



## A Cross-Sectional Study on the Prevalence of Acute and Chronic Malnutrition Among Children in the Under- Five Children in A Chennai Based Population

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### ABSTRACT

**Background:** Malnutrition is a major cause for morbidity and mortality among the under – five age group children but is not given due importance because of the lack of awareness of its manifold implications. Malnutrition is a public health emergency.

**Methods:** A cross-sectional study was conducted in the Urban and Rural field practice areas of A.C.S. Medical College among 300 under – five children selected by simple random sampling. Weight and height of the child were measured after the interview schedules were filled. WHO reference values for weight for age – 2 S.D and height for age – 2 S.D were used for defining acute and chronic malnutrition respectively

**Results:** The prevalence of acute malnutrition was found to be 30% with 95% C.I of (24.81 -35.19), and the prevalence of chronic malnutrition was found to be 33.6% with 95% C.I of (28.26-38.94). Both acute and chronic malnutrition were more frequently seen among children in the urban area and among children with birth-weights  $\geq 2.5$ Kg and this association was found to be statistically significant.

**Conclusions:** The high prevalence of malnutrition necessitates the need to focus on that aspect of public health. Health education to the parents and the immediate family on the importance of nutrition and on the health hazards of malnutrition could go a long way in reducing the prevalence of malnutrition. Chronic malnutrition especially (stunting) can go unnoticed for years because the child just looks proportionately small for his age and doesn't look obviously malnourished. Focus is needed particularly on Low birth weight children as they are at a higher risk of being malnourished.

**KEYWORDS :** Malnutrition, under-five children, acute, chronic

### INTRODUCTION

The prevalence of under-weight children in India is among the highest in the world. It is also observed that the malnutrition problem in India is a concentrated phenomenon that is, a relatively small number of states, districts, and villages account for a large share of the malnutrition burden — only 5 states and 50% of villages account for about 80% of the malnutrition burden<sup>1</sup>. Children of today are citizens of tomorrow; the young child under 5 years is most vulnerable to the vicious cycles of malnutrition, infection and disability all of which influence the present condition of a child and the future human resource development of the nation as a whole. Hence the assessment of the ground reality as reflected by the statistics on nutritional status of children becomes very significant in this context<sup>2</sup>. According to World Health Organization, protein energy malnutrition (PEM) refers to “an imbalance between the supply of protein and energy and the body's demand for them to ensure optimal growth and function”. It is a major public health problem in India<sup>3</sup>. The burden of under-nutrition among under-five children has not changed much even though various intervention programs are in operation in India<sup>1</sup>. Environmental factors, infectious diseases, inadequate diet, and the handicaps of poverty appear to be far more important than genetic predisposition as determinants of childhood malnutrition. Therefore, the assessment of growth not only serves as one of the best global indicators of children's nutritional status but also provides an indirect measurement of the quality of life of an entire population<sup>4</sup>. Hence a study was taken up with the objectives of estimating the prevalence of malnutrition in the under-five age group and to identify the factors associated with malnutrition.

### METHODS

**Study Design:** Cross-sectional study, with both descriptive and analytical components, the descriptive component was used to find the prevalence of acute and chronic malnutrition among rural and urban population. The analytical component was used to find the association of acute and chronic malnutrition with the suspected risk factors.

**Study area:** Rural and Urban field practice areas of ACS Medical College.

**Study Population:** The study was done on children aged between 6 months and 5 years after obtaining the informed consent of the mother or a reliable informant.

**Exclusion Criteria:** Children aged 0 – 6 months were not included, to avoid the influences of breast – feeding on the nutritional status. Children without a reliable informant at the time of data collection were excluded from the study.

**Sampling method and sample size calculation:** Simple random sampling method was used. Based on literature <sup>4</sup>, the prevalence of underweight, acute malnutrition and chronic malnutrition were found to be 29.5%, 42% and 74% respectively. Assuming the lowest prevalence of 29%. With type I error of 5 % and with limit of accuracy kept at 18% of prevalence, the minimum sample size required for the study was calculated to be 290 and it was decided to use a sample size of 300 for the study. Allowing a non – response of 10%, 330 households were selected and the final non – response rate was 6%, the decided sample size was achieved after visiting 318 households.

Anthropometric measurements were calculated using standard procedures.

**Classification of main study variables**

**Acute malnutrition:** Wasted refers to children whose weight is <2 SD below the mean weight-for-height value. This is an index of thinness and is claimed to be an indicator of acute malnutrition <sup>4</sup>. The mean values were calculated from WHO reference values.

**Chronic malnutrition:** Stunted refers to children whose height was <2 SD below the mean height-for-age value. This is an index of shortness and has been proposed as an indicator of chronic malnutrition<sup>4</sup>. The mean values were calculated from WHO reference values.

**Socio-economic status:** Subjects were classified into 5 groups based on the B.G Prasad 2013 classification<sup>5</sup>.

**Data analysis:** The data entry and analysis were done using statistical package for social sciences (SPSS) version 16, the final data was summarized into percentages and analyzed by cross-tabulations. 95% Confidence Intervals were calculated for the prevalence rates.. Associations were assessed through Odds ratio and 95% C.I of the Odds ratio which was found using Epi Info version 7. 2 tailed p-values were calculated identify associations.

**RESULTS**

A population based cross-sectional study was done to find the prevalence of acute and chronic malnutrition in both the rural and urban areas of Thiruvallur district among 300 children in the age group of >6 months to 5 years and the following observations were made

49.3% of the rural population and 56% of the urban population were males 18.7% of the rural population and 10.7% of the urban population were residing in kutcha houses. Nuclear families were more commonly seen in the urban area (70.6%) when compared to the rural area (62%).Low birth weight (weight < 2.5kg) was seen in 17.3% of the rural population and 20% of the urban population, 51.3% of the rural population and 57.3% of the urban population belonged to the 1st birth order Details can be seen in (Table 1).

The overall prevalence of acute malnutrition was 30% with 95% C.I of (24.81 -35.19), and the overall prevalence of chronic malnutrition was 33.6% with 95% C.I of (28.26-38.94), both forms of malnutrition were more common in the urban areas. Details can be seen in (Table 2).

Acute malnutrition was 1.67 times more common in the urban areas and the association was statistically significant (p-value = 0.04). Acute malnutrition was 1.84 times more commonly seen among subjects with birth weight ≥ 2.5kg and the association was statistically significant (p-value = 0.04). Acute malnutrition was more common among males, subjects from joint families and subjects who drank un-boiled water. However, the associations were not statistically significant. Details can be seen in (Table 3).

Chronic malnutrition was 1.89 times more common in the urban areas and the association was statistically significant (p-value = 0.01). Chronic malnutrition was 2.14 times more commonly seen among subjects with birth weight ≥ 2.5kg and the association was statistically significant (p-value = 0.01). Chronic malnutrition was more common among males, subjects from joint families and subjects who drank un-boiled water. However, the associations were not statistically significant. Details can be seen in (Table 4)

The association between age and acute malnutrition can be seen in (Figure 1).

**DISCUSSION**

A population based cross-sectional study was done in the rural and urban areas of Thiruvallur district. The main objectives of the study were to find the prevalence of acute and chronic malnutrition among the under-5 population and also to study the association between certain suspected risk factors and malnutrition. Simple random sampling method was used and based on literature review it was decided to study a sample of 300 children in the under-5 population.

The overall prevalence of acute malnutrition was found to be 30% with

95% C.I of (24.81 -35.19), and the overall prevalence of chronic malnutrition was found to be 33.6% with 95% C.I of (28.26-38.94). Both acute and chronic malnutrition were more frequently seen among children in the urban area and among children with birth-weights ≥ 2.5Kg and this association was found to be statistically significant. This could be because of the fact that hygiene and nutrition are better among the rural population when compared to overcrowded urban slums and also because of the fact that special focus is given to a low birth-weight child by the entire family, which usually results in over-nutrition and obesity. According similar study done on under – 5 children in Chennai<sup>6</sup>, the prevalence of malnutrition was found to be 42.9%, this was higher than the values found in the current study as in this study the prevalence of acute and chronic Malnutrition were identified separately and so the assessment methods were different in both studies. In both the studies there was a statistically significant association between low birth weight and malnutrition.

To conclude, the high prevalence of malnutrition necessitates the need to focus on that aspect of public health. Health education to the parents and the immediate family on the importance of nutrition and on the health hazards of malnutrition could go a long way in reducing the prevalence of malnutrition. Chronic malnutrition especially (stunting) can go unnoticed for years because the child just looks proportionately small for his age and doesn't look obviously malnourished.

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**DECLARATIONS**

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Conflict of interest: Nil

Ethical approval: Approval for the conduction of the study was obtained from THE Institutional Ethics Committee of ACS Medical College

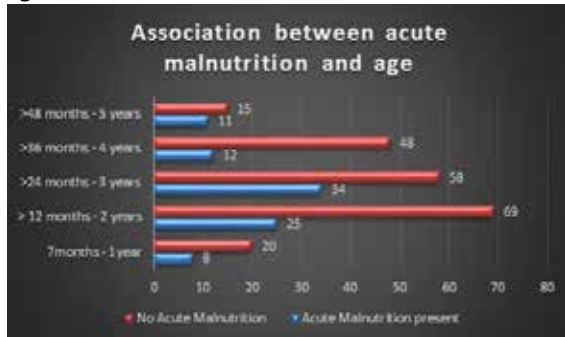
**Table 1: Socio demographic details of the study subjects**

Variable	Rural Number (Percentage) (150)	Urban Number (Percentage) (150)	Total Number (Percentage) (300)
<b>Gender</b>			
Male	74(49.3%)	84(56%)	158(52.6%)
Female	76(50.7%)	66(44%)	142(47.4%)
<b>Age</b>			
≤ 2 Years	68(45.3%)	54(36%)	122(40.6%)
> 2 Years	82(54.7%)	96(64%)	178(59.4%)
<b>Type Of House</b>			
Kutcha	28(18.7%)	16(10.7%)	44(14.7%)
Semi-Pucca	50(33.3%)	49(32.7%)	99(33%)
Pucca	72(48%)	85(56.6%)	157(52.3%)
<b>Type Of Family</b>			
Nuclear	93(62%)	106(70.6%)	199 (66.3%)
Joint	57(38%)	44(29.4%)	101 (33.6%)
<b>Birth Order</b>			
1st	77(51.3%)	86(57.3%)	163(54.3%)
2nd	62(41.3%)	57(38%)	119(39.6%)
3rd	10(6.6%)	6(4%)	16(5.3%)
4th	1(0.6%)	1(0.6%)	2(0.6%)
<b>Birth Weight</b>			
< 2.5 Kg	26(17.3%)	30(20%)	56(18.6%)
≥ 2.5 Kg	124(82.6%)	120(80%)	244(81.3%)
<b>Immunisation For Age</b>			
Complete	145(96.6%)	148(98.6%)	293(97.6%)
Incomplete	5(3.3%)	2(1.3%)	7(2.3%)

**Table 2: Prevalence of Acute and Chronic Malnutrition**

MALNUTRITION ON THE BASIS OF	RURAL NUMBER (PERCENTAGE) (OUT OF 150) (95% C.I)	URBAN NUMBER (PERCENTAGE) ( OUT OF 150) (95% C.I)	TOTAL (PERCENTAGE) (95% C.I) (300)
WEIGHT FOR AGE	37(24.6%) (17.71 – 31.49)	53(35.3%) (27.65 – 42.95)	90(30%) (24.81 -35.19)
HEIGHT FOR AGE	40(26.6%) (19.53 – 33.67)	61(40.6%) (32.74 – 48.46)	101(33.6%) (28.26-38.94)

**Figure 1: Association between acute malnutrition and age**



**Table 3:**

FACTOR ASSOCIATED	CLASSES OF THE FACTORS ASSOCIATED	NO. WITH ACUTE MALNUTRITION (OUT OF 90)	ODD'S RATIO	P VALUE
AREA OF LIVING	RURAL (150)	37	1.00	0.04*
	URBAN (150)	53	1.67 (1.01-2.75)	
GENDER	FEMALE (142)	39	1.00	0.36
	MALE (158)	51	1.26 (0.76-2.07)	
AGE	> 2 YEARS (178)	57	1.00	0.36
	≤ 2 YEARS (122)	33	0.79 (0.47-1.31)	
BIRTH WEIGHT	< 2.5 KG (56)	23	1.00	0.04*
	≥ 2.5 KG (244)	67	1.84 (1.01-3.36)	
TYPE OF FAMILY	NUCLEAR (199)	58	1.00	0.65
	JOINT (101)	32	1.12 (0.67-1.89)	
EDUCATION OF FATHER	SECONDARY ABOVE (203)	57	1.00	0.29
	PRIMARY OR LESS (97)	33	1.32 (0.79-2.22)	
EDUCATION OF MOTHER	SECONDARY ABOVE (211)	60	1.00	0.36
	PRIMARY OR LESS (89)	30	1.28 (0.75-2.18)	
NATURE OF DRINKING WATER	BOILED (106)	29	1.00	0.46
	UNBOILED (194)	61	1.22 (0.72-2.06)	

**Table 4:**

FACTOR ASSOCIATED	CLASSES OF THE FACTORS ASSOCIATED	NUMBER WITH CHRONIC MALNUTRITION (OUT OF 101)	ODD'S RATIO	P VALUE
AREA OF LIVING	RURAL (150)	40	1.00	0.01*
	URBAN (150)	61	1.89 (1.16-3.06)	
GENDER	FEMALE (142)	46	1.00	0.66
	MALE (158)	55	1.11 (0.69-1.80)	
AGE	>2 YEARS (178)	56	1.00	0.33
	≤ 2 YEARS (122)	45	1.27 (0.78-2.07)	

BIRTH WEIGHT	< 2.5 KG (56)	27	1.00	0.01*
	≥ 2.5 KG (244)	74	2.14 (1.18-3.86)	
TYPE OF FAMILY	NUCLEAR (199)	66	1.00	0.79
	JOINT (101)	35	1.07 (0.64-1.77)	
EDUCATION OF FATHER	SECONDARY ABOVE (203)	65	1.00	0.38
	PRIMARY OR LESS (97)	36	1.25 (0.76-2.08)	
EDUCATION OF MOTHER	SECONDARY ABOVE (211)	67	1.00	0.28
	PRIMARY OR LESS (89)	34	1.33 (0.79-2.23)	
NATURE OF DRINKING WATER	BOILED (106)	37	1.00	0.73
	UNBOILED (194)	64	1.09 (0.67-1.79)	

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