Study of nutritional status of primary school children in an urban field practice area of Pune

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Abstract
Childhood years constitutes the most crucial period in life, when the foundations are laid for cognitive, social and emotional language, physical and motor development and cumulative lifelong learning. The young child is most vulnerable to the vicious cycles of malnutrition, infection and resultant disability all of which influence the present condition of a child at micro level and the future human resource development of the nation at the macro level. The present study was a cross sectional study which was carried out in two randomly selected municipal schools of an urban area. The Study consisted of 400 school children from 6 - 9 yrs age group, in which 75 (18.75%) children were found to be stunted and 114 (28.5%) children were underweight. Prevalence of Malnutrition in the form of stunting, and underweight significantly associated with socioeconomic status, educational status of mother, type of family and high birth order. Health education, personal hygiene education, nutrition education may be made as part of the school curriculum.
Keywords: nutritional status, Primary school children.

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INTRODUCTION

Nutritional status during school age is a major determinant of nutritional and health status in adult life. Globally, including in India, health hazards associated with undernutrition and micronutrient deficiencies remain major public health problems[1]. According to Food And Agricultural Organisation (FAO), nearly 870 million people, or one in eight, were suffering from chronic undernourishment in the year 2010-2012[2].Various studies have found the prevalence of malnutrition in primary school children in the range of 50%-60%[3].One in three malnourished child in the world lives in India. Prevalence of malnutrition varies across states with Madhya Pradesh recorded highest and Kerala lowest[4].The school age group spans the period between preschool years and adult life. This age group forms a very large proportion of the population. Population projections indicate that over the next decade this age group will show by far the largest increase in numbers. It is therefore essential that over the next decade efforts should be focused on improving the health and nutritional status of school-age children, (irrespective of whether they are studying in school or are school dropouts) so that they reach adult life with optimal nutrition and health status[1,5]. Determining a child's nutritional status is important because it helps define the child's health status. Proper nutrition levels are generally associated with better health status among children and later health when these children reach adolescence and adulthood. Accurate assessment of nutritional status is indispensable to planning, implementation and evaluation of nutrition interventions. So the present study was planned to assess nutritional status of school age children.

MATERIAL AND METHODS

The present study was a cross sectional study which was carried out in two randomly selected municipal schools of an urban field practice area of Medical College in Pune. The study was carries out from Jan to Dec 2013.The study was approved by the Institutional Ethics

Committee. Permission from Education Officer, Municipal Corporation of an urban area was taken before start of the study. Sample size was estimated at 5% level of significance with allowable error of 10%. Thus 384 school children was calculated sample size of the study. Sampling Procedure- The list of all the schools in the urban area were obtained from the education department. Two Schools in the urban area were randomly selected and subsequently class groups were selected for participation. All the children (Universal sample), belonging to the age group of 6 – 9 years, in the two schools were included in the study. The total number of children in two schools was 430. Out of these, 20 were excluded from the study as they were absent on the day of examination of their class and 10 students were not included as their parents did not give the consent. Thus finally total number of children studied was 400.

Inclusion Criteria

Students from 1st to 4th standard who were present at the time of study and whose parents had given consent to participate in the study.

Exclusion Criteria

Children from 1st to 4th standard absent at the time of study, chlidren whose parents were not giving consent to participate in the study, Children less than 6 years of age and greater than 9 years of age. Necessary permission to conduct the study was obtained from principals of schools. Consent to participate in the study was taken from parents of the children. Following information was obtained through questionnaire in the form of letter addressed to parents of children.1) Date of birth 2) Occupation and income of father 3) Occupation of other family members 4) Family income 5) Type of family 6) Educational status of parents 7) Birth order. Anthropometric measurements- Anthropometric measurements recorded during conduct of study were- weight (in kgs), Height (in cms). Weight and height were measured as per WHO guidelines. Weight of children was measured by using portable electronic weighing machine. Body weight was measured in kgs and measured to nearest 100gm. Height of children was measured with subject standing against anthropometric tape that was positioned against the wall. Height was measured in cms and recorded to nearest 0.5 cms. Socioeconomic classification as suggested by modified Kuppuswamy Scale was adopted and modified as per the All India Consumer Price Index (AICPI) of October 2013[6,7].

Data analysis

Data was analyzed using SPSS software 17 version and Open Epi Software Version 2.3. The z scores for underweight and stunting were calculated by using WHO Anthro plus software.[8-11]

RESULTS

This cross sectional study was carried out in two randomly selected schools of Municipal Corporation of an urban area. The Study consisted of 400 school children from 6 - 9 yrs age group, in which 75 children were found to be stunted and 114 children were underweight.

Table 1: Relationship between demographic variables and stunting

Variables		Normal (n=325) (%)	Stunting (n=75) (%)	Total (%)	P value
Sex	Male	167 (80.68)	40 (19.32)	207 (100)	χ^2 = 0.093, df = 1,p = 0.7608
	Female	158 (81.87)	35 (18.14)	193 (100)	
Type of family	Nuclear	232 (84.06)	44 (15.94)	276 (100)	χ^2 = 4.608, df = 1, p = 0.0318*
	Joint and Three generation	93 (75)	31 (25)	124 (100)	
Socioeconomic class	II+III	54 (91.52)	5 (8.48)	59 (100)	χ^2 = 4.797, df = 1, p = 0.0285*
	IV+ V	271 (79.47)	70 (20.53)	341 (100)	
Literacy status	≤ Secondary	300 (80.43)	73 (19.57)	373 (100)	χ^2 = 2.45, df = 1, p = 0.118
	> secondary	25 (92.59)	2 (7.41)	27 (100)	
Birth Order	≤ 3	290 (83.57)	57 (16.43)	347 (100)	χ^2 = 9.280, df = 1, p = 0.0023*
	> 3	35 (66.04)	18 (33.96)	53 (100)	

(df= degree of freedom; * p<0.05 statistically significant)

Table - 1 shows that 40 (19.32%) female children were stunted as compared to of 35 (18.14%) male children. However, the association between sex and stunting was not significant. It is evident from table - 1 that 44 (15.94%) of school children from nuclear family were stunted as compared to 31 (25%) of school children from joint and Three generation family family were stunted. The association between type of family and stunting was statistically significant. The problem of stunting was more 70 (20.53%) in socioeconomic classes (class - IV and class - V combined) as compared to 5 (8.485%) in socioeconomic classes (class - II and class III combined). The association between socioeconomic status and stunting was significant. Table - 1 shows that 73 (19.57%) children of mothers having education secondary level education or less than secondary level education

were stunted as compared to 2 (7.41%) children were stunted whose mothers were having higher than secondary education, however the association between literacy status and stunting was statistically not significant. Table - 1 shows that 57 (16.43%) children of

third or less than third birth order were stunted as compared to 18 (33.96%) children were stunted whose birth order was more than 3. A highly significant association was found between birth order and stunting.

Table 2: Relationship between demographic variables and underweight

Variables		Normal (%) n= 286	Underweight N=114	Total (%)	P value
Sex	Male	143 (69.08%)	64 (30.92%)	207 (100)	χ^2 = 1.231, df = 1, p = 0.2673
	Female	143 (74.09%)	50 (25.91%)	193 (100)	
Type of family	Nuclear	207 (75)	69 (25)	276 (100)	χ^2 = 5, df 352= 1, p = 0.0207*
	Joint and Three generation family	79 (63.71)	45 (36.29)	124 (100)	
Socioeconomic class	II+III	49 (83.05)	10 (16.95)	59 (100)	χ^2 = 4.531, df = 1, p = 0.0333*
	IV+ V	237 (69.50)	104 (30.50)	341 (100)	
Literacy status	≤ Secondary	262 (70.24)	111 (29.76)	373 (100)	χ^2 = 4.30, df = 1, p = 0.0382*
	> secondary	24 (88.89)	3 (11.11)	27 (100)	
Birth Order	≤ 3	255 (73.49)	92 (26.51)	347 (100)	χ^2 = 5.074, df = 1, p = 0.0243*
	> 3	31 (58.49)	22 (41.51)	53 (100)	

(df= degree of freedom; * p<0.05 statistically significant)

Table - 2 shows that 64 (30.92%) male children were underweight as compared to 50 (25.91%) in females. However, the association between sex and underweight was not significant. Table - 2 shows that 69 (25%) children living in nuclear family were underweight as compared to 45 (36.29%) children living in joint family and three generation family were underweight. Significant association was found between type of family and underweight. socioeconomic classes (class - IV and class - V combined) as compared to 10 (16.95%) in socioeconomic classes (class - II and class III combined). The association between socioeconomic status and underweight was significant. Table - 2 shows that 111 (29.76%) children were underweight whose mothers. were having secondary or less than secondary education as compared to 3 (11.11%) children of mothers whose education was higher than secondary education. The association between literacy status and underweight was significant. Table - 2 shows that maximum i.e. 22 (41.51%) children were having a problem of underweight in more than 3 birth order as compared to minimum i.e. 92 (26.51%) in third or less than third birth order. The association between birth order and underweight was statistically significant.

Table 3: Clinical signs of micronutrient deficiencies

Clinical condition	No.* (%)
Pallor	43 (10.75)
Skin (Dry, Dry and scaly, pellagrous dermatitis)	58 (14.5)
Hair (Easily pluckable, lustreless, Dyspigmentation, Thin and sparse, flag sign)	17 (4.25)
Teeth signs (Mottled and caries teeth)	112 (28)
Lips (Cheliosis and Angular stomatitis)	29 (7.25)
Face signs (white patches, diffuse depigmentation)	102 (25.5)

*Some children were having multiple signs.

The above table shows that the commonest sign was Dental caries and mottled teeth 113 (28%). Hair signs are seen in 17 (4.75%) children, lip signs are seen in 30 (7.5%) children, skin signs are present in 58(14.5%) children, pallor in 43 (10.75) children and signs on face are present in 102 (25.5%) children.

DISCUSSION

When nutritional status (height for age) of children was compared according to their sex, it was found that out of 195 female children 40 (19.32%) were stunted as compared to of 35 (18.14%) male children, however significant association was not seen. Maj Mukherjee R, Lt Col Chaturvedi S, Col Bhalwar R [12] found that the prevalence of stunting in boys was 14.96% and in girls it was 12.53% and association was not significant which is similar to present study. Nutritional status (Weight for age) of children was also compared according to their sex, it was found that that 64 (30.92%) male children were underweight as compared to 50 (25.91%) in females and the association between sex and underweight was not significant. Maj Mukherjee R, Lt Col Chaturvedi S, Col Bhalwar R [12] found that prevalence of underweight in boys was 10.97% and in girls it was 8.63%. The association between sex and underweight was not significant which was similar to present study. When nutritional status (height for age) of children was compared according to type of family, it was found that 44 (15.94%) of school children from nuclear family were stunted as compared to 31 (25%) of school children from joint and three generation family were stunted. The association between type of family and stunting was statistically significant. In present study children living in

joint and three generation family were more likely to suffer from chronic malnutrition than children in nuclear families due to overcrowding. Nutritional status (Weight for age) of children was also compared according to type of family, in which 69 (25%) children living in nuclear family were underweight as compared to 45 (36.29%) children living in joint family and three generation family were underweight. Significant association was found between type of family and underweight. When nutritional status (height for age) of children was compared according to socioeconomic status, the problem of stunting was more 70 (20.53%) in socioeconomic classes (class - IV and class - V combined) as compared to 5 (8.485%) in socioeconomic classes (class - II and class III combined) (Table – 20). The association between socioeconomic status and stunting was not significant. When nutritional status (weight for age) of children was compared according to socioeconomic status, the problem of underweight was more 104 (30.50%) in socioeconomic classes (class - IV and class - V combined) as compared to 10 (16.95%) in socioeconomic classes (class - II and class III combined). The association between socioeconomic status and underweight was significant (Table – 21). On interrogation, ignorance, lack of knowledge regarding nutritive value of food, overcrowding are contributory to malnutrition in lower socioeconomic classes in the present study. When nutritional status (height for age) of children was compared according to their literacy status, it was found that 73 (19.57) children of mothers having secondary level education or less than secondary level education were stunted as compared to 2 (7.41) children were stunted whose mothers were having higher than secondary education. However, the association between literacy status and stunting was statistically not significant. Dr. Renu Bala trivedi and Dr Mukta[13] observed that highest prevalence of stunting in illiterate and primary educated mothers children and lowest in mothers having graduate and postgraduate education and association was significant which is different from present study. Nutritional status (Weight for age) of children was also compared according to their literacy status, it was found that 111 (29.76%) children were underweight whose mother were having secondary and less than secondary education as compared to 3 (11.11%) children were underweight whose mothers were having higher than secondary education. The association between literacy status and underweight was statistically significant. On interrogation it was found that literate mothers were adopting many practices related to maternal and child health care, feeding and eating practices which ultimately affect the nutritional status of children. Sunil Pal Singh C, Ravi Babu D[14] found that prevalence of underweight was higher among children of illiterate mothers (65.6%) as compared to children of literate mothers (52.4%) and association was significant which was similar to present study. When nutritional status (height for age) of children was compared according to birth order, it was found that 57 (16.43%) children of third or less than third birth order were stunted as compared to 18 (33.96%) children were stunted whose birth order > 3. A highly significant association was found between birth order and stunting. When nutritional status (Weight for age) of children was compared according to birth order, maximum i.e. 22 (41.51%) children were having a problem of underweight in greater than 3rd birth order as compared to minimum i.e. 92 (26.51%) in third or less than third birth order. The association between birth order and underweight was statistically significant. In present study, commonest sign was Dental caries and mottled teeth in 113 (28%) children. Hair signs are seen in 17 (4.75%) children, lip signs are seen in 30 (7.5%) children, skin signs are present in 58 (14.5%) children, pallor in 43 (10.75) children and signs on face are present in 102 (25.5%) children (Table – 32). Das P, Basu M, Dhar G, et al[15] has found that dental caries was commonest (29%) clinical feature which was similar to present study. Chandna S. and Salil Sehgal.[16] found that angular stomatitis and cheilosis was present in 10.4% and 8.7% of cases. Shakya SR, Bhandary S, Pokharel PK[17] found that 6.8% of children were having angular cheilosis.

CONCLUSION

Prevalence of Malnutrition was still high in the study area with 18.75% of children being stunted, 28.5% children being underweight. Prevalence of Malnutrition in the form of stunting and underweight significantly associated with socioeconomic status, educational status of mother, type of family and high birth order.

RECOMMENDATIONS

Higher educational status of mothers has a definite role in the nutritional status of child so higher education of the girls should be promoted and efforts should be taken to reduce school dropout in girls. The problem of undernutrition was seen more in higher birth order so proper utilization of family planning services should be done. Nutrition education and nutrition rehabilitation should be given to the parents of school children. Health education, personal hygiene education, nutrition education may be made as part of the school curriculum.

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