

Study of prevalence of under nutrition and nutritional status in under five children at an urban health training center

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Abstract

Background: Nutrition plays a key role in physical, mental and emotional development of children and much emphasis has been given to provide good nutrition to growing population especially in the formative years of life. Under-five children comprise around 13% of the Indian population. Considering that under nutrition is an important nutritional problem, the present study was undertaken to assess the nutritional status of children ageing less than five years of age residing in Urban Field Practice Area of Urban Health Training Centre of medical college. **Material and Methods:** The study was a community based cross sectional study, undertaken in Children under five years of age residing in the given area of urban field practice area of the department of Community Medicine. **Results:** In the present study prevalence of under nutrition was 205 (35.5%). Out of 576 children, 192 (33.3%) were under weight (Grade I and Grade II Under nutrition) and 13 (2.2%) were severely underweight (Grade III and Grade IV Under nutrition). Out of 576, maximum number of children belonged to 25-36 months age group (27.1%), female were 290 (50.3%) 39.74% of the children whose mothers were not completed adequate ANC Visits, 54.21 % of the children who had birth weight < 2.5 KG were undernourished, 75% children who had not received Colostrum feeding, 76.92% among the children in whom exclusive breast feeding was not practiced were under nutrition, 34.79% in children in whom birth spacing was less than 3 years, 53.03% of the children who were not given Vitamin A were undernourished, maximum children i.e. 344 (83.2%) had Febrile illness followed by 45 (10.9%) had Diarrhea and 24 (5.8%) had Worm infestation. **Conclusion:** In the present study, prevalence of under nutrition was 35.5%. Parent's illiteracy, Faulty feeding practices, partial immunization, h/o frequent Febrile illness and other infections in the past one year etc., were some of the determinants for undernourishment. **Keywords:** undernutrition, immunization, parent's illiteracy, faulty feeding practices, undernourishment.

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INTRODUCTION

Nutrition plays a key role in physical, mental and emotional development of children and much emphasis

has been given to provide good nutrition to growing population especially in the formative years of life.^{1,2,3} Globally, more than one-third of child deaths are attributable to under nutrition.^{1,2,4} Under-five children comprise around 13% of the Indian population. Childhood morbidity and mortality is a sensitive indicator of a country's socio-economic development. Protein energy malnutrition (PEM), which is manifested as decrease in weight for age or height for age or weight for height, is the most widely prevalent form of malnutrition among under-five children.⁵ Most common causes of under nutrition include faulty infant feeding practices, impaired utilization of nutrients due to infections and parasites, poor immunization status,

inadequate food and health security, poor environmental conditions and lack of proper child care Practices.⁶ Under nutrition during the critical phases of early growth, can lead not only to the stunting of physical growth, but also to sub-optimal intellectual development and poor neuro integrative competence in children.⁷ Considering that under nutrition is an important nutritional problem, the present study was undertaken to assess the nutritional status of children ageing less than five years of age residing in Urban Field Practice Area of Urban Health Training Centre of medical college.

MATERIAL AND METHODS

The study was a Community based cross sectional study, undertaken in urban field practice area of the department of Community Medicine of government medical college, to find out the prevalence of under nutrition and its associated risk factors among under five children. Study duration was of 2 years (July 2018 to June 2019). Study was approved by institutional ethical committee. Institutional Ethics committee approval was taken before start of study. The informed consent was taken from the mother of each child.

Inclusion criteria: Children under five years of age residing in the given area for more than one year.

Exclusion criteria: Children of Parents not cooperating on frequent visits.

Predesigned proforma consisting of standard questions related to Socio-demographic factors and epidemiological determinants like family size, Immunization history, birth history, birth weight, birth spacing, feeding practices etc. and questionnaire also included questions on history of medical illness, followed by general and systemic examination.

Anthropometric measurements such as Weight, Height, Mid upper arm circumference, Head circumference, Chest Circumference were measured Data thus obtained was coded and entered into Microsoft excel worksheet. Data was analyzed using SPSS. The frequency distribution of the study subjects according to age, sex, religion, educational status, occupation of their parents, socioeconomic status and other study variables were analyzed. Prevalence of under nutrition was estimated. Relation between under nutrition and major socio-demographic factors such as age, sex, religion, educational status of parents, socioeconomic status and other study factors was estimated. The association of under nutrition with the above factors was found by chi-square test. The statistical significance was evaluated at 5% level of significance. To generate graphs and tables Microsoft Word and Microsoft Excel was used.

RESULTS

The nutritional status of children was assessed by using IAP Classification.

Table 1: IAP Classification¹⁷

Weight for Age	Nutritional status
Between 100 and 80%	Normal
Between 79 and 70%	Grade I (Mild Under nutrition)
Between 69 and 60%	Grade II (Moderate under nutrition)
Between 59 and 50%	Grade III (Severe under nutrition)
Less than 50%	Grade IV (Very Severe under nutrition)

In the present study prevalence of under nutrition was 205 (35.5%). Out of 576 children, 192 (33.3%) were under weight (Grade I and Grade II Under nutrition) and 13 (2.2%) were severely underweight (Grade III and Grade IV Under nutrition). Out of 576, maximum number of children belonged to 25-36 months age group (27.1%), followed by 37-48 months age group (20.5%). Maximum proportion of under nourished children were in the age group of 0-12 months i.e. 54(56.25%) followed by 38(35.18%) in 49 – 60 months and least proportion in 13-24 months i.e. 27(27.55%), difference was statistically highly significant. ($P < 0.001$) Out of 576 children female were 290 (50.3%) and males were 286 (49.7%). Significant difference was observed between boys and girls ($P < 0.05$)

Table 2: According to Age and gender

Age(months)	Under nutrition	Normal	Total (%)	P VALUE
0-12	54 (56.25)	42 (43.75)	96 (100.0)	<0.0001
13-24	27 (27.55)	71 (72.44)	98 (100.0)	
25-36	45 (28.84)	111 (71.15)	156 (100.0)	
37-48	41 (34.74)	77 (65.25)	118 (100.0)	
49-60	38 (35.18)	70 (64.81)	108 (100.0)	
Gender				
Male	87 (30.41)	199 (69.58)	286 (100.0)	0.01
Female	118 (40.68)	172 (59.31)	290 (100.0)	

Out of 576 under five children maximum i.e. 280 were from Lower middle class, followed by 171 from middle class, 76 from upper middle class, 39 from lower class and 10 from upper class. Above table reveals that proportion of under nutrition was highest i.e. 39.77% in middle class children, whereas lowest i.e. 27.64% in upper middle class, difference was statistically not significant. ($p>0.05$)

Table 3: Under five children according to socioeconomic status and nutritional status

Socioeconomic status	Under nutrition	Normal	Total (Percent)
Upper class	3 (30)	7 (70)	10 (100.0)
Upper middle class	21 (27.64)	55 (72.36)	76 (100.0)
Middle class	68 (39.77)	103 (60.23)	171 (100.0)
Lower middle class	101 (36.08)	179 (63.92)	280 (100.0)
Lower class	12 (30.77)	27 (69.23)	39 (100.0)
Total	205 (35.6)	371 (64.4)	576 (100.0)

39.74% of the children whose mothers were not completed adequate ANC Visits had under nutrition. 42.46% in children delivered at home compared to those who delivered in hospital i.e. 34.59%, difference was statistically not significant. Maximum number of the children who had birth weight < 2.5 KG were undernourished i.e. 103 (54.21%), difference was statistically highly significant. ($p<0.001$). 75% children who had not received Colostrum feeding were malnourished; difference was statistically highly significant. ($p<0.001$) In 66.36% children were normal in whom exclusive breast feeding was practiced, while 76.92% among the children in whom exclusive breast feeding was not practiced were under nutrition, difference was statistically highly significant. ($p<0.001$) The proportion of under nutrition was comparatively more among children having fixed breastfeeding schedule (73.91%) than children who received demand feeding (33.99%), difference was statistically highly significant. ($p<0.001$). Majority of under nutrition i.e. 127 (34.79%) was seen in children in whom birth spacing was less than 3 years compared to 16 (33.33%) in whom birth spacing was 3 or > 3 years, difference was statistically not significant. ($p>0.05$).

Table 4: Under five children according to antenatal and postnatal characteristics

Characteristics	Under nutrition	Normal	Total (Percent)	P value
ANC Visits				
Adequate	174 (34.93)	324 (65.06)	498 (100.0)	0.41
Inadequate	31 (39.74)	47 (60.25)	78 (100.0)	
Place of delivery				
Home	31 (42.46)	42 (57.53)	73 (100.0)	0.18
Hospital	174 (34.59)	329 (65.40)	503 (100.0)	
Birth weight (in KG)				
< 2.5	103 (54.21)	87 (45.78)	190 (100.0)	<0.001
≥ 2.5	102 (26.42)	284 (73.57)	386 (100.0)	
Birth weight (in KG)				
< 2.5	103 (54.21)	87 (45.78)	190 (100.0)	<0.001
≥ 2.5	102 (26.42)	284 (73.57)	386 (100.0)	
Colostrum feeding				
Given	187 (33.87)	365 (66.12)	552 (100.0)	<0.001
Not given	18 (75)	6 (25)	24 (100.0)	
Exclusive breast feeding				
Yes	185 (33.63)	365 (66.36)	550 (100.0)	<0.001
No	20 (76.92)	6 (23.07)	26 (100.0)	
Frequency of breast feeding				
Demand	188 (33.99)	365 (66.0)	553 (100.0)	0.84
Fixed	17 (73.91)	6 (26.08)	23 (100.0)	
Birth interval (in years)				
< 3	127 (34.79)	238 (65.20)	365 (100.0)	0.84
≥ 3	16 (33.33)	32 (66.66)	48 (100.0)	

Out of the 350 fully immunized for age children a maximum i.e. 212 (60.57%) were normal. Maximum i.e. 60% of the un-immunized children were undernourished, difference was statistically significant. ($p<0.05$). Maximum i.e. 53.03% of the children who were not given Vitamin A were undernourished, difference was statistically highly significant. ($p<0.01$). Among children who had illness in the last one-year maximum children i.e. 344 (83.2%) had Febrile illness followed by 45 (10.9%) had Diarrhea and 24 (5.8%) had Worm infestation. Children with frequent h/o Worm infestation in the last

one year had under nutrition i.e. 15 (62.5%), difference was statistically highly significant. ($p < 0.01$). It was observed that a higher proportion of children with frequent h/o diarrhea in the last one year had under nutrition i.e. 22 (48.89%), difference was statistically significant. ($p = 0.05$). It was observed that a higher proportion of children with frequent h/o febrile illness in the last one year had under nutrition i.e. 152 (44.18%). This difference was statistically highly significant. ($p < 0.001$)

Table 5: Under five children according to Immunization status and illness

	Under nutrition	Normal	Total (Percent)	P value
Immunization status				
Completely immunized	138 (39.42)	212 (60.57)	350 (100.0)	0.01
Partially immunized	64 (28.95)	157 (71.04)	221 (100.0)	
Un- immunized	3 (60)	2 (40)	5 (100.0)	
Total	205 (35.6)	371 (64.4)	576 (100.0)	
Received Vitamin A	170 (33.33)	340 (66.66)	510 (100.0)	0.002
Worm infestation H/O	15 (62.5)	9 (37.5)	24 (100.0)	0.005
Diarrhea H/O	22 (48.89)	23 (51.11)	45 (100.0)	0.05
Febrile illness H/O	152 (44.18)	192 (55.81)	344 (100.0)	0.001

DISCUSSION

As per National Family Health Survey [NFHS]-4 data in urban Maharashtra stunting, wasting and underweight were 29.3%, 24.9% and 30.7% respectively.⁸ The effects of malnutrition on the community are both direct and indirect.⁹ The direct effects are the occurrence of frank and subclinical nutrition deficiency diseases such as kwashiorkor, marasmus, vitamin and mineral deficiency diseases. In spite of a large number of national programmes related to nutrition such as ICDS, mid-day meal, etc., about 6600 under-five children die every day, accounting to 46% child deaths due to protein energy malnutrition.¹⁰ It is projected that more than half of the Indian population will live in urban areas by 2020 and nearly one third of this urban population will be of slum dwellers.¹¹ The ongoing process of rapid urbanization has deleterious repercussions on health and nutrition especially for children. In the present study prevalence of under nutrition was 35.5%. Similar findings were reported by Purohit L *et al.*,¹² (38.15% were underweight), while Algur V *et al.*,¹³ noted overall prevalence of malnutrition based on IAP classification was found to be 66%. Dhone A B *et al.*,¹⁴ (65.2% were undernourished), Dhatrak P *et al.*,¹⁴ noted that 46% were underweight in a urban slum of Nagpur. The present study found that maximum proportion of under nourished children were in the age group of 0-12 months (56.25%) followed by 49-60 months (35.18%). Stalin P *et al.*,¹⁶ noted that prevalence of underweight among infants was highest as compared to other age groups. However others studies showed that as age increased the prevalence of under nutrition also increased,^{12,14,15} Significant difference was observed between boys and girls as far as under nutrition is concerned. Priyanka R *et al.*,¹⁷ and Kaushal P *et al.*,¹⁸ also reported similar finding. In the present study proportion of under nutrition was highest i.e. 39.77% in middle class children, whereas

lowest i.e. 27.64% in upper middle class. However other studies reported that the proportion of underweight children was highest in lower socioeconomic class,^{12,15,17} In the present study, maximum number of the children who had birth weight < 2.5 KG were undernourished i.e. 54.21%. This difference was statistically highly significant. Similar findings were reported by Nurani N *et al.*,¹⁹ Jaiswal A *et al.*,²⁰ and Aklima J *et al.*,²¹ In the present study, the proportion of under nutrition was least in children with birth order two, i.e. 33.77% and was found to be high in children with birth order Four or more i.e. 46.16%. Though this difference was statistically not significant. Similar findings were reported by Nurani N, *et al.*,¹⁹ Ahmed M A *et al.*,²² Purohit L *et al.*,¹² Maximum proportion of under nutrition i.e. 34.79% was seen in children in whom birth spacing was less than 3 years compared to 33.33% in whom birth spacing was 3 or > 3 years. This difference was statistically not significant. ($p > 0.05$) Similar findings were reported by Das S *et al.*,²³ and Ahmed M A. *et al.*,²² It was observed that maximum number of children i.e. 65.97% were normal if Initiation of breast feeding was started within one hour of birth of the baby. Further it was observed that a maximum number of children in whom Initiation of breast feeding was delayed Beyond 24 hours of birth of the baby i.e. 55.55% were under nutrition. The difference was statistically not significant. ($p > 0.05$) Similar findings were reported by Luthra M, *et al.*,²⁴ Ramji S *et al.*,²⁵ and Midha T *et al.*,⁵ Proportion of under nutrition was higher among children who had not received Colostrum feeding 75%. This difference was statistically highly significant. ($p < 0.001$) Similar findings were reported by Luthra M *et al.*,²³ and Midha T. *et al.*,⁵ In the present study, majority i.e. 66.36% of the children were normal in whom exclusive breast feeding was practiced. Among the children in whom exclusive breast feeding was not practiced 76.92% were under nutrition,

difference was statistically highly significant. ($p < 0.001$). Similar findings were reported by Nurani N *et al.*,¹⁹, Dhattrak PP *et al.*,¹⁴ Priyanka R *et al.*,¹⁷ Proportion of under nutrition was comparatively more among children having fixed breast feeding schedule i.e. 73.91% than children who received demand feeding i.e. 33.99%, difference was statistically highly significant. ($p < 0.001$). Similar findings were reported by Choudhari S G, *et al.*,²⁶ Ahmed M A *et al.*,²² and Midha T *et al.* (2018).⁵ In the present study, it was observed that fully immunized for age children a maximum i.e. 60.57% were normal. Maximum i.e. 60% of the un-immunized children were under nutrition, difference was statistically significant. ($p < 0.05$) Similar findings were reported by Dhattrak PP *et al.*,¹⁴ Ahmed M A *et al.*,²², Priyanka R *et al.*,¹⁷ and Kaushal P. *et al.*,¹⁸ In the present study, it was observed that a higher proportion of children with frequent h/o Worm infestation in the last one year had under nutrition i.e. 62.5%, higher proportion of children with frequent h/o diarrhea in the last one year had under nutrition i.e. 48.89% and higher proportion of children with frequent h/o febrile illness in the last one year had under nutrition i.e. 44.18%. This difference was statistically significant. ($P \leq 0.05$) Similar findings were reported by Aklima J *et al.*,²¹ and Priyanka R *et al.*,¹⁷ Urban slum dwellers are exposed to poor housing, overcrowding, poor quality drinking water, inadequate sanitation, which is further aggravated by their ignorance, illiteracy, and low socioeconomic status, and lack of access to basic health care facilities. Children living under such conditions are always at a high risk of developing health and nutritional problems.²⁶

Limitations of the study were assessment of malnutrition was based on weight for age only. The assessment of nutritional status involves various techniques such as clinical examination, anthropometric measurements, biochemical evaluation, functional assessment, assessment of dietary intake, vital statistics, assessment of ecological factors, etc. However, as it was not feasible due to constraints like time, cost, facility, etc., the present study was restricted to anthropometric measurement. Few of the variables analysed in the present study were based on the information given by the mothers of study participants. Hence an element of unavoidable recall bias could be present in the study

CONCLUSION

In the present study, prevalence of under nutrition was 35.5%. Maximum number of children belonged to 25-36 months age group; number of female children were slightly higher than male children. Completely immunized children were 60.76%. Parent's illiteracy, faulty feeding practices, partial immunization, h/o frequent febrile illness and other

infections in the past one year etc., were some of the determinants for undernourishment.

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