International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Prevalence of Malnutrition Among School Children in Deoghar District, Jharkhand: A Cross-Sectional Nutritional Assessment Study

Sharanabasappa S[1], Prof Dr Anupama Oka[2]

[1]PhD Scholar, SJJT UNIVERSITY,
[2]Research Guide, SJJT UNIVERSITY

ABSTRACT

Background: Malnutrition among school-aged children continues to be a major public health concern in India, particularly in rural and socio-economically disadvantaged regions such as Jharkhand. Deoghar district, predominantly rural in nature, faces persistent challenges related to child nutrition and growth. Malnutrition during school age adversely affects physical growth, cognitive development, and academic performance.

Methods: A community-based cross-sectional study was conducted during 2023 among 179 school-going children aged 6–10 years from selected rural areas of Deoghar district, Jharkhand. Standard anthropometric techniques were used to measure height and weight. Body Mass Index (BMI) was calculated and nutritional status was assessed using WHO (2007) BMI-for-age percentile standards. Statistical analysis was performed using SPSS.

Results: The mean height, weight, and BMI of children were lower than WHO reference values across most age groups. Based on BMI-for-age percentiles, 36.32% of children were undernourished, 53.07% had normal nutritional status, and 10.61% were overweight. No child was classified as obese. The prevalence of undernutrition was comparable among boys (37.9%) and girls (37%). No statistically significant sex difference was observed in mean BMI.

Conclusion: A high prevalence of undernutrition among school children underscores the urgent need for strengthening school-based nutrition programs, regular growth monitoring, and intersectoral coordination to address malnutrition during late childhood

Keywords: Anthropometry, BMI-for-age, Malnutrition, School children, Deoghar district

INTRODUCTION

Malnutrition among children continues to be a major public health challenge globally, particularly in low- and middle-income countries. Despite notable economic growth and the implementation of several national nutrition programs, India continues to bear a disproportionate burden of childhood malnutrition. Malnutrition during childhood adversely affects physical growth, cognitive development, immunity, and overall health, thereby limiting human capital formation and national productivity. School-age children constitute a nutritionally vulnerable group, yet they remain comparatively underrepresented in nutrition research and programmatic focus.

In India, malnutrition is traditionally addressed during the first 1,000 days of life; however, evidence suggests that nutritional deficits often persist beyond early childhood and continue into school age. The age group of 6–10 years represents a critical transitional phase characterized by steady physical growth, neurological development, and increasing academic demands. Nutritional inadequacies during this period may result in stunting, underweight, delayed puberty, reduced learning capacity, poor school performance, and increased susceptibility to infections. These adverse outcomes can have long-term consequences extending into adolescence and adulthood.

Jharkhand is one of the most nutritionally vulnerable states in India, with a high proportion of rural population and significant representation of socio-economically disadvantaged communities. According to the National Family Health Survey (NFHS-5), the state continues to report a high prevalence of undernutrition among children. Factors such as poverty, food insecurity, low parental education, limited dietary diversity, inadequate access to health services, and suboptimal sanitation contribute to poor nutritional outcomes in the region. Within Jharkhand, Deoghar district is predominantly rural, and many households depend on agriculture and daily wage labor, which are often associated with unstable income and food insecurity.

School-going children in rural districts like Deoghar are particularly vulnerable to malnutrition due to irregular meal patterns, poor dietary quality, recurrent infections, and limited health monitoring. Although national initiatives such as the Mid-Day Meal Scheme, Rashtriya Bal Swasthya Karyakram (RBSK), and POSHAN Abhiyaan aim to improve child nutrition, gaps in implementation and monitoring at the grassroots level continue to pose challenges. Regular assessment of nutritional status among school children is therefore essential to evaluate the effectiveness of these programs and to identify children at risk of malnutrition.

Recent evidence suggests that school-age malnutrition is increasingly recognized as a determinant of educational outcomes and long-term economic productivity. Studies have shown that undernourished school children exhibit poor attention span, reduced learning capacity, increased absenteeism, and lower academic achievement. Addressing malnutrition during school age therefore offers an important opportunity for nutritional catch-up and prevention of intergenerational undernutrition. This highlights the need to expand the nutrition policy focus beyond early childhood to include school-going children, particularly in nutritionally vulnerable regions like Jharkhand.

Anthropometric assessment is a widely accepted, simple, and cost-effective method for evaluating the nutritional status of children. Indicators such as height, weight, and Body Mass Index (BMI) for age provide valuable insights into both acute and chronic forms of malnutrition. BMI-for-age percentiles recommended by the World Health Organization (WHO) are commonly used to classify undernutrition, normal nutritional status, and overweight among school-age children. These measurements not only reflect current nutritional status but also serve as predictors of future health outcomes.

Despite the public health importance of school-age nutrition, limited data are available on the anthropometric and nutritional status of school children in Deoghar district. Most existing studies from Jharkhand focus on under-five children or adolescents, leaving a critical evidence gap for the 6–10-year age group. Understanding the magnitude and pattern of malnutrition in this population is essential for designing targeted interventions and strengthening school-based health and nutrition services.

In this context, the present study was undertaken to assess the prevalence of malnutrition among school-going children aged 6–10 years in Deoghar district of Jharkhand using anthropometric measurements. The

findings are expected to provide baseline information for planners, health professionals, and policymakers to formulate effective strategies for improving child nutrition and overall well-being.

Flow Diagram: Conceptual Framework of the Study Background

Global Burden of Childhood Malnutrition
↓
High Prevalence of Malnutrition in Low- and Middle-Income Countries
↓
India's Persistent Childhood Malnutrition Despite National Nutrition Programs
↓
Jharkhand as a Nutritionally Vulnerable State
(High rural population, poverty, food insecurity, limited health access)
↓
Deoghar District Context
(Predominantly rural, low socio-economic status, limited local data)
↓
School-Age Children (6–10 years)
(Critical period for physical growth and cognitive development)
↓
Consequences of Malnutrition at School Age
(Growth retardation, poor immunity, reduced academic performance)
↓
Need for Anthropometric Assessment
(Simple, reliable indicators: height, weight, BMI-for-age)
↓
Evidence Gap in Deoghar District
(Limited studies focusing on school-going children)
↓
Present Study
Assessment of Malnutrition among School Children
of Deoghar District, Jharkhand

MATERIALS AND METHODS

The present cross-sectional study was carried out during 2023 in selected rural areas of Deoghar district, Jharkhand. A total of 179 school-going children aged 6–10 years were included in the study.

Height was measured to the nearest 0.1 cm using an anthropometric rod, and weight was measured to the nearest 0.1 kg using a calibrated digital weighing scale. BMI was calculated using the formula:

BMI = Weight (kg) / Height (m^2)

Nutritional status was assessed using WHO (2007) BMI-for-age percentile standards. Children were categorized as undernourished (<5th percentile), normal (5th–85th percentile), overweight (85th–95th percentile), and obese (≥95th percentile). Data analysis was performed using SPSS, and a p-value ≤0.05 was considered statistically significant.

RESULTS AND DISCUSSION

Socio-demographic profile of the children

The socio-demographic characteristics of the selected children are presented in Table 1. Out of the total 179 school-going children studied, 48.6% were boys and 51.4% were girls. The majority of children belonged to the age group of 6–7 years (43.6%), followed by 8–9 years (31.8%) and 10 years (24.6%). The relatively higher proportion of younger children reflects early school enrollment in rural areas. Balanced representation of boys and girls allows for meaningful comparison of nutritional status across sexes.

Anthropometric characteristics of children

The mean height, weight, and BMI of the selected children are summarized in Table 2. The pooled mean height, weight, and BMI were 117.95 ± 14.53 cm, 20.93 ± 6.61 kg, and 14.92 ± 3.35 kg/m², respectively. Although girls showed slightly higher mean height and weight compared to boys, the differences were not statistically significant ($p > 0.05$). The absence of significant sex differences suggests similar nutritional exposure and living conditions among boys and girls in the study area. However, the mean anthropometric values for both sexes were lower than WHO (2007) reference standards, indicating suboptimal growth patterns among school children in Deoghar district.

These findings are consistent with studies conducted in other rural and tribal regions of India, which have reported lower anthropometric measurements among school-age children due to chronic nutritional inadequacies and socio-economic constraints (Medhi et al., 2007; Twara et al., 2015).

Age-wise anthropometric assessment

Age-wise distribution of height, weight, and BMI is shown in Table 3. A gradual increase in mean height and weight with advancing age was observed in both boys and girls, which is consistent with normal growth trends.

However, when compared with WHO growth standards, the mean values across most age groups were found to be lower, indicating growth faltering. Girls exhibited significantly higher mean height at ages 9 and 10 years compared to boys, which may be attributed to earlier pubertal growth spurts among girls. No statistically significant difference was observed in BMI across age groups, suggesting that both sexes are equally vulnerable to nutritional deficiencies.

Similar patterns have been reported in earlier studies among rural and tribal children, where girls showed marginally better linear growth during late childhood (Sinha and Kumari, 2018; Medhi et al., 2007).

Nutritional status based on BMI-for-age percentiles

The nutritional status of children based on BMI-for-age percentiles is presented in Table 4. The findings revealed that 36.32% of children were undernourished, while 53.07% had normal nutritional status. Additionally, 10.61% of children were classified as overweight, and no cases of obesity were observed.

The prevalence of undernutrition was nearly equal among boys (37.9%) and girls (37.0%), indicating that gender did not significantly influence nutritional outcomes. The high proportion of undernourished children reflects persistent nutritional deprivation and chronic energy deficiency among school-age children in Deoghar district.

The observed prevalence of undernutrition is comparable to findings from studies conducted among rural and tribal school children in Jharkhand, West Bengal, Uttar Pradesh, and Odisha, where undernutrition ranged from 34% to over 60% (Sinha and Kumari, 2018; Joshi et al., 2021; Twara et al., 2015). Although the prevalence in the present study is relatively lower than some earlier reports, it remains unacceptably high and warrants urgent public health attention.

The presence of overweight children, though comparatively lower, indicates the emerging double burden of malnutrition, where undernutrition coexists with overnutrition even in rural settings. This trend may be attributed to changing dietary patterns, reduced physical activity, and increased consumption of energy-dense foods.

Discussion in the context of public health implications

Malnutrition during school age has far-reaching implications for physical growth, cognitive development, immunity, and academic performance. The high prevalence of undernutrition observed in this study suggests that existing nutrition and school health programs may not be adequately addressing the needs of school-going children in rural Deoghar.

Anthropometric assessment remains a vital tool for early detection of malnutrition. Regular growth monitoring at schools, coupled with timely nutritional and health interventions, can help prevent long-term consequences such as stunting, poor educational outcomes, and reduced productivity in adulthood. The findings of this study emphasize the importance of strengthening school-based health services and nutrition surveillance systems in rural districts.

A substantial proportion of school-going children in Deoghar district continue to experience undernutrition, highlighting the need for sustained school-based nutrition and growth monitoring interventions.

Table 1: Socio-demographic profile of children (n = 179)

Variable	Category	Number	Percentage
Sex	Boys	87	48.6
	Girls	92	51.4
Age (years)	6–7	78	43.6
	8–9	57	31.8
	10	44	24.6

Table 2: Mean height, weight and BMI of selected children

Parameter	Boys (n=87)	Girls (n=92)	Total (n=179)	p-value
Height (cm)	115.78 ± 12.86	119.45 ± 15.48	117.95 ± 14.53	NS
Weight (kg)	20.56 ± 6.40	21.18 ± 6.77	20.93 ± 6.61	NS
BMI (kg/m²)	15.31 ± 4.08	14.65 ± 2.73	14.92 ± 3.35	NS

Values expressed as Mean ± SD; NS – Not significant

Table 3: Age-wise anthropometric characteristics of children

Age (years)	Sex	Weight (kg) Mean ± SD	Height (cm) Mean ± SD	BMI Mean ± SD
6	Boys	17.08 ± 4.43	108.50 ± 6.60	14.37 ± 2.60
	Girls	15.26 ± 2.58	109.54 ± 8.43	12.79 ± 2.36
7	Boys	17.88 ± 1.64	112.53 ± 9.12	14.23 ± 1.67
	Girls	17.06 ± 2.42	112.06 ± 1.10	13.88 ± 3.48
8	Boys	21.14 ± 5.34	116.19 ± 13.90	16.58 ± 7.28

Age (years)	Sex	Weight (kg) Mean ± SD	Height (cm) Mean ± SD	BMI Mean ± SD
	Girls	21.10 ± 3.63	118.00 ± 9.33	15.34 ± 3.16
9–10	Boys	22.35 ± 6.25	118.06 ± 9.96	15.97 ± 4.93
	Girls	26.52 ± 6.38	131.46 ± 11.06	15.33 ± 2.42

Table 4: Classification of children according to BMI-for-age percentiles

BMI-for-age percentile	Nutritional status	Boys n (%)	Girls n (%)	Total n (%)
<5th percentile	Undernutrition	33 (37.9)	34 (37.0)	65 (36.32)
5th–85th percentile	Normal	42 (48.3)	50 (54.3)	95 (53.07)
85th–95th percentile	Overweight	12 (13.8)	8 (8.7)	19 (10.61)
≥95th percentile	Obesity	0	0	0

CONCLUSION

The present study highlights a substantial burden of undernutrition among school-going children in Deoghar district, Jharkhand. Although more than half of the children had normal nutritional status, over one-third were undernourished, which may adversely affect their growth, health, and academic performance. The coexistence of undernutrition and overweight indicates an emerging double burden of malnutrition. Regular anthropometric monitoring, school health services, and nutrition-focused interventions are essential to improve child health outcomes in the region.

RECOMMENDATIONS

Based on the findings of the present study, the following recommendations are proposed to address malnutrition among school-going children in Deoghar district, Jharkhand:

1. Strengthening School Health and Nutrition Programs

Regular growth monitoring of school children should be institutionalized through school health programs. Periodic measurement of height, weight, and BMI can help in early identification of undernutrition and overweight, enabling timely referral and intervention.

2. Effective Implementation of Mid-Day Meal Scheme

The Mid-Day Meal (MDM) programme should be strengthened to ensure adequate quantity, quality, and nutritional adequacy of meals provided to school children. Emphasis should be placed on inclusion of protein-rich and micronutrient-dense foods to support optimal growth.

3. Nutrition Education for Parents and Teachers

Awareness programs should be conducted for parents, caregivers, and school teachers focusing on:

- Importance of balanced nutrition during school age
- Early signs of malnutrition
- Appropriate feeding practices for growing children

Community-based education can help improve household-level nutrition practices.

4. School-Based Nutrition Interventions

Schools should be encouraged to implement nutrition-sensitive initiatives, such as:

- School kitchen gardens
- Promotion of locally available, affordable, nutrient-rich foods

These measures can enhance dietary quality and sustainability of nutrition interventions.

5. Targeted Support for Undernourished Children

Children identified as undernourished should receive targeted nutritional supplementation and follow-up through existing public health systems, including Anganwadi services and primary health centers. Coordination between the health and education sectors is essential.

6. Integration with National Health Programs

The findings of this study should be integrated with ongoing programs such as:

- Rashtriya Bal Swasthya Karyakram (RBSK)
- POSHAN Abhiyaan to strengthen monitoring, reporting, and management of malnutrition at the district level.

7. Capacity Building of Frontline Health Workers

Training of ASHA workers, Anganwadi workers, and school health nurses on anthropometric assessment and interpretation of growth indicators should be enhanced to ensure accurate detection and management of malnutrition.

REFERENCES

1. Anurag, S., Syed, E.M. and Payal, M.S. (2012). Nutritional status of school-age children in urban slums of India. *Archives of Public Health*. 70(1): 8.
2. Awasthi, C.P., Kumar, S., Tiwari, P.P. and Singh, A.B. (2000). Nutritional status of preschool and school children in rural areas. *Journal of Dairying, Foods and Home Science*. 19(1): 16–21.
3. Chandra, K.R., Paddennavar, U.H. and Sadashivappa, T. (2006). Nutritional assessment of school children in Karnataka. *Science Engineering Technology*. 2: 1–19.
4. Medhi, G.K., Hazarika, N.C. and Mahanta, J. (2007). Nutritional status of adolescents. *Indian Journal of Pediatrics*. 74(4): 343–347.
5. National Family Health Survey (NFHS-5) (2019–21). *State Fact Sheet: Jharkhand*. IIPS, Mumbai.
6. Partnership for Child Development (1998). Anthropometric status of school children in five countries. *Proceedings of the Nutrition Society*. 57(1): 149–158.
7. Sinha, R. and Kumari, K. (2018). Prevalence of malnutrition among tribal school children in Jharkhand. *Indian Journal of Current Microbiology and Applied Sciences*. 7: 3619–3624.
8. Twara, T., Upasna, S. and Agrawal, A. (2015). Nutritional status of school-going tribal children. *International Journal of Health Sciences and Research*. 5(6): 347–352.
9. WHO (2007). *Growth Reference Data for 5–19 Years*. World Health Organization, Geneva.
10. UNICEF. (2019). *The State of the World's Children: Children, Food and Nutrition.* UNICEF, New York.
11. Black, R.E., et al. (2013). Maternal and child undernutrition and overweight in low-income and middle-income countries. *The Lancet*, 382(9890), 427–451.
12. Dewey, K.G. and Begum, K. (2011). Long-term consequences of stunting in early life. *Maternal & Child Nutrition*, 7(Suppl 3), 5–18.
13. Bundy, D.A.P., et al. (2018). *Disease Control Priorities, Third Edition: Child and Adolescent Health and Development.* World Bank, Washington DC.
14. Best, C., et al. (2010). What impact does nutrition have on children's educational outcomes? *A systematic review.* British Journal of Nutrition, 104(4), 1–15.

15. Global Nutrition Report. (2021). *The State of Global Nutrition.* Development Initiatives, Bristol, UK.
16. Ministry of Health and Family Welfare (MoHFW). (2020). *Operational Guidelines for School Health Programme under Ayushman Bharat.* Government of India.
17. Khadilkar, A., et al. (2015). Growth charts for Indian children. *Indian Pediatrics*, 52(9), 739–755.
18. Prentice, A.M. (2006). The emerging epidemic of obesity in developing countries. *International Journal of Epidemiology*, 35(1), 93–99.
19. Ranjani, H., et al. (2016). Epidemiology of childhood overweight & obesity in India. *Indian Journal of Medical Research*, 143(2), 160–174.
20. WHO. (2020). *Nutrition Landscape Information System (NLiS): Country Profile – India.* World Health Organization.