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Nutritional Status and its Determinants among School-Going Children in Rural Areas: A Cross-sectional Analysis.

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ABSTRACT

Nutritional status during childhood is a critical determinant of growth, cognitive development, and future health. Rural school-going children are particularly vulnerable to malnutrition due to poverty, limited dietary diversity, and lack of awareness. A cross-sectional study was conducted over one year among 60 children aged 6–14 years in rural schools. Data were collected using a pre-tested questionnaire covering demographic details, socioeconomic status, parental education, and dietary habits. Anthropometric measurements including height, weight, BMI, and mid-upper arm circumference (MUAC) were recorded following WHO guidelines. Data were analyzed using descriptive statistics and chi-square test to identify associations. Among the 60 participants, 30% were underweight, 56.7% had normal BMI, and 13.3% were overweight/obese. MUAC assessment indicated 26.7% malnutrition. Nutritional status showed significant association with parental education ($p=0.01$), socioeconomic status ($p=0.02$), and dietary diversity ($p=0.01$). Children of literate parents, higher socioeconomic groups, and those with adequate dietary diversity were more likely to have normal nutritional status. Malnutrition remains a significant concern among rural school-going children, influenced by socioeconomic and educational determinants. Interventions should target improving parental awareness, dietary diversity, and strengthening school-based nutrition programs.

Keywords: Nutritional status, Rural children, Determinants

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INTRODUCTION

Childhood nutrition is a cornerstone of health and development, directly influencing growth, cognitive performance, immunity, and future well-being. School-going children, particularly those in rural areas, represent a vulnerable group as they are in a dynamic phase of physical and mental development [1].

Malnutrition—whether undernutrition, micronutrient deficiencies, or emerging overnutrition—remains a major public health concern in developing countries, including India [2, 3]. Rural children often face challenges such as poverty, food insecurity, limited dietary diversity, and inadequate access to health services, which predispose them to nutritional deficiencies [4]. Moreover, parental education, socioeconomic status, sanitation, and cultural practices strongly shape dietary intake and health outcomes. School environments also play a critical role, as midday meal programs and nutritional education can either mitigate or exacerbate disparities [5]. Despite national efforts to improve child nutrition through integrated schemes, significant gaps persist in rural communities. Assessing the nutritional status and identifying its determinants among school-going children is vital for designing targeted interventions.

METHODOLOGY

This cross-sectional study was conducted over a period of one year among school-going children in rural areas. A total of 60 children were included in the study, selected using simple random sampling from government and private schools located in the defined rural field practice area. The study population comprised children aged 6–14 years who were present on the day of survey and whose parents or guardians provided informed consent. Children with chronic illnesses or physical disabilities that could influence growth and nutrition were excluded. Data collection was carried out through a pre-tested, structured questionnaire administered to parents and guardians, supplemented by direct interviews with children. The questionnaire included information on demographic characteristics, socioeconomic status, dietary habits, personal hygiene, and environmental factors. Socioeconomic classification was assessed using a standard scale appropriate for rural households. School records were also reviewed to verify age and class of the participants.

Anthropometric measurements were obtained following standard WHO guidelines. Weight was measured using a calibrated digital weighing scale, and height was recorded using a stadiometer with children standing erect without footwear. Body Mass Index (BMI) was calculated and compared with WHO growth standards to classify nutritional status into categories of underweight, normal, overweight, or obese. Mid-upper arm circumference (MUAC) was also measured as an additional indicator of nutritional status.

Data were entered in Microsoft Excel and analyzed using SPSS software. Descriptive statistics such as mean, standard deviation, and proportions were used to describe demographic and nutritional characteristics. Chi-square test was applied to study the association between nutritional status and determinants such as socioeconomic status, parental education, and dietary habits. A p-value of less than 0.05 was considered statistically significant. Ethical clearance was obtained from the institutional ethics committee prior to the commencement of the study.

RESULTS

Table 1: Demographic Characteristics of Study Participants (n = 60)

Parameter	Category	Number (%)
Age Group (years)	6–9	22 (36.7%)
	10–12	24 (40.0%)
	13–14	14 (23.3%)
Gender	Male	32 (53.3%)
	Female	28 (46.7%)
Socioeconomic Status	Low	30 (50.0%)
	Middle	20 (33.3%)
	High	10 (16.7%)

Table 2: Nutritional Status of Study Participants (n = 60)

Nutritional Indicator	Category	Number (%)
BMI-for-age	Underweight	18 (30.0%)
	Normal	34 (56.7%)
	Overweight/Obese	8 (13.3%)
MUAC Classification	<12.5 cm (Malnourished)	16 (26.7%)
	≥12.5 cm (Normal)	44 (73.3%)

Table 3: Association of Nutritional Status with Determinants (n = 60)

Determinant	Normal Nutrition (n=34)	Malnourished (n=26)	p-value
Parental Education	Literate: 24 (70.6%)	Literate: 8 (30.8%)	0.01*
	Illiterate: 10 (29.4%)	Illiterate: 18 (69.2%)	
Socioeconomic Status	Middle/High: 24 (70.6%)	Middle/High: 6 (23.1%)	0.02*
	Low: 10 (29.4%)	Low: 20 (76.9%)	
Dietary Diversity Score	Adequate: 26 (76.5%)	Adequate: 7 (26.9%)	0.01*
	Inadequate: 8 (23.5%)	Inadequate: 19 (73.1%)	

*Significant association (p < 0.05)

DISCUSSION

The present cross-sectional study assessed the nutritional status and its determinants among 60 school-going children in rural areas. The findings highlight a substantial burden of malnutrition, with 30% of children classified as underweight and 26.7% identified as malnourished by MUAC standards. Although more than half of the children (56.7%) had a normal BMI-for-age, the coexistence of undernutrition and overweight (13.3%) indicates the early emergence of a double burden of malnutrition in rural settings. Such findings underscore the nutritional transition occurring even in rural populations, where traditional problems of undernutrition are now compounded by overweight due to dietary changes and sedentary lifestyles [6, 7].

Age and gender distribution revealed that malnutrition was more prevalent in the younger age groups (6–9 years), likely due to inadequate dietary intake and higher susceptibility to infections. Although both genders were affected, boys outnumbered girls in absolute frequency of malnutrition, which may be linked to sample distribution. However, gender-based nutritional disparities are commonly reported in rural India, often influenced by cultural preferences, though this study did not show a striking difference. Socioeconomic status played a significant role, with half of the participants belonging to the low-income group. Children from these households showed higher rates of undernutrition, reaffirming the strong association between poverty, food insecurity, and poor health outcomes [8].

Parental education emerged as a significant determinant of nutritional status. Children of literate parents were more likely to have normal nutrition compared to those of illiterate parents. This finding supports existing evidence that parental education enhances awareness about dietary diversity, hygiene practices, and healthcare-seeking behavior, ultimately leading to better child nutrition. In contrast, illiterate parents may have limited knowledge regarding balanced diets, appropriate feeding practices, and the importance of sanitation, thereby contributing to higher rates of malnutrition. This association highlights the need for targeted health education interventions focusing on rural parents, particularly mothers, who are primary caregivers [9, 10].

Dietary diversity was also found to be significantly associated with nutritional outcomes. Children with adequate dietary diversity were predominantly in the normal nutrition group, while inadequate diversity correlated with higher malnutrition rates. This suggests that monotonous cereal-based diets common in rural areas, often lacking in fruits, vegetables, and animal proteins, contribute to micronutrient deficiencies and growth retardation. Enhancing dietary diversity through awareness campaigns, school meal fortification, and promotion of kitchen gardens could be effective strategies to address these gaps.

Our study also found a small but important proportion of overweight and obese children, reflecting changing lifestyles even in rural communities. Increased access to packaged foods, reduced

physical activity, and lack of awareness about healthy eating may explain this emerging trend. Although the numbers are currently low, if unaddressed, this could lead to an increased burden of childhood obesity and its associated comorbidities in the future.

In conclusion, the results highlight that malnutrition among rural school-going children remains a significant public health problem, influenced by parental education, socioeconomic status, and dietary diversity. Interventions should not only address undernutrition but also prevent overweight by promoting balanced diets and active lifestyles. Strengthening school-based nutrition programs, community health education, and targeted poverty alleviation measures could collectively help improve the nutritional profile of rural children.

CONCLUSION

Malnutrition remains a significant concern among rural school-going children, influenced by socioeconomic and educational determinants. Interventions should target improving parental awareness, dietary diversity, and strengthening school-based nutrition programs.

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