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Original Research Article

HEALTH PROFILE AND NUTRITIONAL STATUS OF PRIMARY SCHOOL CHILDREN IN RURAL AREA OF TERTIARY CARE CENTER

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ABSTRACT

Background: Nutritional status reflects an individual's health based on nutrient intake and utilization. The nutrition of primary school children is crucial for their growth, development, and long-term health, especially in developing countries like India, where undernutrition due to poor dietary habits and socioeconomic factors can significantly hinder their physical and mental development. The objectives of the study were to assess the health profile and nutritional status of primary school children and study the factors associated with undernutrition.

Materials and Methods: A cross-sectional study was carried out with 160 children from a government school in a rural area of Maharashtra. Convenient sampling was used for selecting the participants. Anthropometric measurements, including height and weight, were recorded using standardized instruments. Body Mass Index (BMI) for age, height for age, and weight for age z-scores were computed according to WHO growth standards. Data analysis was performed using Open Epi, employing descriptive statistics and chi-square tests to examine associations between nutritional status and various factors. Ethical approval was granted by the Ethical Review Committee, and informed consent was obtained from the parents or guardians of all participating children.

Results and Conclusion: Out of 160 subjects, 22.5% (36) were stunted, and 30.6% (49) experienced wasting. Underweight prevalence was 35.7% (57). The gender distribution included 77 girls (48.1%) and 83 boys (51.9%). Mean age of boy was 7.90 ± 1.49 years and mean age of girl was 7.79 ± 1.56 years, with age ranging from 5 to 11 years.

Keywords: Nutritional status, primary school children, health profile.

INTRODUCTION

A healthy childhood lays the foundation for a healthy adulthood. School health though important, is not in the priority list of many government across the globe. There is a high prevalence of malnutrition among school‐going children in low‐ and middle‐income countries.[1] School-going age is very significant because this is the main period of life to make the body store nutrients. These stores help in the rapid growth of children.[2] Nutrition of primary school children determines their life time health, strength and intellectual vitality. This span of life is a dynamic stage of physical growth and mental development.[3] Undernutrition impairs physical, mental, and behavioral development of children and is a major cause of child death. Growth monitoring provides a diagnostic tool for health and nutrition surveillance of individual children and can serve as an entry point for community mobilization and social action.[4] On the other hand, we have the burden of obesity also in children due to lifestyle factors and unbalanced eating habits. In countries like India and other developing countries this rising epidemic with the problem of undernutrition has led to double burden of malnutrition.[5]

It is well known that as children grow older and enter adolescence, their eating habits change in both quantity and quality. A healthy diet is not their priority during childhood and poor dietary practices may lead to several health problems.2 The National Family Health Survey 5 (2019-2021) reports that 36% of children under five in India are stunted, 19% are wasted, 32% are underweight, and 3% are overweight.[6]

In developing countries, children's nutritional status is influenced by socioeconomic factors, awareness of diseases like diarrhea and acute respiratory infections, the mother's education level, and access to safe drinking water.[7] School-going children are the future workforce and will play a key role in improving the socio-economic conditions of developing countries like India. Therefore, ensuring their mental and physical well-being is of utmost importance, and this can be achieved through adequate nutrition.[2]

Poor health among the school going children due to nutritional deficiencies had resulted in high absenteeism and early dropouts.[8] India's commitment to the 2030 SDGs emphasizes ending hunger, ensuring food security, improving nutrition, and promoting sustainable agriculture. Failure to reduce undernutrition threatens the country's goal of reducing child mortality as per the SDGs.7 Understanding the need of the hour, growth monitoring and surveillance are considered to play a pivotal role in child health programs.[9]

Need for study

Proper nutrition during school age was essential to address deficiencies from earlier childhood. Recognizing this, understanding the nutritional status of school-going children became crucial. Additionally, existing literature on the nutritional health of school children in rural areas was limited. Against this backdrop, the present study aimed to investigate the health profile and nutritional status of primary school children in rural areas.

MATERIAL AND METHODS

A cross-sectional study was conducted at a Government Primary School from January to March 2024. The study included all 160 children present at the school (out of a total enrollment of 165) located in the rural field practice area of a medical college in Maharashtra. The study involved students enrolled in classes from first to fifth grade. Permission to conduct the research was obtained from both the school administration and the children's parents. Additionally, verbal assent was obtained from children aged 6 to 11 years.

Anthropometric measurements, along with clinical and physical examinations, were performed on the school premises. Weight was measured to the nearest 100 grams using a digital scale, and height was measured to the nearest 0.5 cm. "Height-for-age" was classified as normal, mild to moderate stunting, or severe stunting using the 2007 WHO reference z-scores for children aged 5–19 years, with separate reference tables for boys and girls. Severe stunting was defined as a height-for-age below -3 standard deviations (SD), mild to moderate stunting as height-for-age between -2SD and -3SD, and normal height as above -2SD. "Weight-for-age" was similarly categorized as normal, mild to moderate underweight, or severe underweight, based on WHO z-score tables for boys and girls aged 5–19 years.10

Data were analyzed using Microsoft Excel 2021 and Open EPI-Info Version 3.01 (updated on 2013/04/06). Descriptive statistics (percentage, mean, standard deviation) were used to summarize the data. The chi-squared test was applied to assess the association of various factors, with significance determined by a p-value of less than 0.05.

RESULTS

A total of 160 children participated in the study, consisting of 77 girls (48.13%) and 83 boys (51.87%). The mean age of the boys was 7.90 ± 1.49 years, and the mean age of the girls was 7.79 ± 1.56 years, with ages ranging from 5 to 11 years. The younger age groups (6-7 years) had the highest participation across both genders.

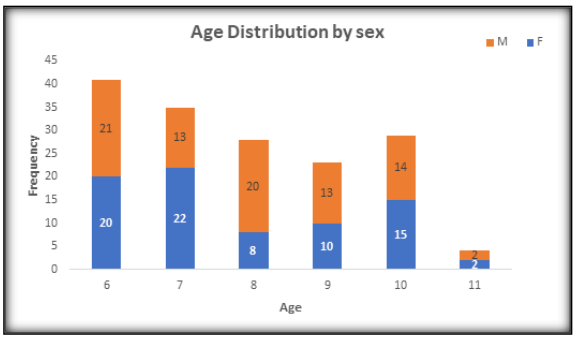

Figure 1: Distribution of study participant by Age and Sex

The above [Table 1] shows that 108 children (67.5%) had a normal BMI. Additionally, 39 children (24.38%) had a BMI less than 2 standard deviations (S.D.), 10 children (6.25%) had a BMI less than 3 standard deviations (S.D.), 1 child (0.62%) had a BMI between +1 S.D. and +2 S.D., and 2 children (1.25%) had a BMI greater than +2 S.D. While the majority of adolescents (67.5%) had a normal BMI, a significant portion (30.63%) were either severely thin or thin, with thinness being more prevalent among younger age groups, particularly among boys aged 6 and girls aged 7.

In this [Table 2], majority 63.7% children were had a normal weight for their age. However, undernutrition remains a concern, with 27.6% of the children classified as moderately underweight and 8.1% as severely underweight. The prevalence of undernutrition was similar among boys and girls, though a slightly higher percentage of girls were

severely underweight (9.1%) compared to boys (7.2%).

The [Table 3] presents the distribution of children based on their Height for Age Z-Score, which is used to assess stunting—a measure of chronic malnutrition. Most children (77.5%) in the study had a normal height for their age, 32 (20%) were moderately stunted and only 4 (2.5%) were severely stunted with a slightly higher occurrence in girls (3.9%) compared to boys (1.2%).

Table 1: Age wise BMI distribution in adolescents using WHO Growth Chart.

Age (years)	Gender	No.	< -3SD (severe Thinness)	<-2SD (Thinness)	-2SD to +1SD (Normal)	+1SD to +2SD (Overweight)	>+2SD (Obese)
6	Boys	21	0	10	11	0	0
	Girls	20	1	3	16	0	0
7	Boys	13	4	2	7	0	0
	Girls	22	0	8	14	0	0
8	Boys	20	1	4	15	0	0
	Girls	8	2	1	5	0	0
9	Boys	13	0	0	12	1	0
	Girls	10	1	2	6	0	1
≥10	Boys	16	1	3	12	0	0
	Girls	17	0	6	10	0	1
Total		160 (100%)	10 (6.25%)	39 (24.38%)	108 (67.5%)	1 (0.62%)	2 (1.25%)

Table 2: Distribution of children According to Weight for Age Z-Score.

Z-Score Category Weight for age	Boys(n=83)		Girls(n=77)		Total
	Frequency	(%)	Frequency	(%)	
Normal	55	66.3	47	61.0	102 (63.7%)
Moderate Underweight	22	26.5	22	28.6	44 (27.6%)
Severe Underweight	6	7.2	7	9.1	13 (8.1%)
Overweight	0	0	1	1.3	1 (0.6 %)
Total	83	100	77	100	160 (100%)

Table 3: Distribution of children According to Height for age Z-Score.

Z-Score Category Height for Age	Boys(n=83)		Girls(n=77)		Total
	Frequency	(%)	Frequency	(%)	
Normal	66	79.5	58	75.3	124 (77.5%)
Moderate Stunting	16	19.3	16	20.8	32 (20%)
Severe Stunting	1	1.2	3	3.9	4 (2.5%)
Total	83	100	77	100	160 (100)

Table 4: Sociodemographic characteristics of children according to nutritional status.

Variable		Underweight N=57	Normal N=102	$\chi 2$	p value
Age	6	14	27	8.203	0.084
	7	15	20		
	8	15	13		
	9	5	17		
	≥10	8	25		
Sex	Boys	28	55	0.3375	0.561
	Girls	29	47		
Education of Mother	Illiterate	18	9	14.512	0.0023
	Primary	9	30		
	Mid school	19	38		
	Higher secondary	11	25		
Education of father *	Primary	7	11	1.076	0.584
	Mid school	29	41		
	Higher secondary	21	43		
SES Class	II	2	11	8.9206	0.0116
	III	14	42		
	IV	41	49		

(* Children (7) in the normal category had either lost their father or experienced separation between their mother and father, and were living with their grandparents.)

A significant association was found between the mother's education level and the child's nutritional status (p=0.0023). Children of illiterate mothers were more likely to be underweight (31.6%) compared to those with more educated mothers. Also, there was a significant association between SES class and nutritional status (p=0.0116). Children from lower SES classes (Class II and III) had a higher prevalence of underweight compared to those from higher SES classes (Class IV).

DISCUSSION

The present study investigated the nutritional status of primary school children, focusing on 160 children aged 6 to 11 years, comprising 77 girls (48.13%) and

83 boys (51.87%). Among the children, 22.5% were stunted, 30.6% were wasted, and the prevalence of underweight was 35.7%. In comparison, a review study by Brij Pal Singh,[2] in Haryana reported that the prevalence of underweight children ranged from 6.6% to 83%, stunting from 13.8% to 56.1%, and wasting from 6.7% to 75%.

Our study found that while most children (63.7%) had a normal weight for their age, undernutrition was prevalent, affecting 35.7% of the population, with a slightly higher percentage of girls being severely underweight (9.1%) compared to boys (7.2%). Similarly, a study by N. C. Shivaprakash,[11] in Mandya district, Karnataka, found an overall prevalence of underweight among school children of 30.3%, with a higher prevalence in boys (32.3%) compared to girls (28.3%).

The analysis of height-for-age Z-scores revealed that 77.5% of children had a normal height, indicating that most were not affected by stunting. However, 20% were moderately stunted, and 2.5% were severely stunted, with a slightly higher prevalence of severe stunting among girls (3.9%) compared to boys (1.2%). A similar study by Basant Singh,[1] in Pune, Maharashtra, found that the prevalence of mild to moderate and severe stunting was 16.4% and 3%, respectively. Another study by Birendra Kumar Rajak,[4] in Patna reported a higher prevalence of severe stunting among girls (7.69%) compared to boys (3.84%). In a study by Anju Gahlot in Kanpur,[12] 54.7% of respondents were male, and 45.3% were female. Among the 360 study subjects, 72.2% had a normal height-for-age, while 27.8% were stunted, with a higher proportion of stunted girls (36.8%) compared to boys (20.3%).

Our study also found that while the majority of adolescents (67.5%) had a normal BMI, a significant portion (30.63%) were either severely thin or thin, with 0.62% classified as overweight and 1.25% as obese. Thinness was more prevalent among younger age groups, particularly among boys aged 6 and girls aged 7. Similarly, a study by Anita Aramani,[5] in Mangalore among primary school children reported the prevalence of undernourishment (thinness and severe thinness) at 40.5%, and overweight and obesity at 2.8% and 1.3%, respectively. The highest proportion of thinness and severe thinness was observed in the 8- and 9-year age groups. Another study by Dr. Seema P,[13] in Bangalore, conducted among 932 children, found that 416 children (44.6%) were thin for their age and gender. Severe thinness was observed in 175 children (18.8%), with 98 boys (21.3%) and 77 girls (16.3%) affected.

This study identified a significant positive association between maternal education (p=0.0023) and socioeconomic status (p=0.0116) with underweight prevalence, indicating that lower maternal education and lower socioeconomic status are linked to higher rates of underweight. These factors significantly impact the nutritional status of children. Similarly, a study by Paramasivam Raajeswari,[14] in Vellore District, Tamil Nadu, found that socioeconomic status significantly influenced children's nutritional status, with children from lower-class families having a much higher prevalence of underweight (44.7%), approximately 3 to 5 times greater than those from upper-class families. Mother's education also played a crucial role, with children of mothers who had only studied up to middle school showing a higher rate of underweight (57.9%). Another study by Saba Syed,[15] in Hyderabad, Telangana, found that maternal illiteracy was observed in over 62% of malnourished children compared to 48.3% of normal children. Maternal literacy showed a highly significant association with malnutrition among children (P<0.005).

CONCLUSION

This study reveals a significant prevalence of undernutrition among primary school children aged 6 to 11 years, with 35.7% being underweight, 30.6% wasted, and 22.5% stunted. Undernutrition was more prevalent among girls and younger children. Additionally, lower maternal education and socioeconomic status were strongly associated with higher rates of underweight, highlighting the need for targeted interventions to improve children's nutritional outcomes.

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