Community Medicine Section

Nutritional Status of Children Aged 3-6 Years in a Rural Area of Tamilnadu

ANURADHA R[1], RANJIT SIVANANDHAM[2], SAM DASHNI SALOME[3], RONIYA FRANCIS[4],
ROOPA D[5], SAKTHI SAMPAVI[6], SABU S R[7], RANJIT PRASAD[8]

ABSTRACT

Background: A child's entire life is determined in large measures by the food given to him during his first five years. Since childhood is the most vulnerable phase in the life of human being, nutritional inadequacies will result in the hampering of the development of the body. Future of the country is determined by the growing generation of the country.

Objectives: a) To assess the nutritional status of children aged 3-6 y in a rural area of TamilNadu.

b) To identify the factors associated with the nutritional status of the above study population.

Settings and Design: Kuthambakkam village in Tamilnadu, Cross sectional study.

Materials and Methods: Total number of children aged 3-6 y is 172 in Kuthambakkam village. The entire children aged 3-6 y was included in the study. Mothers of the children were interviewed using an interview schedule to collect information regarding the sociodemographic profile, feeding practices, and immunization status. Socio-economic status was assessed using modified BG Prasad's classification. Weight of the children was measured using a portable weighing machine. Nutritional status among 3-6 y old children was assessed by computing weight for age (standard used - National Centre For Health Statistics (NCHS)

standards for weight for age) and grading of nutritional status of the children was done using the Indian Academy of Paediatrics (IAP) classification. Grade I to Grade IV nutritional grade is taken as undernourished.

Statistical Analytical: Prevalence will be expressed in percentage and Chi-square test will be used to find association with factors.

Results: The prevalence of under-nutrition ($\leq$ 80 percentage of standard weight for age) was 66.5%. The prevalence of grade 1 malnourishment was 46.2%.The prevalence of under nourishment increased with increasing age and the difference was found to be statistically significant (p< 0.05).Prevalence of under nourishment was higher among male children (76.9%) than female children (56.3%) and was statistically significant. As the socioeconomic status increased the prevalence of undernourishment decreased and the difference was found to be statistically significant(p<0.05). Duration of exclusive breast feeding had influence on the nutritional status.

Conclusion: Community based preventive measures should be taken to allievate malnutrition. Health education to the mothers on dietary practices like feeding their children with locally available low cost but healthy food should be given. Nutritional rehabilitation centres should be established. Improving the socioeconomic standards is mandatory.

INTRODUCTION

Malnutrition and Infection are the two most important factors that affect the growth of children. In most cases of childhood infections, the cause can be traced to insufficient food intake or absorption, which renders the human system vulnerable to infections. The magnitude of the problem of malnutrition among children under five years of age is high throughout in India [1]. More than 26,000 children under the age of 5 die around the world each day mostly conditions due to preventable causes. Nearly all of them live in developing countries or, more precisely in 60 developing countries [2]. A child's entire life is determined in large measures by the food given to him during his first five years. Childhood is a period of rapid growth and development, and nutrition is one of the influencing factors in this period [3]. A number of anthropometric indices have been used successfully for many years to estimate the prevalence of under-nutrition among pre-school children. These include height-for-age, weight-for-age and weight-for-height. Height-for-age is an index of cumulative effect of under-nutrition during the life of the child. Weight-for-age is the combined effects of both, the recent and the long-term levels of nutrition, whereas weight-for-height reflects the recent nutritional experiences of the child. These indices are reasonably sensitive indicators of the immediate and underlying general causes of nutrition [4]. The risk of mortality is inversely related to children's height-for-age and weight-for-height [5,6]. Freedom from hunger and malnutrition is a basic human right and their alleviation is a fundamental prerequisite for human and national development [7].

The present study was a community based cross sectional study carried out in Kuthambakkam village of Tamilnadu among children aged 3-6 y from September 2012-December 2012. Ethical clearance was obtained. The objectives of the study was to assess the nutritional status of children aged 3-6 y and to identify the factors associated with the nutritional status of the above study population.

Based on the prevalence rate of 52.23 % among under 5 children in a study conducted in Nagpur [8] minimum sample size required for this study, with allowable error of 15% and 95% CI, was 156.

Total number of Children aged 3-6 y was 172 in Kuthambakkam village. All the children aged 3-6 y were included in the study. Informed consent was obtained from mothers of the children. Mothers of the children were interviewed using an interview schedule to collect information regarding the sociodemographic profile, feeding practices and immunization status. Socio-economic status was assessed using modified BG Prasad's classification [9].

Anthropometric data regarding weight of the children was recorded. Weight of the children was measured using a portable weighing machine and readings were taken to the nearest 0.1 kg. The individual was made to stand still on the platform of the weighing machine, with the body weight evenly distributed between both the feet. Light indoor clothing was allowed to be worn and footwear was removed when the weight was measured.

Percentage of standard weight for age	Nutritional grade	Nutritional status	Frequency (n)	Percentage
> 80%	Normal	Normal	53	33.5%
71 – 80%	Grade 1	Mild under-nutrition	73	46.2%
61 – 70%	Grade 2	Moderate under-nutrition	27	17.1%
51 – 60%	Grade 3	Severe under-nutrition	4	2.5%
< 50 %	Grade 4	Very severe under-nutrition	1	0.6%
Total n(%)			158	100.0%

[Table/Fig-1]: IAP classification of nutritional status

Age in months	Nutritional Status			Chi-square for linear trend	p-value
	Normal	Undernourished n(%)	Total n(%)		
36-48	31 (41.9)	43 (58.1)	74 (100.0)	3.90	0.047
49-60	10 (26.3)	28 (73.7)	38 (100.0)		
61-72	12 (26.1)	34 (73.9)	46 (100.0)		
Total n(%)	53 (33.5)	105 (66.5)	158 (100.0)		

[Table/Fig-2]: Age and nutritional status

Sex	Nutritional Status			Chi-square for linear trend	p-value
	Normal	Undernourished n(%)	Total n(%)		
Male	18 (23.1)	60 (76.9)	78 (100.0)	7.5716	0.005
Female	35 (43.8)	45 (56.3)	80 (100.0)		
Total n(%)	53 (33.5)	105 (66.5)	158 (100.0)		

[Table/Fig-3]: Sex and nutritional status

Mother's occupation	Nutritional Status			Chi square value	p-value
	Normal	Undernourished n(%)	Total n(%)		
semiskilled	1(7.6)	12 (92.3)	13(100)	5.3495	0.0689
unskilled	9(28.1)	23(71.8)	32(100)		
unemployed	43(38.0)	70(61.9)	113(100)		
n(%)	53(33.5)	105(66.4)	158(100)		

[Table/Fig-4]: Mother's occupation and nutritional status

Father's Occupation	Nutritional Status			Chi square value	p-value
	Normal	Undernourished n(%)	Total n(%)		
Clerks	14(63.6)	8(36.4)	22(100)	11.24	0.02
Skilled workers	15(28.3)	38(71.7)	53(100)		
Semi skilled workers	11(31.4)	24(68.5)	35(100)		
Unskilled workers	13(28.2)	33(71.74)	46(100)		
Un employed	0(0)	2(100)	2(100)		
Total n(%)	53(33.5)	105(66.5)	158(100)		

[Table/Fig-5]: Father's occupation and nutritional status

Evaluation of nutritional status- Nutritional status among 3-6 y old children was assessed by computing weight for age (standard used- National Center For Health Statistics (NCHS) standards for weight for age and grading of nutritional status of the children was done using the Indian Academy of Paediatrics (IAP) classification. Grade I to Grade IV nutritional grade is taken as undernourished [10].

IAP CLASSIFICATION
Nutritional grade Percentage of standard weight for age

Normal	> 80%
Grade I	71-80%
Grade II	61-70%
Grade III	51-60%
Grade IV	< 50%

Analytical strategy
Prevalence was expressed in percentage and Chi-square test was used to find association with factors.

RESULTS
The prevalence of under-nutrition (≤ 80 percentage of standard weight for age) was 66.5%. The prevalence of grade 1 malnourishment was 46.2% [Table/Fig-1]. The prevalence of under nourishment increased with increasing age and the difference was found to be statistically significant (p < 0.05) [Table/Fig-2]. Prevalence of under nourishment was higher among male children (76.9%) than female children (56.3%) and was found to

be statistically highly significant [Table /Fig-3]. Nutritional status of children of mothers who were unemployed was better than those whose mothers were working but not statistically significant [Table/Fig-4]. Father's occupation and nourishment of the children were statistically associated [Table/Fig-5].

The prevalence of under nutrition among children whose mothers were illiterate was 78.6% [Table/Fig-6]. No significant association was found between parents educational status [Table/Fig-6], type of family [Table/Fig-7], family size [Table/Fig-8] and the nutritional status of the children. As the socioeconomic status increased the prevalence of undernourishment decreased and the difference was found to be statistically significant (p<0.05) [Table/Fig-9]. The second order children were more undernourished than the first and third order but the difference was not statistically significant [Table/Fig-10].

Time of initiation of breast feeding and nutritional status was not statistically associated. However there was a statistically significant association between duration of exclusive breast feeding and the nutritional status [Table /Fig-11]. No significant association between immunization and nutritional status of the children [Table/Fig-12].

DISCUSSION
In this study the prevalence of under-nutrition (≤ 80 percentage of standard weight for age) was 66.5%. The prevalence of grade 1 malnourishment was 46.2%. In a study conducted in a rural area the prevalence of protein energy malnutrition among children aged 1-5 y was found to be 56.4% [11]. In a dietary survey conducted by Vinod et al., it was found that 52.23 %children were suffering from various grades of malnutrition among whom 32.18 % children were in grade I, 16.09 % in grade II, 3.46 % in grade III and 0.5 % in grade IV malnutrition [8].

Children in the age group 49-60 months were more undernourished than other age group children and the difference was found to be statistically significant (p < 0.05). Kavitha et al., [12] reported in her study the prevalence of protein energy malnutrition was higher in 3rd year age periods as compared to 4th and 5th year.

Prevalence of under nourishment was higher among male children (76.9%) than female children (56.3%) and the difference was found

Father's Educational Status	Nutritional Status			Chi square value	p-value
	Normal	Undernourished n(%)	Total n(%)		
High school and above	25 (33.8)	49 (66.2)	74 (100.0)	0.022	0.883
Middle School	18 (32.7)	37 (67.3)	55 (100.0)		
Primary School	7 (31.8)	15(68.2)	22 (100.0)		
Illiterate	3 (42.9)	4 (57.1)	7 (100.0)		
Total n(%)	53 (33.5)	105 (66.5)	158 (100.0)		
Mother's Educational Status					
High school and above	11 (32.4)	23 (67.6)	34 (100.0)	0.417	0.518
Middle School	25 (37.3)	42 (62.7)	67 (100.0)		
Primary School	14 (32.6)	29 (67.4)	43 (100.0)		
Illiterate	3 (21.4)	11 (78.6)	14 (100.0)		
Total n(%)	53 (33.5)	105 (66.5)	1 58 (100.0)		

[Table/Fig-6]: Parent's educational status and nutritional status

Type of Family	Normal n(%)	Underno- urished n(%)	Total n(%)	Chi-square	p-value
Type of Family	Normal n(%)	Undernourished n(%)	Total n(%)		
Nuclear	49 (33.6)	97 (66.4)	146 (100.0)	0.091	0.762
Joint	4 (33.3)	8 (66.7)	12 (100.0)		
Total n(%)	53 (33.5)	105 (66.5)	158 (100.0)		

[Table/Fig-7]: Type of family and nutritional status

Family size	Normal n(%)	Underno- urished n(%)	Total n(%)	Chi-square	p-value
3	15(32.6)	31(67.3)	46 (100)	0.4865	0.7841
4	29(35.8)	52(64.2)	81 (100)		
>5	9(29.0)	22(70.9)	31(100)		
Total n(%)	53(33.5)	105 (66.4)	158(100)		

[Table/Fig-8]: Family size and nutritional status

Socioeconomic Classification*	Normal n(%)	Underno- urished n(%)	Total n(%)	Chi-square	p-value
Class 1	2 (66.7)	1 (33.3)	3 (100.0)	5.429	0.019
Class 2	12 (46.2)	14 (53.8)	26 (100.0)		
Class 3	25 (33.8)	49 (66.2)	74 (100.0)		
Class 4	14 (27.5)	37 (72.5)	51 (100.0)		
Class 5	0 (0.0)	4 (100.0)	4 (100.0)		
Total n(%)	53 (33.5)	105 (66.5)	158 (100.0)		

[Table/Fig-9]: Socio-economic status and nutritional status

Birth Order	Normal n(%)	Underno- urished n(%)	Total n(%)	Chi- square for linear trend	p-value
1	37 (35.6)	67 (64.4)	104 (100.0)	0.304	0. 581
2	14 (28.6)	35 (71.4)	49 (100.0)		
3	2 (40.0)	3 (60.0)	5 (100.0)		
Total n(%)	53 (33.5)	105 (66.5)	158 (100.0)		

[Table/Fig-10]: Birth order and nutritional status

Time of Initiation of Breastfeeding	Normal n(%)	Underno- urished n(%)	Total	Chi- square value	p-value
No breastfeeding	2 (100.0)	0 (0.0)	2 (100.0)	4.025	0.258
0-1 hour	44 (32.8)	90 (67.2)	134 (100.0)		
>1 -4 hours	6 (31.6)	13 (68.4)	19 (100.0)		
>4 hours	1 (33.3)	2 (66.7)	3 (100.0)		
TOTAL	53 (33.5)	105 (66.5)	158 (100.0)		
Duration of Exclusive Breastfeeding					
Noexclusive breastfeeding	2(100.0)	0 (0.0)	2 (100.0)	9.484	0.023
0-4 months	13 (31.7)	28 (68.3)	41 (100.0)		
>4-6months	33 (39.3)	51 (60.7)	84 (100.0)		
>6 months	5 (16.1)	26 (83.9)	31 (100.0)		
TOTAL	53 (33.5)	105 (66.5)	158 (100.0)		

[Table/Fig-11]: Breastfeeding practices and nutritional status

to be highly significant. This finding is unique in Indian context where females are prone to get neglected and sex wise prevalence of under nutrition was usually higher in females as compared to males [8,12].

Singh JP et al., in his study similarly found that prevalence of malnutrition was higher among male children (54.82%) than female children (45.18%) [13].

As the socioeconomic status increased the prevalence of undernourishment decreased and the difference was found to be statistically significant (p<0.05). Dhakal MM et al., [14] mentioned that the burden of malnourishment still haunts the poor with 82.75% children from low income group i.e. IV & V by Prasad Scale.

No significant association was found between educational status of parents and nutritional status of the children. Ahmed E et al., reported a higher proportion of children suffering from PEM belongs to illiterate parents and especially that of illiterate mothers [11]. Similarly in a study conducted by Verma et al., literacy of mother displayed a significant (p< 0.001) inverse relationship with malnutrition being highest (70%) among children whose mothers are illiterate [15].

No significant association was found between family size and nutritional status of the children. Mudkhedkar et al., found that relationship between family size and nutritional status was inversely proportionate when size of family was large (>8) [16]. In a study done in rural Hissar, it was found that majority of the cases of protein energy malnutrition had family size of 5 – 8 members [17].

The second order children were more undernourished than the first and third order but the difference was not statistically significant. Verma et al., found a significant association (p < 0.001) was observed between birth order and the nutritional status of the child. Highest prevalence of malnutrition (76.2%) was observed in children with birth order 4 and above [14].

Time of initiation of breast feeding and nutritional status was not statistically associated. However, there was a statistically significant association between duration of exclusive breast feeding and the nutritional status. Kavita et al., reported that Children deprived of colostrum and exclusive breastfeeding also showed significant difference in prevalence of PEM [12].

Immunisation Status	Normal n(%)	Underno-urished n(%)	Total	Chi-square value	p-value
Adequately immunised	44 (34.6)	83 (65.4)	127 (100.0)		
Partially immunised	9 (29.0)	22 (71.0)	31 (100.0)	0.352	0.552
TOTAL	53 (33.5)	105 (66.5)	158 (100.0)		

[Table/Fig-12]: Immunisation Status and Nutritional Status

CONCLUSION

The nutritional status of a community particularly of its vulnerable groups comprising of children has been recognized as an important indicator of national development which in turn depends on social development indices. Nutritional inadequacies will result in the hampering of the development of the body. Future of the country is determined by the growing generation of the country. It is the health status of children of any country that represents the health status of people of that country. Since this growing generation is going to be the future productive citizens, they should be healthy enough to make use of the full potential of their productive age. Community based preventive measures should be taken to allieviate malnutrition. Health education to the parents, especially to the mothers on dietary practices like feeding their children with healthy food in terms of quality and quantity should be given . Nutritional rehabilitation centres should be established. Improving the socioeconomic standards is mandatory.

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PARTICULARS OF CONTRIBUTORS:
1.   Assistant Professor, Department of Community Medicine, Saveetha Medical College,Saveetha University, Thandalam, Kanchipuram District, Tamilnadu, India.
2.   Student, Saveetha Medical Collegeand Hospital, Saveetha University, Thandalam, Kanchipuram District, Tamilnadu, India.
3.   Student, Saveetha Medical Collegeand Hospital, Saveetha University, Thandalam, Kanchipuram District, Tamilnadu, India.
4.   Student, Saveetha Medical Collegeand Hospital, Saveetha University, Thandalam, Kanchipuram District, Tamilnadu, India.
5.   Student, Saveetha Medical College and Hospital, Saveetha University, Thandalam, Kanchipuram District, Tamilnadu, India.
6.   Student, Saveetha Medical College and Hospital, Saveetha University, Thandalam, Kanchipuram District, Tamilnadu, India.
7.   Student, Saveetha Medical College and Hospital, Saveetha University,Thandalam, Kanchipuram District, Tamilnadu, India.
8.   Student, Saveetha Medical College and Hospital, Saveetha University, Thandalam, Kanchipuram District, Tamilnadu, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Anuradha R,
Assistant Professor, Department of Community Medicine,
Saveetha Medical College, Saveetha University, Thandalam, Kanchipuram District, Tamilnadu, India.
Phone : 09884959653, E-mail : dr.anuhems@gmail.com

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