

Original Research Article

Nutritional status of rural school-going children (11-13 years) of Dharmapuri district, Tamil Nadu, South India

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ABSTRACT

Background: The childhood years are characterized by rapid growth and development on both a physical and mental level. Compared to adults, they require a greater amount of nutrition per unit of body weight. The prevalence of undernutrition among schoolchildren is one of the foremost public health problems in developing countries such as India. Various studies have highlighted the burden of undernutrition nationwide among different groups in India. The objective of the present study was to assess the nutritional status of school children attending schools in Dharmapuri, Tamil Nadu.

Methods: A descriptive cross-sectional study was carried out among 972 school children of 11 to 13 years of age for 6 months by consecutive sampling technique. The children were assessed for nutritional status by clinical examination as well as anthropometric assessment and were compared with the WHO growth standards. Statistical analysis was conducted using SPSS version 22 on the data obtained.

Results: The mean age of the children was 12.11 ± 0.8 of which 491(51%) were boys and 481 (49%) were girls. Among children, the prevalence of underweight, overweight, and obesity was 565 (58%), 25 (2.6%), and 23 (2.4%) respectively.

Conclusions: The burden of undernutrition is indeed a serious concern in the rural school children of Dharmapuri district in Tamilnadu. The importance of routine school health visits is stressed and this issue needs to be addressed promptly through a multipronged approach.

Keywords: Children, Nutrition, Rural, Tamil Nadu

INTRODUCTION

In a country, the nutritional status of the children has a direct impact on their development. Providing a child with a solid nutritional start is beneficial for his/her physical, mental, and social development. The current trend of food consumption and urbanization has led to many complications in diagnosing diseases. On one side, there are increased rates of obesity and on the other, there is underweight. This paradox is very common in developing countries and is found to increase proportionally with time.^{1,2} Among India's most serious

yet marginally addressed development challenges is malnutrition, which contributes significantly to the country's disease burden. Although India has made significant programme commitments since 1975, such as implementing Integrated Child Development Services (ICDS) and offering a mid-day meal scheme nationwide, it still struggles to combat undernutrition. It is important to remember that stunting has lifelong negative impacts on human capital, poverty, and equity and also leads to a lack of potential in education and limited professional opportunities. It is estimated that 60 million Indian children are underweight, with the prevalence higher in rural areas than in urban ones.³ Meanwhile, the

emergence of overweight and obesity also has been shaped, at least in part, by industry marketing and greater access to processed foods, along with lower levels of physical activity.⁴ The adolescent period occurs between childhood and adulthood. According to Patton and others (2016), adolescents aged 10-14 years, 15-19 years, 15-24 years, and 20-24 years come into adolescence, late adolescence, youth, and young adulthood. Adolescence is a period of transition when habits are formed that continue into adulthood. It is likely that good habits, such as exercise and a healthy diet, will lead to many benefits, including improved academic performance.⁵ In Early adolescence (10-14 years) nutrition has a significant impact on pubertal development and can account for up to 25% of puberty variations. Apparently, obesity and over-nutrition lead to pubertal onset.⁶ It is important that a good nutritional foundation should be laid during this period of school age to prevent the occurrence of deficiency diseases and lifestyle-related degenerative diseases such as obesity, diabetes, hypertension, cardiovascular diseases, and cancers. In accordance with Indian Academy of Pediatrics guidelines, an adolescent boy should consume the same amount of calories as his father (2,400-2,800), and a girl should consume a bit more than her mother (2,100-2,400) depending on the amount of sedentary to athletic activity.⁷ As compared to NFHS-4(2015-16) to NFHS-5(2019-20), stunting has declined in nearly two-thirds of Tamilnadu's districts but in the past five years, the prevalence has increased in Thoothukudi, Pudukkottai, Tiruvannamalai, Karur, Sivagangai, Nagapattinam, Madurai, and Perambalur by at least 5% points (pp). In light of all these points, the present study outlined the objective to assess the nutritional status of school-aged children in rural Tamilnadu's Dharmapuri district.

METHODS

This was a cross-sectional descriptive study carried out among school-going children aged 11-13 studying at government and private schools in Marandahalli after obtaining the necessary permission from the chief

educational officer of Dharmapuri district, Tamilnadu. A Consecutive sampling method was used to select 972 participants. The study was conducted for six months from March 2022 to August 2022. With the authorized consent from the school's management the data was collected using a proforma and the Anthropometric measurements were recorded according to WHO/NCHS child growth standards. The height and weight of each child were compared with WHO growth standards.⁸ Body-mass index (BMI) was calculated for each of the study participants by calculating their height and weight and by using the formula $BMI = \text{weight in kg} / \text{height in meter}^2$. Underweight, overweight, and obesity in adults are commonly classified using this scale. For children and adolescents between 2 and 20 years old, BMI is interpreted relative to a child's age and sex by percentiles because the amount of body fat changes with age and varies by sex.⁹

Statistical analysis

The data were analyzed using SPSS 25.0 software package (IBM Corp., Armonk, NY, USA). By using percentages and proportions, we summarized qualitative variables such as underweight, stunting, and wasting, as well as weight and height by mean (SD).

RESULTS

Total number of children participated in the study was 972.

Table 1: Age and gender distribution of children.

Characteristic	Category	Frequency	Percentage
Age (years)	11	262	27
	12	340	35
	13	370	38
Gender	Boys	491	51
	Girls	481	49

Table 2: Nutritional status of children according to BMI percentile.

Nutritional status based on BMI (n=972)	Boys (n=491)		Girls (n=481)		Total (n=972)	
	N	%	N	%	N	%
Underweight (BMI <5 th percentile)	276	48.8%	289	51.2	565	58.1
Healthy weight (BMI 5 th to <85 th percentile)	188	52.4	171	47.6	359	36.9
Overweight (BMI 85 th to <95 th percentile)	13	52	12	48	25	2.6
Obese (BMI 95 th percentile or more)	10	43.5	13	56.5	23	2.4

Table 1 shows the age and gender distribution of the children belonging to the age group 11 to 13 years. Out of the 972 children, 491 (51%) were boys and 481 (49%) were girls. Among the 972 children, 262 (27%) were belonging to 11 years of age, 340 (35%) and 370 (38%) were belonging to 12 and 13 years of age with a mean age of 12.11 ± 0.8 ; respectively.

Table 2 shows the nutritional status of children according to BMI percentile where the highest prevalence was underweight (BMI <5th percentile) was found to be 565 (58.1%), of which girls 289 (51.2%) were higher when compared to boys 276 (48.8%). About 359 (37%) of children were in healthy weight (BMI 5th to <85th percentile) with highest percentage in girls. The overweight and obesity percentages were found to be 25

(2.6%) and 23 (2.4%) where overweight was found to be higher in boys 13 (52%) and obese in girls 13 (57%).

DISCUSSION

It is the nutrition of school children that determines their lifelong health, strength, and intellectual vitality. A dynamic period of physical and mental development occurs during this period of life. A prevalence of underweight above 30% and wasting above 10% are considered serious public health problems.¹⁰ However, the health and nutritional status of Indian children is not at satisfactory levels, as shown in the NFHS-5 Tamil Nadu fact sheet, 2019-2021.¹¹

The present study revealed the overall prevalence of under-weight among the study participants to be 58%. The prevalence of underweight in boys was 49% and in girls, it was 51%. The prevalence of underweight was more among girls compared to boys. This difference in prevalence may be due to the strong influence of pubertal development and nutritional habits on lifestyle patterns among girls and their parents. This is high when compared to a study conducted by Bhuvanesh et al, the overall prevalence of 14.43%, and the prevalence was more among boys compared to girls.¹² Also, the present study shows a higher prevalence when compared to a study by Shivaprakash et al, which showed an overall prevalence of underweight in the studied school children as 30.3% and the prevalence of underweight was more among boys compared to girls.¹³ In the current study, only 37% of children were of a healthy weight, which is very much lower when compared to a study conducted by Kumawat et al, where 79.58% of children were of healthy weight.¹⁴

The prevalence of overweight and obesity were 2.6% and 2.4% which is comparatively less than a study conducted by Selvaraj et al, where it was 10% and 6% respectively.¹⁵ Also a study conducted by Shanmugam et al, where the overweight and obese were 8.3% and 5% when compared to the present study showed a lower prevalence percentage.¹⁶

As this study was limited to school children, the information about the parents on their socio-economic status, living conditions and habits were not obtained.

CONCLUSION

Even though obesity and overweight are increasing in recent times; undernutrition is still prevalent in rural school children. The value of this study lies in the fact that children of this age group are available and amenable to early identification and intervention and the present study has successfully documented the nutritional status in terms of underweight, normal, overweight, and obese among school-going children of Dharmapuri district, Tamilnadu. Being underweight among school children will have a direct and indirect impact on their positive

health and survival, as malnourished children approach adolescence and their reproductive years in a nutritionally and educationally disadvantaged position. The results of the present study will be useful for policymakers to make changes in the developmental and nutritional health care programmes. Nutritional intervention is also necessary to ameliorate the nutritional status among the studied rural school-going children.

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