Original Article

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Nutritional Status and the Factors Associated with it among Children Aged 1-5 Years in a Rural Area of Jammu

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Abstract

Purpose: Malnutrition has long been a major public health concern globally leading to high morbidity and mortality in under-five children. Prevalence of underweight children in India is highest in the world; nearly double that of Sub-Saharan Africa. Therefore, this study was done with the objectives of: (i) To study burden of under-nutrition among children 1-5 years of age, and (ii) to study its association with selected socio-demographic factors and feeding practices.

Methods: A total of 750 children aged 1-5 years were studied with 50 subjects each from 15 villages using multi-stage random sampling technique. Caregivers (mostly mothers) of the eligible participants were interviewed to determine association of under-nutrition (as determined by mid-upper arm circumference) with variables like age, gender, socio-economic status of the family, breast-feeding and complementary feeding practices, number of doses of vitamin A prophylaxis received, along with the episodes of common morbidities in the children.

Results: More than one-fourth of the study children were suffering from of under-nutrition with the majority in 1-3 years. Exclusive breastfeeding for 6 months and age at which the child started complementary feeding were found to have significant association with the nutritional status of children. Significant association was also observed between under-nutrition and morbidities such as diarrhea, acute respiratory infections (ARIs) and measles.

Conclusion: Under-nutrition continues to be a significant public health problem in under-fives. Multi-pronged approaches aimed at improving maternal and child health care, including nutrition education, growth monitoring, exclusive breastfeeding, complementary feeding, standard case management of diarrhea and ARI would be beneficial to combat the problem of malnutrition.

Key words: Acute respiratory infections, Children, Diarrheal diseases, Mal-nutrition, Measles, Risk-factors, Under-five, Under-nutrition

INTRODUCTION

Malnutrition has long been a major public health concern globally leading to high morbidity and mortality among under-five children. It is associated with one-third of all deaths in the age - group of 1-5 years. Each year nearly 2.3 million deaths among 6-60 months aged children in developing countries are associated with malnutrition.[1] 99 million children, that is, 15% of total under-five children in the world, are under-weight and 25% are stunted. Prevalence of under - weight children in India is highest in the world; nearly double that of Sub-Saharan Africa.[2] According to National Family Health Survey-3 reports, 40% children under 3 years of age are under-weight and 45% are stunted in India.[3]

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Malnutrition in children is multidimensional; governed by biological, behavioral and environmental factors.[4] It places a huge burden by not only increasing mortality, but also imposes significant national health and development costs

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due to associated morbidities, including reduced cognitive ability.[5] It reduces children's resistance to infection and increases the burden of disease in the communities.[5]

In view of above, need was felt to conduct a study with the specific objectives of: (i) To study the burden of under-nutrition among children 1-5 years of age, and (ii) to study its association with selected socio-demographic and feeding practices. Findings from this study would not only help in estimating the current burden but also help in framing new strategies and recommendations for prevention and control of under-nutrition.

METHODS

The present cross-sectional study was carried out in block R.S. Pura, a rural field practice area of Postgraduate Department of Community Medicine, Government Medical College (GMC), Jammu, located at a distance of 23 km from GMC Jammu. The population of the block was 1,80,560 as per Census 2001, spread over 198 villages.[6] The block is divided into 8 zones for the purpose of administration. The study was conducted between January and December 2011. Ethical Clearance for the study was obtaining from the Institutional Ethics Committee of GMC and Hospital, Jammu.

Multistage random sampling technique was used, wherein zones formed the 1st Stage units, villages 2nd stage units and eligible children formed the 3rd Stage units. Two villages from each of the first 7 zones were picked up randomly while only one village was picked up from the last remaining eighth zone thus providing all the 15 clusters needed for the study. A total of 750 subjects were studied with 50 subjects drawn from each of the 15 clusters. In case a sample of 50 households with children 1-5 years was not available in that village, remaining children were taken from next geographically closest village.

The study was conducted to assess the nutritional status of children 1-5 years of age and to identify the factors associated with it in the study population. Among the various methods available for assessment of nutrition status, most of them fraught with technical and logistic difficulties.[1] This study employs a simple and easy to use anthropometric method, mid-upper arm circumference, to estimate overall nutritional status of children aged 1-5 years.[7]

Mothers of eligible participants (or another responsible care-giver) were interviewed at their place of residence after taking prior consent from them in the language that was easier for them to comprehend (Dogri). Information was collected regarding age and gender of the child, socio-economic status (SES) of the family (determined using modified Uday Pareek Scale),[8] breast-feeding and complementary feeding (weaning) practices adopted for the child, number of doses of vitamin A prophylaxis received in the last 6 months along with history of common morbidities.

Histories of diarrhea, acute respiratory infection (ARI) were ascertained within 14 days prior to the day of interview whereas history or evidence of measles was recorded within 1-month prior to the date of interview. In this study, diarrhea was defined as passage of loose, liquid or watery stools passed more than 3 times a day. ARI was identified with history of running nose, cough, fever, sore throat, difficult breathing or ear problem depicting both upper and lower respiratory tract infection. The operational definition used for diagnosing measles was if a child had a history of fever, catarrhal symptoms of upper respiratory tract (coryza, cough) and a macular or maculo - papular rash.[9]

The questionnaire used in the present study was pre-tested and then modified based on difficulties in understanding or interpretation that were encountered. The questionnaire, which was written in English, was translated to local language (Dogri) and again translated back to English to ensure its accuracy.

The data were analyzed using SPSS software for windows (version. 11.5). Chi-square test was used to determine the statistical significance of the difference in prevalence of under-nutrition with various risk factors. A probability of <0.05 was considered statistically significant.

RESULTS

Table 1 depicts the socio - demographic characteristics of study population of the total 750 children studied in 15 villages of block R.S. Pura, Jammu, most subjects (65.5%) were in the age group of 1-3 years. About 58.4% of the study population comprised of boys and 41.6% were girls. The mean age of study subjects was 33.45 ± 12.7 months. The majority (84.5%) of subjects belonged to middle SES (upper middle 24.3%, middle 44.1% and lower middle 16.1%) families as per modified Uday Pareek Scale.

The association of nutritional status of the study subjects with the socio - demographic characteristics has been shown in Table 1. The majority (71.3%) of the study subjects with under - nutrition were in the younger age group (41.3% in 1-2 years; 30% in 2-3 years). The nutritional status was found to be significantly associated

with age of the child ($P = 0.029$) and the prevalence of under-nutrition was found to decrease with advancing age. However, no significant association with the gender of the child was found ($P = 0.168$). SES also showed no significant association with the nutritional status of the study subjects ($P = 0.199$).

Table 2 shows the association of various factors with the prevalence of under-nutrition in study population. Exclusive breastfeeding for 6 months was found to be significantly associated with their nutritional status ($P = 0.048$). The duration of breastfeeding was found to have no significant association with prevalence of under-nutrition. The age at which weaning was initiated found to have a significant association ($P = 0.006$) with the nutritional status of children. Intake of supplementary doses of vitamin A had no significant association ($P = 0.352$) with the nutritional status of the study subjects.

Prevalence of various morbidities and their association with the nutritional status of study children is depicted in Table 3. 39.1% of study subjects had an episode of ARI in the last 15 days while 44.6% of the children with under-nutrition had a history of ARI in the past. Significant association was seen between the nutritional status and ARI in the children ($P = 0.05$). Statistically significant association between diarrhea and under-nutrition was found ($P = 0.01$). Although the prevalence of measles in children studied was low (1.2%), it had a significant association with under-nutrition ($P = 0.01$).

Figure 1 shows the overall nutritional status of the children in the 15 study villages. The prevalence of under-nutrition in the study villages of R.S. Pura block ranges from 68% in Tanda and Mahlowal to 8% in Simbal. Disaggregated analysis revealed 28.4% of them suffering from under- nutrition; with 19% having mild-moderate under-nutrition, and 9% had severe under-nutrition. Higher proportions of girls (31.1%) as compared to boys (26.5%) were suffering from various grades of under-nutrition.

Table 1: Socio-demographic characteristics of the study population

Characteristics	Nutritional status of study subjects (*n* [%])			*P* value
	Normal *n*=537	Under-nutrition *n*=213	Total *n*=750	
Age (in months)				
12-24	163 (30.4)	88 (41.3)	251 (33.5)	0.029
25-36	177 (33.0)	64 (30.0)	241 (32.1)	
37-48	137 (25.5)	40 (18.8)	177 (23.6)	
49-60	60 (11.2)	21 (9.9)	81 (10.8)	
Gender				
Boys	322 (59.9)	116 (54.5)	438 (58.4)	0.168
Girls	215 (40.1)	97 (45.5)	312 (41.6)	
SES				
Upper	55 (10.2)	19 (8.9)	74 (9.9)	0.199
Upper middle	142 (26.4)	40 (18.8)	182 (24.3)	
Middle	226 (42.1)	105 (49.3)	331 (44.1)	
Lower middle	85 (15.8)	36 (16.9)	121 (16.1)	
Lower and BPL	29 (5.4)	13 (6.1)	42 (5.6)	

BPL: Below poverty line, SES: Socio-economic status

DISCUSSION

Analysis of the study sample results does not reveal gross discrepancy with respect to socio-demographic profile

Table 2: Factors associated with nutritional status of children in the study area

Characteristics	Nutritional status of study subjects (*n* [%])			*P* value
	Normal *n*=537	Under-nutrition *n*=213	Total *n*=750	
Exclusive breast feeding				
Present	237 (44.1)	111 (52.1)	348 (46.4)	0.048
Absent	300 (55.9)	102 (47.9)	402 (53.6)	
Duration of breast feeding (months)				
None	42 (7.8)	17 (8.0)	59 (7.9)	0.091
1-6	130 (24.2)	41 (19.2)	171 (22.8)	
7-12	100 (18.6)	40 (18.8)	140 (18.7)	
13-24	173 (32.2)	89 (41.8)	262 (34.9)	
>24	92 (17.1)	26 (12.2)	118 (15.7)	
Age at weaning (months)				
<4	14 (2.6)	5 (2.3)	19 (2.5)	0.006
4-6	52 (9.7)	20 (9.4)	72 (9.6)	
6-8	374 (69.9)	126 (59.2)	500 (66.7)	
8-10	35 (6.5)	13 (6.1)	48 (6.4)	
10-12	4 (0.7)	2 (0.9)	6 (0.8)	
>12	58 (10.8)	47 (22.1)	105 (14.0)	
Vitamin A supplementation*				
Received	65 (14.1)	31 (17.0)	96 (14.9)	0.352
Not received	395 (85.9)	151 (82.9)	546 (85.1)	

*Percentage calculated out of 642 children. For rest of the 108 children, documented evidence of having received vitamin A was not available

Table 3: Prevalence of common morbidities and their association with nutritional status of study subjects

Characteristics	Nutritional status of study subjects (*n* [%])			*P* value
	Normal *n*=537	Under-nutrition *n*=213	Total *n*=750	
ARI				
Present	198 (36.9)	95 (44.6)	293 (39.1)	0.05
Absent	339 (63.1)	118 (55.4)	457 (60.9)	
Diarrhoeal disease				
Present	101 (18.8)	58 (27.2)	159 (21.2)	0.01
Absent	436 (81.2)	155 (72.8)	591 (78.8)	
Measles				
Present	3 (0.6)	6 (2.8)	9 (1.2)	0.01
Absent	534 (99.4)	207 (97.2)	741 (98.8)	

ARI: Acute respiratory infection

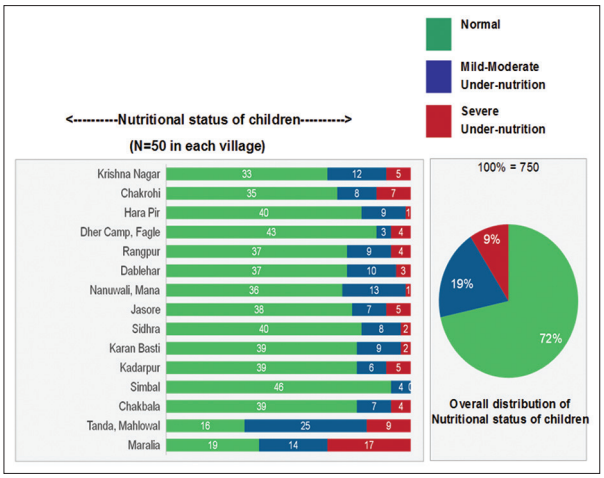

Figure 1: Nutritional status of children in 15 cluster villages of study area

with the census data. As a corollary, this seems to ensure representativeness of the study results. In the present study, it was observed that younger children had a higher prevalence of poor nutritional status. The results obtained in our study are consistent to those reported by Thakur *et al.* who observed that the prevalence of under-nutrition decreased significantly with increasing age.[10] Avachat *et al.* also observed that the majority of children in ages of 1-3 years were significantly suffering from under-nutrition as compared to older children.[11] Studies conducted by other authors including, Bisai *et al.* and Ray *et al.* also suggested similar findings.[1,12]

No gender differentials in the prevalence of under-nutrition were observed in our study. Our findings are in conformity to those made by National Family Health Survey-3 which states that the prevalence of under-nutrition was almost same in boys and girls.[3] Narkhede *et al.* also observed that under-nutrition was uniformly distributed in both the genders.[13] Bhavsar *et al.* conducted a study in urban slums of Mumbai also found that gender was not associated with the prevalence of under-nutrition in children.[14] Studies conducted by other authors, including Bisai *et al.* and Wong *et al.* also suggests similar findings.[1,4]

SES was found to have no significant association with the increased risk of under-nutrition in the study children. Narkhede *et al.* and Anuradha *et al.* also in their studies observed no significant association between under-nutrition and SES.[13,15]

This study also revealed that children who were given exclusive breastfeeding for 6 months had a lower prevalence of under-nutrition in them. The findings of the present study are similar to those reported by Bhavsar *et al.* (Mumbai) and Rasania and Sachdev who found that exclusive breastfeeding had a significant association with prevalence of under-nutrition in children.[14,16] It was also observed by Anuradha *et al.* that the breastfeeding practices had a significant impact on the prevalence of under-nutrition ($P = 0.02$).[15] Fuchs *et al.* conducted a study in Bangladesh and observed that lack of breastfeeding was significantly associated with under-nutrition in children ($P = 0.01$).[17]

In this study, 66.7% of children started complementary feeding (weaning) around 6 months of age as recommended by World Health Organization. It was further observed that age at which the children started weaning was significantly associated with the prevalence of under-nutrition in them. Our findings are in conformity with those of Rasania and Sachdev who observed a significant association between malnutrition in children when weaning was delayed ($P < 0.05$).[16]

Analysis of common morbidities of the study population revealed that children with diarrhea, ARI and measles were at a significant risk of under-nutrition. The findings are in accordance with that of National Nutrition Monitoring Bureau which stated that presence of common morbidities in children like diarrhea and ARI was associated with the prevalence of under-nutrition in them.[18] Bhavsar *et al.* also observed that morbidities like diarrhea and ARI were significantly associated with prevalence of under-nutrition in children.[14] A study conducted by Rice *et al.* concluded that there is a strong and consistent relationship between malnutrition and increased risk of death due to diarrhoea.[19] Gupta conducted a study in Punjab and had found that 46% of under-five children with diarrhea suffered from malnutrition ($P < 0.001$).[20] Bisai *et al.* reported that children with prevalent morbidities like diarrhea, ARI or measles were more likely to be under-nourished (odds ratio - 3.7, 95% confidence interval - 1.57-8.74).[1] Wong *et al.* and Ray *et al.* also observed a significant association between malnutrition and recurrent history of childhood morbidities like diarrhea, ARI, etc.[4,12]

The overall prevalence of under-nutrition in the study population was observed to be high affecting about one-fourth of them. The findings of our study are very close to those reported by National Family Health Survey-3, which states that wasting is present in 20% of under-five children in India and 43% of them are under-weight.[3] The prevalence of under-nutrition has been reported to range from 50.46% in Maharashtra (Avachat *et al.*), 52.3% in Nagpur (Narkhede *et al.*) and 56.3% in Miraj (Thakur *et al.*).[10,11,13] Sahu *et al.* observed that the prevalence of under-nutrition among under-five children in India was high and varies from 10.6% to 42.3% depending on the assessment methodology adopted.[21]

CONCLUSIONS

The prevalence of under-nutrition was high in the study population thus highlighting yet again that under-nutrition continues to be a public health burden. Multi-pronged approaches like maternal and child health care, nutrition education, growth monitoring will be beneficial to combat this problem. The practice of exclusive breast feeding, the introduction of timely complementary feeding, standard case management of diarrhea and ARI are required to reduce malnutrition of under-five children.

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