Original Research Article

Assessment of nutritional status of primary school children by anthropometry in rural field practice area of Father Muller Medical College, Mangalore

Anita Aramani[1], Saurabh Kumar[2]*, Sudhir Prabhu[2], Das Acharya[2]

[1]Department of Otorhinolaryngology, [2]Department of Community Medicine, Father Muller Medical College, Mangalore, Karnataka, India

*Correspondence:
Dr. Saurabh Kumar,
E-mail: docsaurabh777@gmail.com

ABSTRACT

Background: Malnutrition in the primary school children is one of important problems in India with long term ramifications. This may be related to faulty dietary habits, socioeconomic condition of the family etc. Malnutrition especially undernourishment can lead to delay in growth and development. Anthropometric assessment of the school children provides the information regarding the nutritional status. The objectives of the study were to find out the prevalence of undernourishment, overweight and obesity in the primary school children of the rural field practice area; to find out the association of socio-demographic variables with nutritional status.
Methods: Cross sectional study was conducted from November 2013- February 2014 to assess the nutritional status of the primary school children of the rural field practice areas of our institution in Thumbay region of Dakshina Kannada.
Results: The prevalence of undernourishment (thinness and severe thinness) and overweight and obesity was found to be 40.5%, 2.8% and 1.3% respectively. It was also found that significantly higher proportion of male students was having severe thinness compared to females.
Conclusions: The present study showed that undernourishment (thinness) was still a problem in the rural area school children.

Keywords: Anthropometric, Children, Nutritional status, School, Undernourishment

INTRODUCTION

Malnutrition is the one of the important causes of morbidity and mortality among children in developing and underdeveloped countries.[1] According to the WHO (world health organization), underweight childhood is the major contributor to the global burden of disease (expressed in disease-adjusted life years).[2] It accounts for about 50% of all children deaths worldwide.[3] Underweight childhood is the direct consequences of suboptimal nutrition during the childhood as primary school life is a crucial period of physical as well as mental growth and development of children. It is dynamic growing phase of childhood.[4] It has been found out that health problems due to poor nutritional status in primary school-age children are among the causes of low school enrolment, absenteeism and dropout and unsatisfactory academic results.[5,6] Undernutrition during an individual's childhood is often caused by different factors and can lead to low offspring birth weight, and a higher likelihood of chronic diseases.[7]

On the other hand, we have the burden of obesity also in children due to lifestyle factors and unbalanced eating

habits. Childhood obesity is a global epidemic.[6] In countries like India and other developing countries this rising epidemic with the problem of undernutrition has led to double burden of malnutrition.[8]

Anthropometric measurements are frequently used by physician and health workers as a valuable tool to define nutritional status, and assess the growth and development of children.[1] Nutritional status of children can be assessed by many anthropometric indicators; these are height-for-age (stunting), weight-for-height (wasting) and weight-for-age (underweight).[5] The height-for-age index is an indicator for chronic undernutrition and weight-for-height index is an indicator of acute malnourishment. Weight-for-age is a composite index which takes into consideration both acute and chronic malnutrition.[9] Public health nutrition policy decisions and planning should be based on scientifically accurate anthropometric measurements of the population for which it is intended to be used.[1]

The present study was taken up to assess the nutritional status among primary school going children measuring their height and weight, calculating BMI using WHO Z-score system.

METHODS

The cross sectional study was conducted in the government and private schools of our rural field practice area in 2013-14 for the duration of 4 months from November 2013 to February 2014. After taking the permission from the Block Education Officer, the study was done in the 11 schools in the rural field practice area Thumbay of Father Muller Medical College, Mangalore. The official circular was sent from the Block education Officer to all the schools in advance. The dates of the health checkup which was mainly focused on anthropometric and ENT examination and the study were informed to the School by the community health workers. The data collection forms were given to the schools before itself for the basic demographic data entry (Date of birth, age, sex, class) by the teachers of respective classes.

All the students from 1st to 5th Standard in the govt. and private schools were evaluated for anthropometric

measurements –height and weight. We recorded body weight to the nearest 100 gm using a weighing machine (bathroom scale) with subjects barefoot. Zero error and accuracy were checked on a daily basis before starting the survey. Height of the children from the floor to the highest point on the head was recorded when the subject was facing directly ahead, barefoot, feet together, arms by the sides of the body using a measuring tape. It was ensured that the heels, buttocks and upper back were in contact with the wall when the measurement was made. The height was recorded and rounded off to the nearest 1 cm. General health check up and ENT examination were also done along with anthropometric examination. The children found to be suffering from any type of illnesses were referred for higher centres for further evaluation. Referral forms were given by the investigators to the class teachers of all the ill students.

The data so collected was entered in Microsoft excel 2010 and was analysed with SPSS 23. Body mass index (BMI) was calculated and then Z-scores were calculated for each individual. If the child's height weight and BMI was less than 2SD for the corresponding age and gender, then the child was considered as stunted, underweight or thin respectively. If the child's BMI was more than 2 SD then it was considered as obese, if it fell between one and 2SD then the child was considered as overweight. Results were expressed in percentage and proportions. Chi square test was used to find the association of socio-demographic variables with anthropometric assessment.

RESULTS

The study results were based on the health check up of about 1312 children in 11 schools of rural field practice area of Thumbay who were examined by the team of Community Medicine department of Father Muller Medical College, Mangalore and ENT staff and PGs. The study sample comprised of 50.1% (657) male children and 49.9% (655) female children. Almost equal proportions of the children were found in all the classes from 1st to 5th Standard. The prevalence of undernourishment (thinness and severe thinness) and overweight and obesity was found to be 40.5%, 2.8% and 1.3% respectively (Table 1). Significantly higher proportion of male students was having severe thinness compared to females (Table 1).

Table 1: Distribution of nutritional status of school children by the demographic profile.

Variables		Normal	Thinness	Severe thinness	Over-weight	Obesity	χ2, df & p value
		N (%)	N (%)	N (%)	N (%)	N (%)	
Sex	Male	337 (46.4)*	173 (52.1)	124 (62.3)	14 (37.8)	9 (52.9)	18.76, df=4, p=0.001
	Female	390 (53.6)	159 (47.9)	75 (37.7)	23 (62.2)	8 (47.1)	
Age (in years)	5	36 (5)	19 (5.7)	11 (5.5)	0	0	
	6	119 (16.4)	55 (16.6)	34 (17.1)	6 (16.2)	1 (5.9)	
	7	149 (20.5)	51 (15.4)	39 (19.6)	10 (27)	3 (17.6)	NA
	8	145 (19.9)	91 (27.4)	38 (19.1)	5 (13.5)	2 (11.8)	
	9	150 (20.6)	66 (19.9)	45 (22.6)	5 (13.5)	5 (29.4)	
	≥10	128 (17.6)	50 (15.1)	32 (16.1)	11 (29.7)	6 (35.3)	

Continued.

Variables		Normal	Thinness	Severe thinness	Over-weight	Obesity	χ2, df & p value
		N (%)	N (%)	N (%)	N (%)	N (%)	
Class	Class I	161 (22.1)	69 (20.8)	44 (2.1)	5 (13.5)	1 (5.9)	
	Class II	140 (19.3)	56 (16.9)	35 (17.6)	12 (32.4)	3 (17.6)	
	Class III	144 (19.8)	66 (19.9)	40 (20.1)	3 (8.1)	4 (23.5)	NA
	Class IV	156 (21.5)	75 (2.6)	41 (20.6)	7 (18.9)	2 (11.8)	
	Class V	126 (17.3)	66 (19.9)	39 (19.6)	10 (27)	7 (41.2)	

*Denotes the count and column percentage; NA- Not applicable.

Higher proportion of females was found to be overweight compared to male students. Highest proportion of thinness and severe thinness was observed in the age group of 8 and 9 years of age. Highest proportion of overweight and obesity was observed in the children equal to or above the age of 10 years.

Higher proportion of obesity and overweight was observed in the children of class V while the proportion of thinness amongst the children was almost uniform throughout all the classes. Severe thinness was also uniformly distributed amongst the children except for children of Class 2 (Table 1).

DISCUSSION

Malnourishment is one of the important health problems seen in the school going children. Understanding the nutritional status of the school going children has definite implications for the upcoming generations as better child health and survival are considered humanitarian goals too.

In this study, the prevalence of undernourishment (including thinness and severe thinness) was found to be 40.5% (Table 1). Similar prevalence of undernourishment was reported by Bandopadhyay et al 42.3%, Prabhakar et al 43.7% and Saluja et al 40.9% respectively.[10-12] Sunderam et al, Sharma et al, Kamath et al had reported lower prevalence of undernourishment amongst the school going children.[5,13,14] The disparities in the results of different studies may be due to different settings. The higher prevalence of undernourishment may be attributed to rural settings.

The evidence suggested that higher proportion of male students was having severe thinness. This was in consonance with many studies in African settings. Sebastion et al and Lwambo et al had also observed that the rate of undernourishment among boys was higher than the girls.[15,16] In the study done by partnership for child development in rural areas of low income countries like Ghana, Tanzania, Indonesia, Vietnam and India in 1998, the similar picture of anthropometric status of school going children was found.[17] In most countries boys usually were more stunted and underweight compared to girls. In the study by Majumder et al in Bangladesh, it was found that the girls were suffering more than the boys and that was related to gender discrimination, lack

of knowledge and large family size.[18] Similar attributes could not be explored in the present study.

The prevalence of overweight and obesity was 2.8% and 1.3% respectively in our study. Similar results were observed by Seema et al but higher prevalence had been reported in the study by Kamath et al.[1,14] In the current study it was observed that higher proportion of the children in the age of 10 years and above was overweight and obese, though it was not statistically significant. The probable reason can be poor dietary habits of the older children. On the contrary in the study by Wolde et al, it was observed that as the age of the child progressed undernourishment increased due to deficient dietary intakes.[7]

Limitations

The responses regarding socioeconomic status of the family and education and occupation of the parents were not available in about 80% data collection forms and hence it was excluded in the analysis. Hence relationship of socio demographic determinants could not be ascertained with nutritional status of the children in the field practice areas of our institution. This study was only representative of government and government aided schools except for one private school. Equal representation of government and private school children was not there as the study was in the rural settings.

CONCLUSION

Malnutrition among children is a major public health problem in India. From our study it was seen that undernourishment (thinness and Severe thinness) was present in about 40.5% primary school children. The prevalence of Overweight and obesity was found to be very low. Significantly higher proportions of boys were found to have thinness and severe thinness respectively as compared to girls. The present study showed that undernourishment (thinness) was still a problem in the rural area school children. This study has definite implications for the government, planners and organizations which are endeavoring to formulate the strategies to reach the development targets.

ACKNOWLEDGEMENTS

authorities for giving us permission to conduct the study. We also acknowledge the team of interns from Community Medicine and ENT staff and PGs from our institution, who helped us in the general health check-up and the ENT check-up of the schoolchildren.

REFERENCES

1. Damayanthi MN, Seema P. Nutritional status determined by anthropometric measurement among rural school children aged between (6-18 years) using WHO Z-score in our field practice area. Int J Community Med Public Health. 2018;5(4):1424-7.
2. Mathers C, Fat DM, Boerma JT, World Health Organization, editors. The global burden of disease: 2004 update. Geneva, Switzerland: World Health Organization; 2008: 146.
3. MALED Network Investigators, Psaki S, Bhutta ZA, Ahmed T, Ahmed S, Bessong P, et al. Household food access and child malnutrition: results from the eight-country MAL-ED study. Population Health Metrics 2012;10(1):24.
4. Srivastava A, Mahmood SE, Srivastava PM, Shrotriya VP, Kumar B. Nutritional status of school-age children - A scenario of urban slums in India. Arch Public Health. 2012;70(1):8.
5. Sharma M, Watode B, Srivastava A. Nutritional Status of Primary School Children through Anthropometric Assessment in Rural Areas of Moradabad. Ann Int Med Dental Res. 2017;3(2).
6. Agbozo F, Atito P, Abubakari A. Malnutrition and associated factors in children: a comparative study between public and private schools in Hohoe Municipality, Ghana. BMC Nutr. 2016;2(1):32.
7. Wolde M, Berhan Y, Chala A. Determinants of underweight, stunting and wasting among schoolchildren. BMC Public Health. 2015;15:1.
8. The double burden of malnutrition Case studies from six developing countries. Available at: http://www.fao.org/docrep/009/a0442e/a0442e00.htm. Accessed on 29 December 2018.
9. Anthropometric characteristics and nutritional status of rural school children. The Internet Journal of Biological Anthropology. 2008;2(1):1-6.
10. Bandopadhyay D. A Nutrition Survey of school children, Navi Nagar Mumbai. Med J Forum India. 1988;44(1):31-34
11. Prabhakar JS, Gangadhar MR. Nutritional status of jenukuruba tribal children in Mysore district, Karnataka. Anthropologist. 2009;11:83-8.
12. Saluja N, Bhatngar M, Garg SK, Chopra H, Bajpai SK. Nutritional status of urban primary school children in Meerut. Internet J Epidemiol. 2010;8:1.
13. Sunderam VM: Health profile of school children in Madras city. Indian Pediatr. 1978;15(9):725-30.
14. Kamath R, Jakkula RP, Kumar S. Nutritional status assessment of school children in Bellary district, Karnataka. J NTR Univ Health Sci. 2015;4:13-6.
15. Sebastion MS, Senti S: The health status of rural school children in Amazon Basin of Ecuador. J Trop Pediatr. 1999;45:379-82.
16. Lwambo N, Brooker S, Siza J, Bundy DA, Guyatt H. Age patterns in stunting and anemia in African school children, A cross sectional study in Tanzania. Eur J Clin Nutr. 2000;54:36-40.
17. Partnership for Child Development: The anthropometric status of school children in five countries in the Partnership for Child Development. Proc Nutr Soc. 1998, 57:149-58.
18. Majumder MSI, Islam H, Hossen M, Uddin J, Hasan I, Talukder MAR, Sarovar MA, et al. Assessment of Nutritional status using anthropometry methods: A study of rural and urban primary children in coastal belt of Bangaldesh. Biochem Molecular Biol. 2017;2(5):54-9.