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Assessment of Nutritional Status among Under Five Children in a Rural Area of Kalaburagi District

Basavakumar S Anandi[1], Shrinivas B Reddy[1], Amruta S Indupalli[2]

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Author's Affiliation:
[1]Assistant Professor; [2]Professor, Dept of Community Medicine, ESIC Medical College Gulbarga

Correspondence
Mr. Shrinivas Reddy
reddymrmcg@gmail.com

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ABSTRACT

Background: Malnutrition among under-five children is a major public health problem in India especially in rural areas. About more than 30% of malnutrition world-wide is prevalent in southern Asia; a significant proportion of which is contributed by India. It is well known that malnutrition is frequently a part of a vicious cycle that includes poverty and infections; the devastating effects of which can last lifetime and even affects the next generation. The underlying factors for malnutrition differ from one region to other. Thus, a study was conducted to understand underlying factors for malnutrition in rural context with following

Methodology: A cross-sectional study was undertaken among 201 under-five children in Korwar village (Rural field practice area of ESIC medical college Kalaburagi dist.). Anthropometric measurements were taken to assess nutritional status.

Results: 61% of children were under-weight for their age, 36.3% and 11.9% were found to be stunted and wasted respectively. Mother's educational status and age of the child were significantly associated with under-nutrition.

Conclusions: There was unacceptability high prevalence of malnutrition among under-five children. Thus health institutions at all levels should integrate nutrition as a health component and there is a need to educate the parents to provide age-appropriate energy-rich, locally available, and nutritionally balanced food items.

Keywords: Under-nutrition, Wasting, Stunting, Malnutrition, under-five children.

BACKGROUND

Nutrition plays a pivotal role in child survival, growth, development and thus to play, learn and participate - while malnutrition deprives the child of their futures.[1, 2] A scientific evidence generated by economics, psychology and neuroscience demonstrated that investments made in the earlier years in children greatly impact their long-term physical and mental health, earnings and well-being.[3]

Stunting refers to a child who is too short for his or her age.[4,5] Children suffering from stunting fail to attain full cognitive potential thus their lives are at marked disadvantage; tend to face a learning difficulty in school, earn less as adults and show poor social participation, compared to a nutritionally healthy child.[6]The devastating effects of stunting can last lifetime and even affect the next generation. Globally the prevalence of stunting has been declining too slowly (decline from 2000 to 2017: 32.6 to 22.2%).[2]Indiaalso shows inconsistent and slow decline; NHFS IV (2015-16) reported 38 percent of children under-five years were stunted.[7]Some of the studies have found stunting increases with a child's age through 18-23 months and decreases slightly thereafter. Two out of five stunted children in world live in southern Asiaand this contributes for about 58.7 million cases worldwide.[2]Wasting refers to a child who is too thin for

his or her height which is a sign of acute undernutrition.[4,5]In southern Asia wasting constitutes a critical public health emergency with more than 15% of cases being contributed by this region; wasting has remained about the same over the past several years.[2] In India 21 percent of children under-five years are wasted.[7]Wasting is a chronic condition resulting frompoor nutrient intake or chronic disease conditions, predisposing to long term developmental delays and increased risk of death.[8-11]Some children suffer from more than one form of malnutrition consequently may be either underweight or overweight for their age.[2] In India 36 percent of children under-five years are underweight.[7]Malnutrition acts as a pre-disposing factor for some of the leading childhood diseases such as diarrhea, respiratory infections, measles, tuberculosis etc. and also aggravates the course of illness.[11,12]Several studies have revealed that in addition to direct effects, malnutrition has its bearing on the increased cost of health care adding to poverty.[13]Over several decades major focus has been on reducing child mortality by mainly focusing on control of specific infectious diseases with lesser emphasis being lead on improving child's underlying nutritional status.[4, 14]

The new emerging face of malnutrition is,growing problemof over-weight and obesity among preschool children with increased access to processed foods and wide-spread marketing of food products added byreduced physical activity.[2]Some commonly elicited associated factor for malnutrition in previous studies waspoor dietary intake (both in terms of quantity and quality), withunderlying causes being, poor access to affordable and nutrient-rich foods; inadequate maternal and child care, feeding practices and behaviours; and other factors were: a poor environment lacking safe water, sanitation and good hygiene practices.[4]These in turn influenced by social, economic and political factors.[4, 10]Griffiths et al., in 2004 observed that the shared environment within households such as customs, beliefs and values, having common access to resources and communities were also critical in influencing childhood nutrition.[5]Several studies have documented higher prevalence of stunting among children in rural areas (41%) than urban areas (31%).[7, 15]

Kalaburagi district considered as, one among six backward districts of Hyderabad Karnataka region, the current study was designed to understand factors associated with malnutrition in rural context in this region and thus contribute to more effectively for tackling the problem of malnutrition with focused strategies.[16]The objectives of current study were: 1. To estimate the prevalence of malnutrition among under-five children 2. To find associated factors for malnutrition among under-five children in a rural area of Kalaburagi district.

METHODOLOGY

Study was undertaken in rural field practice area of ESIC, medical college, Kalaburagi district. Total area contained; 3 sub-centres with 8 villages forming a total population of 4800. Among 8 villages, study was conducted in Korwar village, which had population of about 1500. Study area was selected conveniently due to its accessibility and other logistics reasons. Study duration was for 2 months from 1st May 2018 to 30th June 2018. Prior to commencement of study Ethical clearance was obtained from Institutional ethical clearance committee. List of under 5 children available with local anganwadi served as a sampling frame. From the above list; house visits were made only to those houses which had under 5 children. Total population of under-five children in selected village was 230 of which, 29 participants were not included in study due to in-appropriate and in-complete data as well as non-availability of subjects at the time of data collection. Thus, the final analysis was undertaken for 201 participants. Data was collected, preferably from mother; however, in absentiainformation was gathered from either father or relatives present at the time of home visit. Interview method in local language was adopted to collect data by using a structured questionnaire. Apart from anthropometric measurements, nutritional status was assessed by obtaining history of any disease/nutritional related illnesses either in current or past.

Anthropometric measurements:

Measurement of height/length was done in a lying position with wooden board for children under two years of age and children above two years and mothers were measured in a standing position with centimeters to the nearest of 0.1cm. Age was included in completed months by ascertaining it from birth certificate / MCP card available at the time of visit. Nutritional status was assessed by using anthropometric indices of Z-score method. The Z-score is a measure of individual's value with respect to the distribution of the reference population. The formula for the calculation of Z-scores is as follows:

$$\text{Z Value} = \frac{\text{Individual value (ht or wt)} - \text{(median of reference popu)}}{\text{(standard deviation of the reference population)}}$$

As per WHO growth chart standards Height-for-age (HAZ) was used to measure stunting, weight-for-height (WHZ) was used to measure wasting and weight-for-age (WAZ) is a measure of underweight. Values below- 2SD of median was considered moderate malnutrition and below -3SD was

considered were considered under severe grade malnutrition. Children whose height-for-age, weight-for-height and weight-for-age < -2 SD from the median of the reference population were considered stunted, wasted and underweight respectively.[17]Then, the data were exported to statistical package for social sciences (SPSS) software Version 20 for data processing and analysis.

RESULTS

Majority of the subjects were in the age-group of 49 to 60 months i.e. 31.8%, whereas only 5% of subjects were present in less than 1 year age-group. A large proportion of parents of under 5 children were illiterate (i.e. 57.2% of fathers and 56.7% of mothers belonged to this category). However, 20.4% of mothers were educated up to diploma or had some intermediate degree and 10.4% of fathers were educated up to middle school. Most fathers of under-five children were engaged in unskilled tasks by occupation (48.3%), majority of the mothers were unemployed or simply stayed at home (41.3%). Farming formed the second most common type of occupation among fathers (35.3%) followed by unskilled labor work. Most of the families belonged to Class III socio-economic status according to modified BG Prasad scale 2016 and majority of families were of nuclear type (53.2%) as depicted in Table 2.

From the **Table 1** it can be observed that; prevalence of under-weight, stunting and wasting were 61%, 36.3%, and 10.9% respectively among under-five children. Prevalence of stunting was more than that of wasting, which means that most of children were suffering from chronic nutrition related problems.

Table 1: Prevalence of malnutrition among under five children in Korwar village

	Under-weight (n=201)(%)	Stunting (n=201) (%)	Wasting (n=201) (%)
Yes	123(61)	73(36.3)	22(10.9)
No	78(39)	128(63.6)	179(89)

Table 2: Educational status and nutrition: Underweight was more among children of parents with lower educational status. As high as 59.3 % children of illiterate fathersand illiterate mothers were found to be under-weight for their age. Similarly, under-weight children was more among parents educated up to primary school (9.8% children of fathers and 6.5% children of mothers). Children of illiterate fathers and those educated up to primary school were 1.4 and 2.5 times more under-weight for their age than those children whose fathers had graduation degree. However the prevalence of under-weight was not statistically significant between 2 groups (P=0.53). Children of mothers educated up to middle school were 9.5 times more underweight when compared to children of mothers holding diploma or some intermediate degree.The difference in prevalence of under-weight between two groups was statistically significant (p<0.05).

Table 2: Age and nutrition: The prevalence of under-weight was more among 49-60 and 25-36 months age-groups when compared to all others and lowest in below 1-year age-group. Children in 49-60 and 25-36 months age-group were 2.8 and 4 times more under-weight when compared to children in 0-12 month's age-group. *On univariate analysis the association between age and nutritional status was statistically significant in 25-36 months age-group (p<0.05).*

Table 2: Gender and nutrition: The prevalence of under-weight was more among females when compared to males. Female children were 1.4 times more under-weight than male counterparts. However the difference in prevalence of under-weight between two groups was statistically non-significant.

Table 2: Religion and nutrition: The prevalence of under-weight was more among Hindu children (78%) compared to Muslim children (22%) i.e., Hindu children were 1.2 times more under-weight than Muslim children. The difference in prevalence of under-weight between two groups was statistically not significant (p=0.60)

Table 2: Occupational status and nutrition: The prevalence of under-weight was more among parents who were unemployed or employed as unskilled laborers. Children of mothers who were unemployed or employed as unskilled laborers had 1.86 and 1.63 times more prevalence of underweight when compared to children of mothers engaged in semi-professional occupation. The difference in prevalence of under-weight between two groups was statistically not significant.

Table 2: Socio-economic status and nutrition: Children belonging to class IV and V were 1.6 and 1.4 times under-weight when compared children belonging to higher socio-economic class. The association between nutritional status and socio-economic class was statistically non-significant (p=0.14).

Table 2: Type of family and nutritional status: Children belonging to nuclear family were 1.57 times more under-weight when compared to children belonging to three generation family**.** The difference in prevalence of under-weight between two groups was not statistically significant (p=0.41).

Table 2. Prevalence of under-weight among under-five children in Korwar village

Variables	Underweight child		Total	Univariate	
	Yes (%)	No (%)		OR (95% CI)	P value
Educational status – Father					
Illiterate	73(59.3)	42(53.8)	115(57.2)	1.4(0.60-3.5)	0.53
Primary	12(9.8)	4(5.1)	16(8)	2.5(0.63-10.17)	0.31
Middle	11(8.9)	10(12.8)	21(10.4)	0.9(0.28-3.01)	0.85
Secondary	8(6.5)	6(7.7)	14(7)	1.1(0.29-4.2)	0.87
Intermediate	6(4.9)	5(6.4)	11(5.5)	1.0(0.24-4.2)	0.73
Graduate	13(10.6)	11(14.1)	24(11.9)	1	
Educational status – Mother					
Illiterate	73(59.3)	45(57.7)	118(58.7)	1.4(0.70-3.01)	0.30
Primary	8(6.5)	7(9)	15(7.4)	1.0(0.33-3.5)	0.80
Middle	10(8.1)	1(1.3)	11(5.5)	9.5(1.11-81.3)	**0.04**
Secondary	9(7.3)	5(6.4)	14(7)	1.7(0.48-6.0)	0.59
Intermediate	21(17.1)	20(25.6)	41(20.4)	1	
Graduate	2(1.6)	0	2(1)		
Age (in months)					
49-60	42(34.1)	22(28.2)	10(5.00)	2.8(0.73-11.2)	0.22
37-48	23(18.7)	20(25.6)	36(17.90)	1.7(0.42-6.99)	0.67
25-36	35(28.5)	13(16.7)	48(23.90)	4.0(0.97-16.6)	**0.04**
13-24	19(15.4)	17(21.8)	43(21.40)	1.6(0.40-6.9)	0.72
0-12	4(3.3)	6(7.7)	64(31.80)	1	
Gender					
Female	72(58.5)	40(51.3)	112(55.7)	1.34(0.75-2.3)	0.38
Male	51(41.5)	38(48.7)	89(44.3)	1	
Religion					
Hindu	96(78)	58(74.4)	154(76.6)	1.2(0.63-2.3)	0.60
Muslim	27(22)	20(25.6)	47(23.4)	1	
Occupational status of Father					
Unemployed	5(4.1)	3(3.8)	8(4)	1.02(0.22-4.6)	0.72
Unskilled worker	57(46.3)	40(51.3)	97(48.3)	0.87(0.46-1.6)	0.79
Semi-skilled worker	2(1.6)	1(1.3)	9(4.5)	1.22(0.10-14.19)	0.65
Skilled worker	7(5.7)	7(9)	14(7)	0.61(0.19-1.9)	0.59
Shop owner/Farmer	44(35.8)	27(34.6)	71(35.3)	1	
Semi-professional	2(1.6)	0	2(1)		
Occupational status of Mother					
Unemployed	54(43.9)	29(37.1)	83(41.3)	1.86(0.11-30.8)	0.75
Unskilled worker	36(29.2)	22(28.2)	58(28.9)	1.63(0.09-27.5)	0.69
Semi-skilled/Skilled worker	7(5.6)	3(3.8)	10(5)	2.33(0.10-50.97)	0.78
Shop owner/Farmer	25(20.3)	23(29.4)	48(23.9)	1.08(0.06-18.4)	0.50
Semi-professional	1(0.81)	1(1.2)	2(1)	1	
Socioeconomic status					
class V	19(15.4)	11(14.1)	89(44.3)	1.41(0.60-3.3)	0.56
class IV	55(44.7)	27(34.6)	82(40.8)	1.66(0.89-3.09)	0.14
class III	49(39.8)	40(51.3)	30(14.9)	1	
Type of family					
Nuclear	40(32.5)	19(24.4)	59(29.4)	1.57(0.66-3.7)	0.41
Joint	63(51.2)	44(56.4)	107(53.2)	1.07(0.49-2.3)	0.98
Three generation	20(16.3)	15(19.2)	35(17.4)	1	

DISCUSSION

A study by Alom J in 2012 revealed similar findings to our study; that is 16% of the children were severely stunted and 25% were moderately stunted, 3% were severely wasted and 14% were moderately wasted. Furthermore, 11% of the children were severely underweight and 28% were moderately underweight. The results indicated children aged 24–35 and 36–47 months had 5.78 and 5.66 times higher odds of being stunted, respectively, in comparison with children aged 6 months. Reasons quoted were deficiency in proper supplementary food for children after 6 months of age since breast milk only is not sufficient to maintain adequate nutrition beyond 6 months (Mishra & Retherford, 2000).[18]In our study the prevalence of stunting was 36%, this can be attributed to chronic infections and decreased dietary protein intake. In contrast to findings of our study, a study on adolescents in south-western Nigeria revealed that males were more stunted and underweight than females (Omigbodun et al., 2010). In addition; that children from rural schools were more likely

to be stunted and underweight than those from urban areas.[19]A study by Hiwot Yisak revealed male children were more likely to be stunted (COR = 1.6, 95 % CI (1.2-2)); high birth order children were more likely to be stunted (COR = 2.3, 95 % CI (1.4-2.8).[20]But consistent to the findings of our study in a study by Manjunath R, girl children had higher prevalence of underweight (72.7%) and wasting (61.1%) in comparison to boys (66.2% underweight and 56.4% wasting).[21]Rayhan & Khan (2006) investigated the impact of some demographic, socioeconomic, environmental and health-related factors on child nutritional status using the nationwide data of the Bangladesh Demographic and Health Survey (BDHS) 1999–2000. They observed that previous birth interval, size at birth and mother's education had a significant influence on chronic malnutrition.[18]

Mothers without any formal education had significantly higher level of underweight and stunting in their children. Children of mothers who failed to read had 45% prevalence of underweight in contrast to children of those mothers with ten years or more of education wherein the prevalence of underweight was 27%. The report also showed the insufficiency of nutritional counselling to mothers.[22]In coherence to above study our study showed a significant level of association between mother's education and prevalence of malnutrition among under-five children. Mean per capita consumption of calories being far below the minimum threshold for daily intake (2400 Kcal in rural and 2100 Kcal in urban areas), is a serious predisposing factor for the large prevalence of under-nutrition among mothers and children.[23]Hiwot Yisak observed Illiterate mothers were more likely to have stunted child (COR = 3.55, 95 % CI (1.5-7.8)). Families earning less than 500 birr per month were more likely to have stunted child with COR = 2.5, 95 % CI (1.72-3.5), and lacking of farm land was also associated with stunting (COR = 2.2, 95 % CI (1.56-3)). The prevalence of stunting for male and female children is 57.3% and 55.9%, respectively. In contrast to our study, more male children (31.1%) were found to be severely stunted compared to female (26.3%).[20]A study among under-five children of kadakuruba tribe by Manjunath R revealed that overall prevalence of underweight, stunting and wasting were 60.4%, 55.4% and 43% respectively which was statistically significant with respect to age (underweight and stunting). No significant relationship was seen with respect to other factors like sex, mother's age, mother's education and occupation, type of family, family size, number of children. But increase in prevalence with increase in age was attributed to inadequate supplementation of food at family level, bottle feeding rate was 3% but continued breastfeeding rate of 95.1% at age one year dropped to 59.6% at age two years.[21]

LIMITATIONS

Design being a cross-sectional the study provides a single snap shot look at the study population thus the underlying causes and mechanisms related to the high level of malnutrition among children cannot be elicited. The current study did not compare the prevalence of malnutrition with other rural based studies in the region due to lack or absence of such studies. Despite these weaknesses, this work contributes to our understanding of the depth of the problem in the area. Since our study deployed convenient sampling technique, its findings cannot be extrapolated to other populations with similar characteristics. Due to resource constraints the present study was restricted to clinical examination and anthropometric measurements, other factors influencing nutrition such as Bio-chemical evaluation & functional assessment were not studied.

CONCLUSIONS

Current study showed unacceptably high levels of malnutrition among under-five children. Mother's educational status and age of the child were the significant socio-demographic factors associated with the malnutrition. Thus health institutions at all levels should integrate nutrition as a health component and conduct close monitoring and evaluations of the activities at various levels. The nutrition related programs should combat childhood malnutrition through comprehensive preventive measures like strengthening family practices related to infant and young child feeding, childcare with appropriate medical treatment, improvising nutritional counselling to mothers at all levels of care.

RECOMMENDATIONS

Health education on nutrition and good access to & utilization of healthcare can be very effective interventions to reduce in under-nutrition in children over the next decade. Children with growth faltering and under-nutrition should be identified at the early stages, counselled, and provided with supplements regularly and monitored for improvement. From the observations made during the study and considering the results, there is a need to educate the parents to provide age-appropriate energy-rich, locally available, and nutritionally balanced food items for physical growth & mental development.

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