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Undernutrition among School Going Children of Shirur Village, Bagalkot: A Cross-Sectional Study

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ABSTRACT

Introduction: Undernutrition among children accounts for more than half of child morbidity and mortality. Undernourished children are at risk of growth retardation, reduced learning capacity and impaired motor & cognitive development.

Objectives: This study was conducted to find the prevalence of underweight among school going children of Shirur village and to find the socio-demographic risk factors associated with underweight.

Methodology: A cross-sectional study was conducted among 1308 school going children in Shirur village a rural field practice area of S N Medical College Bagalkot. Students were interviewed with help of oral questionnaire containing socio-demographic details followed by anthropometric measurements. WHO growth charts 2007 were used for comparison to find prevalence of underweight and stunting.

Results: Prevalence of overall underweight and stunting was 35% and 25.7% respectively. Underweight was significantly high among females, 6-10 year age group, primary class, Hindu religion, family size of more than or equal to six members and maternal literacy.

Conclusion: This study reflects the high prevalence of underweight and stunting among school going children in rural areas. Improvement of maternal literacy, family planning and nutrition education will reduce the undernutriton in long run. Urgent nutritional interventions by both public and private sector especially in rural areas is the need of hour.

Key Words: Underweight, Stunting, Rural, School Children

INTRODUCTION

India is in a phase of nutritional transition where there is a change in food habits of population from consumption of traditional foods to adoption of western food habits.[1] However malnutrition continues to be a primary cause of ill health and mortality among children in developing countries. It is a major public health problem and accounts for about half of all child deaths worldwide. About 150 million children in developing countries are still malnourished and more than half of underweight children live in South East Asia Region (SEAR).[2] Undernourished children have significantly higher risk of mortality and morbidity. Besides increasing the risk of death and disease, undernutrition also leads to growth retardation and impaired psychosocial and cognitive development.[3]

The school age period is nutritionally significant because this is the prime time to build up body stores of nutrients in preparation for rapid growth of adolescence.[4] School-age children undergo a period of rapid growth, nutrient deficiencies at this age can lead to retarded growth, anaemia, reduced immune function, and impaired motor and cognitive development, all of which may adversely af-

fect academic performance through reduced learning capacity and poor school attendance.[5]

Undernutrition encompasses underweight (acute undernutrition) and stunting (chronic under nutrition).Underweight represents a recent failure to receive adequate nutrition and may be affected by recent episodes of diarrhoea and other acute illnesses. Underweight indicates current or acute malnutrition resulting from failure to gain weight or actual weight loss. To assess underweight BMI for age is better predictor than the weight for height for school children.[6] Failure to achieve expected height/length as compared to healthy, well-nourished children of the same age is a sign of stunting. Stunting is an indicator of linear growth retardation that results from failure to receive adequate nutrition over a long period or recurrent infections. It is an indicator of past growth failure.[3]

Bagalkot district is located in north-western part of Karnataka which is less developed part of Karnataka and is vulnerable to undernutrition. Hence an attempt is made to study the prevalence of underweight and its associated socio-demographic factors among school going children of Shirur, a rural area, Bagalkot.

METHODOLOGY

A school based cross-sectional study was conducted among all the six schools of Shirur village, which is rural field practice area of S. N. Medical College Bagalkot. The study was conducted for a period of 12 months from June 2013 to August 2014.There are 1414 school children between 6-15yreas age group. All children attending school were taken as study subjects. Out of the 1414 school children, 106 children could not be contacted even after repeated three visits to school, hence total study subjects were 1308 children. Study protocol was approved by the Institution's Ethical Committee. After obtaining the prior consent from school authorities, students were personally interviewed with help of pre-designed semi-structured questionnaire containing socio-demographic details. Modified B G Prasad classification was used for socio-economic status. The correction factor (C.F) = (239*4.93*4.63)/100; 239 is AICPI of December 2013.[7]

Anthropometry measurements were taken after completion of questionnaire. Height was measured with a stadiometer mounted on weighing scale to the nearest 0.5cm. Subjects were requested to stand upright without shoes with their heels, buttocks back and head against the height rod, heels together and eyes directed forward. Weight was measured with traditional spring balance that was kept on a firm horizontal surface. The scale was checked every day and calibration was done with known weights. Subjects were asked to wear light clothing and weight was recorded to the nearest 0.5 kg. Body Mass Index (BMI) was calculated using the formula Weight (Kg)/Height (m^2). An underweight child has BMI for age Z-score at least two standard deviations (-2SD) below the median for the WHO Child Growth Standards. A stunted child has a height-for-age Z-score that is at least two standard deviations (-2SD) below the median for the WHO Child Growth Standards.[3] Data was entered in Microsoft Excel 2013 and analysed using Open-Epi software. Chi square test was used to find association between variables.

RESULTS

Out of 1308 school students majority (61.5%) of students were in age group of 11-15 years. Males (52.7%) were on higher side compared to females (47.3%).78.7% of fathers and 62.5% of mothers were literate. Most common occupation of fathers and mothers was labour (62.5 %) and housewife (40 %) respectively. Most of students belonged to Class III (31.3%) & IV (37.3%) of Modified BG Prasad socio-economic classification.

In this study prevalence of underweight and severe underweight was found to be 35% and 7.1% respectively. Overall prevalence of stunting and severe stunting was 25.7% and 7.7% respectively. Underweight & stunting were higher in 6-10years age group as compared to 11-16years age group students. Underweight was more among males (40.6%) when compared to females (28.8%), whereas stunting was marginally higher among females than males.

Table 1-Distribution of study subjects according to age & gender specific nutritional status

Nutritional Status	6-10yrs (N=504)	11-16yrs (N=804)	Male (N=689)	Female (N=619)
Underweight (BMI for age)				
< -2SD to ≥ -3SD	162 (32.1%)	203 (25.2%)	228 (33.1%)	137 (22.1%)
< -3SD	49 (9.7%)	44 (5.5%)	52 (7.5%)	41 (6.6%)
Total	211 (41.9%)	247 (30.7%)	280 (40.6%)	178 (28.8%)
Stunting (Height for age)				
< -2SD to ≥ -3SD	91 (18.1%)	144 (17.9%)	120 (17.4%)	115 (18.6%)
< -3SD	47 (9.3%)	54 (6.7%)	55 (8.0%)	46 (7.4%)
Total	138 (27.4%)	198 (24.6%)	175 (25.4%)	161 (26.0%)

Table 2-Distribution of study subjects according to underweight and selected socio-demographic variables

Variables	Underweight (n=458) (%)	Non-underweight (n=850) (%)	Total	P value	Odds Ratio
Age					
6-10 years	211 (41.9)	293 (58.1)	504	<0.001	1.62
11-15 years	247 (30.7)	557 (69.3)	804		Ref
Sex					
Male	280 (40.6)	409 (59.4)	689	<0.001	1.69
Female	178 (28.8)	441 (71.2)	619		Ref
Class					
Primary	217 (44)	276 (56)	493	<0.001	1.57
Middle	107 (25.9)	306 (74.1)	413		0.70
High	134 (33.3)	268 (66.7)	402		Ref
School					
Govt.	199 (33.7)	392 (66.3)	591	0.3	1.11
Private	259 (36.1)	458 (63.9)	717		Ref
Religion					
Hindu	430 (35.9)	768 (64.1)	1198	0.02	1.64
Muslim	28 (25.5)	82 (74.5)	110		Ref
Literacy status of father					
Illiterate	108 (38.8)	170 (61.2)	278	0.13	1.23
Literate	350 (34)	680 (66)	1030		Ref
Literacy status of mother					
Illiterate	187 (38.4)	300 (61.6)	487	0.02	1.25
Literate	271 (33.1)	550 (66.9)	821		Ref
Father's occupation					
Agricultural labour	155 (37.1)	263 (62.9)	418	0.08	1.65
Coolie	139 (35.8)	249 (64.2)	388		1.56
Own business	119 (36)	212 (64)	331		1.57
employed	45 (26.3)	126 (73.7)	171		Ref
Mother's occupation					
Agricultural labour	88 (34.2)	169 (65.8)	257	0.4	1.00
Coolie	116 (35.4)	212 (64.6)	328		1.05
Own business	63 (40.4)	93 (59.6)	156		1.30
Employed	12 (27.3)	32 (72.7)	44		0.72
Housewife	179 (34.2)	344 (65.8)	523		Ref
Family size					
5 and less	230 (32.5)	477 (67.5)	707	0.04	1.26
6 and more	228 (37.9)	373 (62.1)	601		Ref
Socio-economic Status					
Class I	25 (29.4)	60 (70.6)	85	0.22	0.67
Class II	55 (32.4)	115 (67.6)	170		0.77
Class III	136 (32.5)	283 (67.5)	419		0.77
Class IV	189 (38.1)	307 (61.9)	496		0.99
Class V	53 (38.4)	85 (61.6)	138		Ref

Underweight was significantly higher among different socio-demographic factors like younger age group (6-10 years), male sex, primary class (I-IV standard), Hindu religion and family size (6 members and more). Underweight was marginally higher among private school as compared to government school but this association was not statistically significant.

Literacy status of mother was protective against underweight, whereas that of father had no statistical association with underweight of children even though children with illiterate fathers had higher proportion of underweight children. Proportion of underweight children were highest among those with fathers occupation agricultural labour (37.1%) followed by own business (36%), coolie (35.8%) and least among those with employed category.

Highest proportion of underweight was seen in school children with class V (38.4%) of modified B G Prasad classification followed by class IV (38.1%), Class III (32.5%), class II (32.4%) and least in Class I (29.4%), however this association was not supported statistically.

DISCUSSION

In the present study overall prevalence of underweight and stunting was 35% and 25.7% respectively. Both underweight and stunting was higher in 6-10 year age group, underweight was higher in

males but stunting was marginally higher among females. Almost similar observations were made by Srivatsava et al, where underweight was found to be 38.4% and stunting to be 19.9%, underweight was more among younger age group children and stunting was higher among girls indicating chronic energy deficiency.[8] Bhattacharya et al reported stunting to be 31.33% with younger age more at risk of stunting.[9] Evidence from various studies noted early adolescence and boys were more at risk of underweight but in our study stunting was higher among female children indicating gender bias and parental preferences.[10,11,12,13] Higher prevalence of underweight and stunting was seen by Medhi et al, Shivaramakrishna et al.[11,13] Deshmukh et al reported 53.8% were underweight and was significantly higher in early adolescence and among female children.[14]

In this study underweight was more among Hindus (35.9%) as compared Muslims (25.5%), similar observation seen by Kumar et al. [15] However Medhi et al found underweight more common among Muslims. [11]

Family size of more than six had significantly higher proportion of underweight in present study. Kumar et al noted family size of more than 7 and Joint family had more of underweight children. [15] Bhattacharya also reported similar finding among family size more than >5 members. [9]

In this study mother's literacy was significantly associated with nutritional status of children but father's literacy status had no association with underweight. Bhattacharya et al, Joshi et al and Singh et al also made similar observations. [9,16,17] Srivatsava et al noted children with maternal education of more less than or equal to 6th standard had five times more risk of underweight when compared to that of more than 6th standard.[8]

School children with paternal occupation as agricultural labour had highest proportion of underweight and employed category had the least proportion, however this association was not statistically significant. Maternal occupation had no association with underweight in this study.Srivatsav et al reported underweight more among children with working mothers may be due to less time available for caring of children.[8]

In present study underweight was more common among school children with lower socio-economic status and least among higher socio-economic class but statistically not significant. Similar observations were made by Bhattacharya et al and Deshmukh et al. [9,14]

CONCLUSION

This study was conducted in rural area of north western part of Karnataka. Prevalence of overall underweight and stunting was 35% and 25.7% respectively. Underweight was significantly high among females, 6-10 year age group, primary class (I, II, III, IV standard), Hindu religion, family size of more than or equal to six members and maternal literacy. Study attempts to highlight the nutritional status of school children in rural India, which continues to struggle with both acute and chronic calorie deficiency. Urgent nutritional intervention both by public and private sector is the need of hour, as large proportion of school children are at risk of poor health.

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