Original Research Article

NUTRITIONAL STATUS AMONG CHILDREN RESIDING IN GOVERNMENT SOCIAL WELFARE HOSTELS: A CROSS-SECTIONAL STUDY FROM TAMIL NADU, INDIA

Sriranganathan Thriunavukkarasu[1], Tamilarasan Muniyapillai[2], Sriandaal Venkateshvaran[3], Hemadharshini Subramaniyan[4]

[1]Assistant Professor, Department of Community Medicine, Srinivasan Medical College and Hospital, Dhanalakshmi Srinivasan University, Tiruchirappalli, Tamil Nadu, India.
[2]Associate Professor, Department of Community Medicine, Dhanalakshmi Srinivasan Medical College and Hospital, Perambalur, Tamil Nadu, India.
[3]Associate Professor, Department of Community Medicine, Vellamal Medical College Hospital & Research Institute, Madurai, Tamil Nadu, India.
[4]Post Graduate, Department of Biochemistry, SRM Medical College Hospital and Research Centre, Kattankulathur, Chengalpattu, Tamil Nadu, India.

ABSTRACT

Background: Adolescents residing in government social welfare hostels represent a vulnerable population requiring nutritional status assessment. This study evaluated nutritional status among hostel students in Perambalur district, Tamil Nadu.

Materials and Methods: A cross-sectional study was conducted among 351 students (aged 10-19 years) from 8 randomly selected government backward class and most backward class hostels during October 2016 to September 2018. Data were collected using a pre-tested structured questionnaire covering socio-demographic characteristics and anthropometric measurements. BMI-for-age was calculated using WHO standards.

Results: The mean age was 15±2 years, with 57% girls and 43% boys. Rural residence dominated (98%), with high parental illiteracy rates (fathers: 34.2%, mothers: 45.3%). Nutritional assessment revealed 45% of boys and 62% of girls had normal BMI-for-age, while 39% of boys and 29% of girls showed thinness. Severe thinness was observed in 15% of boys and 8% of girls, with only 1% overweight in both genders.

Conclusion: While nutritional status was generally satisfactory due to government welfare programs, the prevalence of thinness remains a concern requiring continued nutritional monitoring and intervention.

Keywords: Adolescent nutrition, nutritional status, social welfare hostels, BMI-for-age, malnutrition.

INTRODUCTION

Adolescence represents a critical period of development, with approximately 1.2 billion adolescents worldwide constituting 16% of the global population.[1] In India, adolescents aged 10-19 years comprise nearly 253 million individuals, representing 21% of the national population.[2] Government social welfare hostels serve as residential facilities for children from socioeconomically disadvantaged backgrounds, particularly those belonging to backward classes and most backward classes.

The nutritional status during adolescence significantly influences physical growth, cognitive development, and future health outcomes.[3] Malnutrition during this period can lead to stunting, delayed sexual maturation, reduced work capacity, and increased susceptibility to infections.[4] The communal living environment in hostels may present unique challenges and opportunities for nutritional intervention.

Previous studies have documented varying nutritional patterns among adolescent populations in institutional settings. Melaku et al. reported stunting prevalence of 37.7% and thinness in 32.4% of boys, with 21.2% stunting and 21.6% thinness among girls in Ethiopian adolescents.[5] This study assessed the nutritional status among children residing in government social welfare hostels in Perambalur district, Tamil Nadu, evaluating the effectiveness of existing nutritional programs and identifying areas for improvement.

MATERIALS AND METHODS

Study Design and Setting: A cross-sectional study was conducted in Perambalur district, Tamil Nadu, which operates 24 government social welfare hostels for backward class and most backward class school children, housing approximately 1,200 students.[8]

Study Population and Sampling: Using simple random sampling, 8 hostels (one-third of total hostels) were selected using random number tables. Sample size was calculated using the formula $n_0 = (3.84 \times p \times q)/d^2$, where population size (N) = 1,200, confidence level = 95%, allowable error (d) = 5%, and assumed prevalence (p) = 50%. The calculated minimum sample size was 291, increased to 320 accounting for 10% non-response rate. The final sample included 351 participants representing all residents of the selected 8 hostels.

Data Collection

Inclusion Criteria

All residents of selected government backward class and most backward class school hostels willing to participate.

Exclusion Criteria

Unwilling to participate.

A pre-designed, pre-tested structured questionnaire comprised two sections: socio-demographic characteristics (age, gender, class, residential address, parental education and occupation) and anthropometric measurements (height, weight, and calculated BMI-for-age using WHO growth standards).[9]

Nutritional Status Assessment

BMI-for-age was classified according to WHO standards:[10]

- Normal: $\geq$-1 SD to $\leq$+1 SD
- Thinness: <-2 SD to $\geq$-3 SD
- Severe thinness: <-3 SD
- Overweight: >+1 SD to $\leq$+2 SD
- Obesity: >+2 SD

Statistical Analysis: Data were analyzed using SPSS version 21.0. Qualitative variables were presented as frequencies and percentages, while continuous variables were expressed as mean ± standard deviation. Pearson Chi-square test was used to assess associations between variables, with Fisher's exact test applied when cell frequencies were <5. Statistical significance was set at $p<0.05$.

RESULTS

Among 351 participants, the mean age was 15±2 years. The study population comprised 57% girls and 43% boys, with 98% from rural areas.

Nutritional Status by Gender

Table 1: Distribution of BMI-for-Age among Boys (N=151)

BMI-for-Age Category	Frequency (n)	Percentage (%)
Normal	68	45.0
Thinness	59	39.0
Severe Thinness	23	15.0
Overweight	1	1.0
Total	151	100.0

Table 2: Distribution of BMI-for-Age among Girls (N=200)

BMI-for-Age Category	Frequency (n)	Percentage (%)
Normal	124	62.0
Thinness	58	29.0
Severe Thinness	16	8.0
Overweight	2	1.0
Total	200	100.0

Table 3: Association between BMI-for-Age and Gender (N=351)

BMI Category	Boys (n=151) n (%)	Girls (n=200) n (%)	Total (n=351) n (%)	χ^2 Value	P Value
Normal	68 (45.0)	124 (62.0)	192 (54.7)	12.584	<0.001*
Thinness	59 (39.0)	58 (29.0)	117 (33.3)		
Severe Thinness	23 (15.0)	16 (8.0)	39 (11.1)		
Overweight	1 (1.0)	2 (1.0)	3 (0.9)		

*Statistically significant ($p<0.05$)

Table 4: Association between BMI-for-Age and Age Groups (N=351)

BMI Category	Early Adolescence (n=68) n (%)	Middle Adolescence (n=183) n (%)	Late Adolescence (n=100) n (%)	Fisher's Exact Test	P Value
Normal	42 (61.8)	98 (53.6)	52 (52.0)	8.467	0.152
Thinness	18 (26.5)	62 (33.9)	37 (37.0)		
Severe Thinness	7 (10.3)	22 (12.0)	10 (10.0)		
Overweight	1 (1.5)	1 (0.5)	1 (1.0)		

Gender and Age Analysis: Girls demonstrated significantly better nutritional status compared to boys, with a higher proportion in the normal BMI-for-age category (62.0% vs 45.0%, χ^2=12.584, p<0.001). The statistically significant gender difference (χ^2 = 12.584, p<0.001) indicates boys are at higher risk for undernutrition in this population. The prevalence of thinness was lower among girls (29.0%) compared to boys (39.0%), and severe thinness was markedly less common in girls (8.0% vs 15.0%).

Early adolescents showed the highest prevalence of normal BMI-for-age (61.8%), followed by middle adolescents (53.6%) and late adolescents (52.0%). However, this association was not statistically significant (p=0.152), suggesting consistent nutritional patterns across age groups within the hostel setting.

DISCUSSION

Nutritional Status Outcomes: The nutritional assessment revealed encouraging results, with 45% of boys and 62% of girls maintaining normal BMI-for-age. This finding suggests the effectiveness of government nutritional intervention programs including midday meal schemes, nutritional supplements, and bi-annual deworming programs implemented in hostel settings.[13,14]

The significantly better nutritional status among girls compared to boys (p<0.001) is consistent with targeted government programs focusing on girl child nutrition and may reflect biological differences in growth patterns during adolescence.[15] This gender difference contrasts with general population studies where boys typically show better nutritional outcomes, suggesting the positive impact of institutional care on girls' nutrition.

The prevalence of thinness remained concerning, affecting 39% of boys and 29% of girls, with severe thinness observed in 15% of boys and 8% of girls. These figures, while comparable to other studies in similar settings, indicate the need for continued nutritional monitoring and intervention.[16,17] Comparison with Melaku et al.'s Ethiopian study, which reported thinness in 32.4% of boys and 21.6% of girls, shows similar patterns with slightly higher rates in our population.[5]

Age-wise Nutritional Distribution: The non-significant association between BMI-for-age categories and age groups (p=0.152) suggests consistent nutritional support across all age categories within the hostel system. Early adolescents had the highest normal BMI-for-age prevalence (61.8%), which may reflect catch-up growth following admission to hostels or better nutritional responsiveness in younger children.

The gradual decline in normal BMI-for-age from early (61.8%) to late adolescence (52.0%) may indicate increased nutritional demands during peak growth periods that current meal programs may not fully address. This pattern suggests the need for age-specific nutritional interventions, particularly during middle and late adolescence when growth velocity is highest.

Impact of Government Welfare Programs
The study findings demonstrate that government social welfare hostels have achieved reasonable success in maintaining nutritional status among resident children. The structured meal programs, regular nutritional monitoring, and healthcare access provided in these institutions appear to be effective in preventing severe malnutrition.[19] The midday meal program and nutritional supplementation schemes implemented by the Government of Tamil Nadu have likely contributed to the observed nutritional outcomes.[20]

The low prevalence of overweight (1% in both genders) indicates that the institutional meal programs are providing adequate but not excessive nutrition, avoiding the dual burden of malnutrition commonly seen in transitioning societies.

Gender-specific Challenges and Interventions
The significantly higher prevalence of thinness and severe thinness among boys highlights the need for gender-specific nutritional interventions. Boys may require increased caloric provision during adolescence due to higher metabolic demands and greater muscle mass development.[21] The success of existing programs for girls should be analyzed and adapted for boys' specific nutritional needs.

Limitations and Future Directions
The cross-sectional design prevents assessment of nutritional trends over time, and the restriction to one district may limit generalizability. The study did not include laboratory investigations for micronutrient status or detailed dietary assessment, which could provide additional insights into nutritional quality.

CONCLUSION

This study demonstrates that government social welfare hostels in Perambalur district have achieved reasonable success in maintaining nutritional status among resident children, with 54.7% achieving normal BMI-for-age overall. The significant gender difference in nutritional outcomes (p<0.001)

indicates successful interventions for girls while highlighting the need for enhanced focus on boys' nutrition.

The structured nutritional support provided in hostel settings appears effective in preventing severe malnutrition compared to general population studies. However, the persistent prevalence of thinness (33.3% overall) and severe thinness (11.1% overall) requires continued attention and targeted interventions.

Strengthening existing nutritional programs through enhanced monitoring, gender-specific interventions focusing on boys' higher thinness prevalence, and age-appropriate nutritional planning will be essential for achieving optimal nutritional outcomes among this vulnerable population. The success of these institutional nutritional programs provides a model for scaling up similar interventions in other regions.

REFERENCES

1. World Health Organization. Global Accelerated Action for the Health of Adolescents (AA-HA!): guidance to support country implementation. Geneva: WHO; 2018.
2. A Profile of Adolescents and Youth in India. New Delhi: Ministry of Health and Family Welfare, Government of India; 2014.
3. World Health Organization. Adolescent Nutrition: A Review of the Situation in Selected South-East Asian Countries. New Delhi: WHO Regional Office for South-East Asia; 2006.
4. UNICEF. The State of the World's Children 2011: Adolescence - An Age of Opportunity. New York: UNICEF; 2011.
5. Melaku YA, Zello GA, Gill TK, Adams RJ, Shi Z. Prevalence and factors associated with stunting and thinness among adolescent students in Northern Ethiopia: A comparison to World Health Organization standards. Arch Public Health. 2015;73(1):8.
6. Ministry of Health and Family Welfare Government of India. A strategic approach to Reproductive, maternal, newborn, child and adolescent health. New Delhi: MoHFW; 2013.
7. Flegal KM, Wei R, Ogden C. Weight-for-stature compared with body mass index-for-age growth charts for the United States from the Centers for Disease Control and Prevention. Am J Clin Nutr. 2002;75(4):761-6.
8. World Health Organization. Adolescence: a period needing special attention - age-not-the-whole-story. Geneva: WHO; 2014.
9. Kumar S, Np S, Am D. Morbidity pattern among primary schoolchildren in a rural area of Uttar Pradesh. Natl J Community Med. 2014;5(4):1-5.
10. Joshi SM, Likhar S, Agarwal SS, Mishra MK, Shukla U. A Study of Nutritional Status of Adolescent Girls in Rural Area of Bhopal District. Natl J Community Med. 2014;5(2):191-4.
11. Vieira RS, Morelo S, Bosco D, Trezinha M, Grave Q, Adami FS. Perception of body image of adolescents and of their parents in relation to the nutritional status and blood pressure. Cien Saude Colet. 2015;31(4):1839-44.
12. Zarei M, Hsl M, Nasir M, Taib M, Zarei F. Nutritional Status of Adolescents Attending the Iranian Secondary School in Kuala Lumpur, Malaysia. Malays J Med Sci. 2014;6(6):185-97.
13. Srinivasan K, Prabhu GR. A Study of the Morbidity Status of Children in Social Welfare Hostels in Tirupati Town. Indian J Community Med. 2006;31(3):170-2.
14. National Health Mission- Government of India. RMNCH+A: Adolescent Health. New Delhi: Ministry of Health and Family Welfare; 2017.
15. Government of Tamil Nadu. Schemes for the Welfare of Backward Classes, Most Backward Classes and Denotified Communities. Chennai: Department of Backward Classes Welfare; 2016.
16. Campbell A, Ntobedzi A. Emotional Intelligence, Coping and Psychological Distress: A Partial Least Squares Approach to Developing a Predictive Model. Electron J Appl Psychol. 2007;3(1):39-54.