucial for academic performance and overall well-being, influencing their capacity to learn and thrive. Understanding the health dynamics in school settings can help mitigate long-term public health issues. This study aims to ascertain the health status of school children residing in slum areas of an urban locality in the southern part of India using International Classification of Diseases-10 (ICD-10) codes, which can inform policies and interventions to promote better health outcomes and educational attainment.

Method

A cross-sectional study was conducted in a school in urban slum of Hyderabad city to evaluate the health status of school children. Data were collected using a standardized proforma, capturing information such as student demographics (name, age, sex, grade), anthropometry and physical examination findings.

Results

The study encompassed 3,157 children, comprising 1,840 girls (58%) and 1,317 boys (42%), aged between 5 to 16 years. The mean ± SD age of menarche was found to be 13.1 ± 1.2 years. Among the participants, 62.2% reported at least one health-related issue, with dental caries being the most prevalent (38.1%), followed by skin problems (14.3%) and malnutrition (9.4%).

Conclusion

In this study, health problems were found to be more common in boys compared to girls. More than half of the children were suffering from at least one health-related issue. Regular school health checkups help to identify and prevent health complications.

Keywords: School children, Health profile, ICD-10, South India

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INTRODUCTION

Scholastic development is the essential component of children's life. The World Health Organization's Expert Committee on School Health Services noted by early 1950's that "to learn effectively, children need good health."[1] In India, about 42% of the total population are children below the age of 16 years.[2] This forms the majority of total population and needs adequate care and attention for nation development. The health challenges faced by school children vary significantly based on geographic, socio-economic, and environmental factors. Urban children, especially those in slums, are more prone to respiratory issues due to pollution and inadequate sanitation. Socio-economic disparities further compound these problems, with lower-income children having limited access to nutritious food, clean environments, and healthcare. The health problems of school children include malnutrition, infectious diseases, intestinal parasites, skin diseases, and conditions affecting the eyes, ears, and teeth exacerbated by overcrowded living conditions and inadequate sanitation facilities in schools.[2-4] Poor health and malnutrition can have long-term consequences, impairing both physical growth and cognitive development, thereby affecting academic performance and future potential. Given the scarcity of comprehensive studies focusing on the health of school children, especially in urban slum settings, this study aims to fill the gap in knowledge and provide valuable insights into their health status. The findings of this study will not only highlight the pressing health concerns but also help inform targeted interventions and policies aimed at improving the overall well-being and development of these vulnerable children. Addressing the health needs of school-aged children is critical for ensuring they reach their full developmental potential, which in turn contributes to the overall progress of the community and the nation at large.

Methodology

The objective of this research was to assess health status of school-going children through a cross-sectional analysis. A school in the urban slums of Hyderabad under the field practice area of a medical college was included. Ethical permission was obtained from the Institutional Review Board of the institute. All students present during the data collection phase were included in the study and assent was taken. The data was gathered using a standardized and validated proforma, covering various aspects such as student details (name, age, sex, grade), physical examination, personal hygiene, anthropometric measurements, clinical history, provisional diagnosis, etc. Weight-for-age comparisons were made using the Indian Academy of Pediatrics (IAP) classification. Classification of morbidities was done using International Classification of Diseases (ICD 10) which is a medical classification list by the World Health Organization (WHO). It contains codes for diseases, signs and symptoms, abnormal findings, complaints, social circumstances, and external causes of injury or diseases.[2] The survey employed basic medical instruments including weighing machines, measuring tapes, and thermometers. Data entry was performed using Microsoft Excel, and statistical analysis was conducted using SPSS version 25. Variables were presented as Mean $\pm$ SD and percentages, and statistical tests such as Chi-square test and t test were applied to ascertain significance.

Results

A total of 3157 school-going children were included in our study, out of which 1840 (58%) were girls and 1317 (42%) were boys in the age group of 5 to 16 years (Table 1 & Fig.1).

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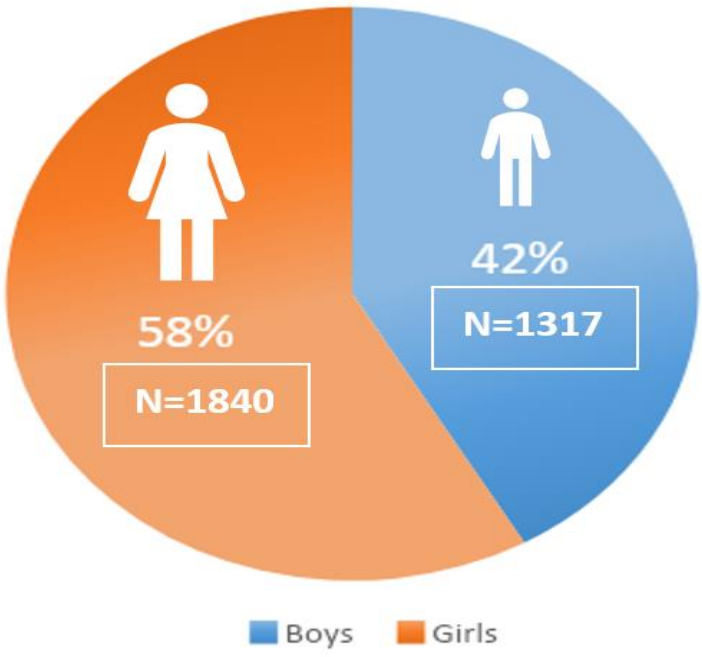
Table 1: Age and gender distribution of School children.

Age (yrs.)	Boys N=1317 (%)		Girls N= 1840 (%)		Total N=3157 (%)	
5	76	(5.8)	109	(5.9)	185	(5.9)
6	91	(6.9)	113	(6.1)	204	(6.5)
7	131	(9.9)	148	(8.0)	279	(8.8)
8	99	(7.5)	159	(8.6)	258	(8.2)
9	191	(14.5)	206	(11.2)	397	(12.6)
10	159	(12.1)	199	(10.8)	358	(11.3)
11	125	(9.5)	172	(9.3)	297	(9.4)
12	146	(11.1)	187	(10.2)	333	(10.5)
13	129	(9.8)	149	(8.1)	278	(8.8)
14	76	(5.8)	157	(8.5)	233	(7.4)
15	69	(5.2)	134	(7.3)	203	(6.4)
16	25	(1.9)	107	(5.8)	132	(4.2)

Figure 1: Gender distribution of school children



The Mean Age ± SD of boys was 9.5 ± 3.0 years, and for girls, it was 9.3 ± 2.8 years. The Mean ± SD age of girls attaining menarche was 13.1 ± 1.3 years. The average weight for boys was 28.1 ± 1.6 kg, whereas for girls, it was 27.8 ± 1.4 kg. Furthermore, boys had a mean height of 138 ± 2.1 cm, which was higher compared to girls' mean height of 136.5 ± 1.6 cm. Notably, these differences in weight and height were statistically significant ($p < 0.001$). These findings are summarized in Tables 2 and 3.

Table 2: Weight & height of children as per the gender and age group:

	Weight in Kgs. (Mean ± SD)		Height in cms. (Mean ± SD)	
Age (years)	Male	Female	Male	Female
5	14 ± 1.1	13 ± 1.3	114 ± 1.9	113 ± 1.2
6	16 ± 1.2	15 ± 1.7	117 ± 1.1	115 ± 1.6
7	21 ± 1.7	20 ± 1.1	122 ± 2.7	120 ± 0.8
8	22 ± 1.3	21 ± 1.9	128 ± 1.1	126 ± 1.9
9	24 ± 0.7	23 ± 0.4	132 ± 1.9	131± 1.2
10	25 ± 1.9	24 ± 1.8	137 ± 2.2	135 ± 1.5
11	29 ± 0.5	30 ± 1.3	141 ± 2.5	140 ± 2.1
12	33 ± 1.9	32 ± 1.1	145 ± 1.8	143 ± 1.1
13	35 ± 2.1	36 ± 1.6	153 ± 2.3	151 ± 2.5
14	37 ± 1.8	37 ± 2.1	154 ± 3.6	152 ± 1.3
15	40 ± 2.3	41 ± 1.9	156 ± 2.1	155 ± 1.9
16	41 ± 2.7	42 ± 1.1	157 ± 2.2	158 ± 2.1
Average	**28.1 ± 1.6**	**27.8 ± 1.4**	**138 ± 2.1**	**136.5 ± 1.6**

Table 3: Weight & Height comparison as per gender:

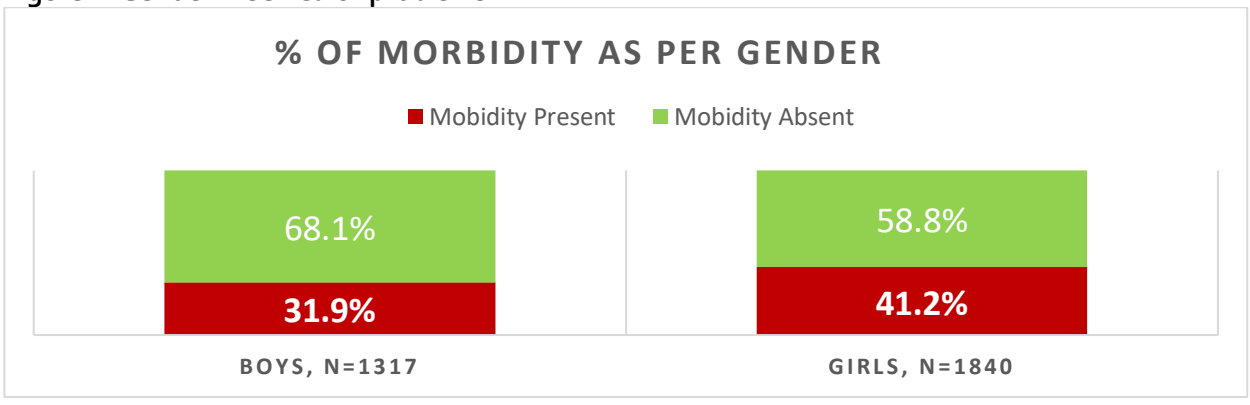
Gender	No.	Average Weight Mean ± SD (Kgs)	t value	p value
Male	1317	28.1 ± 1.6	5.59	<0.001
Female	1840	27.8 ± 1.4		
		Average Height Mean ± SD (cms)		
Male	1317	138 ± 2.1	22.77	<0.001
Female	1840	136.5 ± 1.6		

As per ICD 10, 62.2% of the total children were suffering from at least one health-related issue. Morbidities were present in about 68% of boys and in girls, it was seen in about 58.8% ($p < 0.001$) (Fig.2). The majority had dental caries (23.9%), followed by skin problems (8.9%) and malnutrition (6%). Mental and behavioral problems were seen in very few children (0.3%). The difference among male and female morbidities was found to be statistically significant ($p<0.001$). (Table 4)

Table 4: Health problems in children as per ICD codes*

S.no.	ICD code	Disease	Boys		Girls		Total N=3157	
			n	%	n	%	N	%
1.	A00-B99	Infective & Parasitic	12	0.9	9	0.5	21	0.7
2.	D50-D89	Blood forming organs	18	1.4	33	1.8	51	1.6
3.	E40-E46	Malnutrition	81	6.2	107	5.8	188	6.0
4.	E50-E64	Anaemia	49	3.7	67	3.6	116	3.7
5.	F00-F99	Mental & Behavioural problems	7	0.5	4	0.2	11	0.3
6.	H00-H59	Eye	58	4.4	73	4.0	131	4.1
7.	H60-H95	Ear	53	4.0	29	1.6	82	2.6
8.	J00-J99	Respiratory	57	4.3	54	2.9	111	3.5
9.	**K00-K14**	**Dental Caries**	**299**	**22.7**	**455**	**24.7**	**754**	**23.9**
10.	L00-L99	Skin	153	11.6	129	7.0	282	8.9
11.	M00-M99	Musculoskeletal	19	1.4	33	1.8	52	1.6
12.	N00-N99	Genito-Urinary	9	0.7	3	0.2	12	0.4
13.	Q10-Q15	Congenital Malformations	6	0.5	3	0.2	9	0.3
14.	R00-R09	Circulatory & Respiratory system Symptoms & signs	13	1.0	6	0.3	19	0.6
15.	R10-R19	Digestive system	46	3.5	71	3.9	117	3.7
16.	R59	Lymph nodes	16	1.2	6	0.3	22	0.7
		Total	**896**	**68**	**1082**	**58.8**	**1978**	**62.6**

Figure 2: Gender wise health problems*:



p<0.001- statistically significant

Discussion

In the present study, the Mean± SD age of boys and girls were 9.5 ± 3.0 years and 9.3± 2.8 years respectively. Overall, the boys constituted 42% and girls were about 58% compared to a study done in Belgaum which had 48.4% were boys and 51.6% were girls. The increase in girl's percentage reflects the effective implementation of programmes aimed at improving girl education. The Mean ± SD age of menarche among school girls was found to be 13.1 ± 1.3 years which was similar to another study by Khatoon T., et al,[18] done in Lucknow. During our research, we found out that one or other morbidities were seen in around 62.6% children which was similar to 60% of children in a study conducted in Maharashtra by Kausar H. et al[24]. The majority of the children were diagnosed with dental caries (23.9%) in this study which was similar to a study done by Kulkarni RR[5] which revealed dental caries as 24.9%. Skin diseases in our study were higher (8.9%) when compared to study done by Pandey S., et al[6] which revealed skin problems around 2.5%. Nutritional problems like malnutrition and anemia in the participants were about 6% and 3.7% respectively which were lower to studies conducted by Kumawat R., et al[22] in Bikaner and Nigudgi S R. et al[21] in Gulbarga which revealed malnutrition as 24.17% and anemia as 10.05%. This difference may be attributed to effective implementation of school nutrition programme such as mid-day meal programme.The eye problems in our study were higher (4.1%) when compared to the findings by Rangavittal S.,[19] in South India which revealed eye problems at 4.03%. Gastrointestinal and Respiratory problems in our research were lower, i.e., 3.7% and 3.5% of the children respectively when compared to findings by Kar K.,et[23] al in Odisha and Awate RV., et al[20] in Maharashtra which disclosed gastrointestinal problems at 6.2% and respiratory problems at 10.66%.Mental and behavioral difficulties were also observed to be lower, i.e., 0.3% of the children in our study when compared to a study done in Rohtak, Haryana by Dangi K.[17] revealed that about 5.5% of the children had mental and behavioral issues.

Conclusion

The study findings elucidate the current health status of the children attending school. Health problems were more common in boys than in girls, with over half of the children suffering from at least one health-related issue. The diseases most commonly prevalent among different age groups were dental caries and skin diseases. This finding necessitates strengthening of School health programs in the country.

Recommendations

By incorporating preventive, promotive, and curative services into school health clinics, we can ensure comprehensive care for students. Addressing these health issues necessitates a multi-faceted approach involving improved access to healthcare services, nutrition interventions, sanitation improvements, health education initiatives, and comprehensive mental health support systems tailored to the unique needs of school-going children.

Limitations:

1. Children not present on the date of study were missed and not included in the study.
2. Further muti-school studies will be useful to identify the health issues in school children.

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