

## A cross-sectional study of nutritional status of children below 6 year age group in urban Hyderabad

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Received: 30-09-2021 / Revised: 21-11-2021 / Accepted: 01-12-2021

### Abstract

**Background:** Malnutrition is a curse of developing and under developing countries which is blockage in their physical, mental & social development. It is part of Poverty –Diseases- Malnutrition vicious cycle. Hence present study was conducted to know the malnutrition status of below 6 years children in tertiary care urban centre. **Material & methods:** A cross-sectional observational study was conducted in urban field practice area of Deccan College of Medical Sciences- Department of Community Medicine covered by 24 ICDS centres. From each ICDS centre, 20 children were selected randomly as study subjects. so that 480 children were covered from 24 ICDS centres of Deccan College of Medical Sciences field practice area. **Results:** Maximum number of children was in the age group of 13-24 months i.e. 155 (32.3 %) and least number of children was observed in the age group of 61-72 months i.e. 12 (2.5%). Majority (53.3%) of subjects belonged to upper lower socio – economic status according to modified Kuppaswamy classification. Prevalence of overall malnutrition for underweight, stunting and wasting is found to be 19.4%, 41.3% and 16.5% respectively according to WHO classification. **Conclusion:** Health education and awareness about nutrition to parents and first line workers can make more difference in the nutrition status of children.

**Key words:** Malnutrition, Health profile, Below 6 years children, Anganwadi centre

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### Introduction

The term 'Nutrition' is derived from a Latin word nutritic, meaning nourishment. Mal means any deviation from normal phenomenon. Malnutrition is defined as any deviation from normal nutrition[1]. Early childhood i.e. first 6 years constitutes the most crucial period in time when the foundations are laid for cognitive, emotional, physical/ motor development & cumulative lifelong learning. Child survival, growth and development have to be looked at as a holistic approach as one cannot be achieved without others. There have to be balanced linkages between education, health and nutrition for proper development of child[2].

In the millennium declaration of September 2000, member states of the United Nations made a most passionate commitment to address the crippling and multiplying misery that grip many areas of the world. Governments set a date of 2015 by which they would meet the Millennium Development Goals. Among this, the first goal is to eradicate extreme poverty and hunger, which is measured by the prevalence of underweight children. The target is to halve the burden of undernutrition. The next important goal with regards to children is to achieve two third reduction in under 5 mortality and infant mortality by 2015[3].

In the 21<sup>st</sup> century with miraculous advances in science and technology, the world is busy in devising methods to combat malnutrition, which continues to affect children in whopping

numbers.

World statistics indicate that stunting affects 182 million (33 %) and being underweight affects 150 million (27%) of the world's children, these are associated with over half of the 10 million annual deaths of children under 5 years. Developing countries account for almost this entire burden, with 70 % of all early child mortality and malnutrition concentrated in Sub – Saharan, Africa and South Asia[4].

In India, the National family Health Survey (NFHS) 2005-06 included survey of the nutritional status of young children[5]. Both chronic and acute under nutrition were found to be high in all the 7 states for which reports have been received, namely, Haryana, Karnataka, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh and Goa[5]. At present in India 48 percent children under 5 years age are underweight[5]. This includes 43% moderate to severe cases, 16% severe malnutrition, of these, 20% have moderate to severe wasting and 48% moderate to severe stunting[5].

The high prevalence of bacterial and parasitic diseases in developing countries contributes greatly to malnutrition there. Similarly, malnutrition increases one's susceptibility to and severity of infections, and is thus a major component of illness and death from disease. Malnutrition is consequently the most important risk factor for the burden of disease in developing countries. It is the direct cause of about 300000 deaths per year and is indirectly responsible for about half of all deaths in young children (Fig. 1). The risk of death is directly correlated with the degree of malnutrition[6].

Poverty is the main underlying cause of malnutrition and one of the major determinants. The degrees and distribution of protein–energy malnutrition and micronutrient deficiencies in a given population depends on many factors:

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The political and economic situation, the level of education and sanitation, the season and climatic conditions, food production, cultural and religious food customs, breast-feeding habits, prevalence of infectious diseases, the existence and effectiveness of nutrition programs and the availability and quality of health services provided[6].

About 13.12% of the India's population consists of children between 0-6 years.<sup>7</sup> Each year 27 million children are born in India. Around 10 percent of them do not survive up to 5 years of age. India contributes to 25 per cent of the over 6.9 million under – five deaths occurring worldwide every year. Of the 6.9 million deaths in 2011, almost two – thirds (64 %) were caused by infectious diseases and conditions such as Pneumonia, Diarrhea, Malaria, Meningitis, Tetanus, HIV and Measles. Around 40 % of all under – five deaths are attributable to undernutrition [5].

The key care practices that could impact on child nutrition include care of pregnant and lactating mothers, breast feeding and feeding young children, care of children during illness, psychosocial care of children, food preparation, storage and hygiene[8].

Several studies have been conducted throughout the country on various aspects like growth patterns, feeding practices, morbidities and nutritional deficiencies among 0 – 6 years age group. But few studies have been conducted on the nutritional status of children below 6 years in Hyderabad district and the region. Therefore the present study was undertaken to know the malnutrition status of children below 6 years in the field practice area of tertiary care hospital in Hyderabad district, Telangana state.

#### Material & methods

Present study data was collected from the field practice area (Urban area) of Department of Community Medicine, Deccan College of medical sciences, Hyderabad. This is a cross sectional study which was conducted from 1<sup>st</sup> September 2015 to 1<sup>st</sup> September 2016 [for a period of one year]. Institutional Ethical Committee approval was obtained prior to the initiation of the study. Permission from CDPO of ICDS was taken before starting the study. Anganwadi workers were informed about the visit one day before. The purpose of the study and procedure were explained to them. Children below 6 years of age, permanently residing in the urban field practice area of Department of Community Medicine, Deccan College of medical sciences, Hyderabad.

#### Inclusion Criteria

All under 6 years children enrolled in ICDS centers.

#### Exclusion Criteria

Children, those who are not present on the survey day & whose parents/guardians have not given consent.

#### Sample Size

The prevalence of malnutrition in below 6 years children is 48% at national level[9]. Taking Prevalence (p) = 48%, allowable error (d) = 10% of P and q=1-p sample size was estimated to be 480.

#### Data collection

Field practice area of Department of Community Medicine, Deccan college of Medical Sciences covers a population of approximately 90600. Urban field Practice area includes 6 health centres namely Babanagar, Bhavaninagar, GM chauni, Sayeed nagar, Musheerabad, Hassan nagar area. This urban field practice area of Deccan College of Medical Sciences- Department of Community Medicine covered by 24 ICDS centres. From each ICDS centre, 20 children were selected randomly as study subjects (by Stratified sampling method). so that 480 children were covered from 24 ICDS centres of Deccan College of Medical Sciences field practice area.

ICDS unit were visited on the dates given by CDPO. ICDS unit survey was done with all required instruments. Subjects were interviewed in the AWW and necessary procedures were followed to collect the data. Informed consent was obtained from the child's

parents/guardians. Predesigned questionnaire was used to collect information from study population by personal face to face interview during the ICDS units visit. The questionnaire included socio-demographic variables of child & family (age, sex, education, occupation, type of family, family size and socioeconomic status). After examination treatment was given whenever required. Children requiring referral service were referred to nearest primary health center or medical college hospital for further management.

#### Study instruments

- Pre designed pre-tested questionnaire
- Baby weighing scale
- Infantometer
- Standard portable weighing scale
- Non- stretchable measuring tape

#### Measurement of weight[10]

**For Children upto 1 year/children who were unable to stand on the weighing machine:** the weight was recorded using a standard portable Baby weighing scale (Pan Type) with plastic pan to the nearest 100gm.

**For children above 1 year who could stand:** the weight was recorded using a standard portable weighing scale that was kept on a firm horizontal surface. Weight was recorded to the nearest 100 gm. It was checked daily at the beginning by a standard weight.

#### Measurement of height[10]

**For children upto 2 years:** recumbent length was measured with the help of an infantometer. The infant is placed supine on the infantometer. Assistant or mother is asked to keep the vertex or top of the head snugly touching the fixed vertical plank. The legs are fully extended by pressing over the knees, and feet are kept vertical at 90 degree, the movable pedal plank of infantometer is snugly opposed against the soles and length is read from the scale[10].

**For children above 2 year who could stand:** The child was made to stand with bare feet on a flat floor against a wall with feet parallel and with heels, buttocks, shoulders, and occipital touching the wall. The head was held erect with aligned horizontally without any tilt. With the help of a plastic ruler, the topmost point of the vertex is identified and marking was done with pencil on the wall. The height was measured with measuring tape and recorded[10].

#### Mid – Arm circumference

The left arm was measured at its midpoint while hanging freely. The midpoint was assessed by measuring the distance between the acromial process of scapula and the olecranon process of ulna, taking the midpoint of that distance and the measurement was taken to the nearest 0.1 cm.

#### Data Analysis

The dependent variable of this study is malnutritional status (nutritional deficit) in children under-six years that is measured using three different anthropometric indices called stunting (low height for age), wasting (low weight for height) and underweight (low weight for age). Each of these indices are expressed as the number of standard deviation (SD) units (Z-score) from the median of the reference population for which the 2006 WHO (World Health Organization) Child Growth Standards were calculated[11,12]. Each of these three indices provides different information about growth and body composition that can be used to assess nutritional status. Height-for age measures the linear growth of children. A child whose Z-score for height-for-age is more than two standard deviations (>2SD) below the median of the WHO reference population is considered short for his/her age or stunted.

Children whose Z-scores for weight-for-height are below two standard deviations (<2SD) from the median of the WHO reference population are considered to be too thin for their height or wasted. Weight-for-age is a composite index of the above two indices. Since a child can be underweight for his/her age if he/she is stunted or wasted

or both, weight-for-age is an overall indicator of a population’s nutritional health. Children whose Z-scores for weight-for-age are below two standard deviations (<2SD) from the median of the reference population are classified as underweight. Finally, the dependent variables for this study are stunting (stunted vs normal), wasting (wasted vs normal) and underweight (underweight vs normal).

The data was compiled and analyzed using statistical package for social sciences software for appropriate statistical tests. (SPSS 23.0)

**Results**

The present study was conducted to know the health status in urban field practice area of Deccan College of medical sciences, Hyderabad. Maximum numbers of children were in the age group of 13 -24 months i.e.155 (32.3%) and minimum numbers of children were observed in the age group of 61-72 months i.e. 12(2.5%). Out of 480

children, aged 0-6 years, 51.7% were males and 48.3% were female. Maximum number of children was found to be Hindus i.e.265 (55.2%). Educational status of parents of study subjects reveals that about 31.7% fathers and 30.2% mothers were illiterate. It was observed that most of fathers i.e. 30.2% had completed high school, 15.6% of them were educated up to middle school level and only 1.3% was primary school. It was found that 28.1% of mothers were educated up to high school level, 20.0% had completed their middle school education and 0.4% was professionals. Majority of the children i.e. 412 (85.8%) belonged to the nuclear family. majority of the study subjects i.e 256 (53.3% ) belonged to upper- lower socio economic status and only 7(1.45%) subjects belonged to upper socio economic status. Majority i.e 79.0 % of the subjects had family size of 3 – 5 members and about 16.3% of subjects had family size of 6 – 8.

**Table-1: Distribution of study subjects according to socio-demographic profile (n=480)**

Variables	Number	Percentage
<b>AGE GROUP (years)</b>		
≤12	127	26.4
13 – 24	155	32.3
25 – 36	95	19.8
37 – 48	56	11.7
49 – 60	35	7.3
61– 72	12	2.5
Male	248	51.7
Female	232	48.3
Hindus	265	55.2
Muslims	188	39.2
Christians	27	5.6
Nuclear	412	85.8
Joint	68	14.2
<b>Socio- economic class status (based on modified kuppuswamy classification)</b>		
Lower	0	0
Upper lower	256	53.3
Lower middle	194	40.4
Upper middle	23	4.8
Upper	7	1.5
<b>Family size</b>		
3 -5	379	79.0
6 – 8	78	16.2
9 – 11	20	4.2
>12	3	0.6

In present study Prevalence of overall malnutrition for underweight, stunting and wasting is found to be 19.4%, 41.3% and 16.5% respectively according to WHO classification.

**Table – 2: Distribution of study subjects according to malnutrition (WHO classification)**

Indices	Normal		Moderate Malnourished		Severely Malnourished		Overall Malnourished *	
	No.	%	No.	%	No.	%	No.	%
Weight for age (underweight )	387	80.6	57	11.9	36	7.5	93	19.4
Height for age (stunting )	282	58.8	102	21.3	96	20.0	198	41.3
Weight for Height (wasting )	401	83.5	60	12.5	19	4.0	79	16.5

In the present study based on mid upper arm circumference, mild malnutrition is found to be present in 150 (31.3%) children and severe malnutrition was present in 25 (5.2%) of the children.

**Table – 3: Distribution of study subjects according to mid – upper arm circumference**

Nutritional status based MUAC (in cms)	No.	Percentage
Normal (>13.5)	305	63.5
Mild (12.5-13.5)	150	31.3
Severe (<12.5)	25	5.2
<b>Total</b>	<b>480</b>	<b>100.0</b>

In the present study 217 (45.2%) children were normal with no morbidities in the past 1 month from the time of study. Most common morbidities are fever 151(31.5%), 50(10.5%) children were reported to have fever and ARI and a minimum of 1 (0.2%) children were reported to have worm infestation and vomiting. Other infections included diarrhea episodes in 20(4.2%) and 3(0.6%) skin infections.

**Table – 4: Common morbidities reported in study subjects (N =480)**

Morbidity	Numbers	Percentage
No illness	217	45.2
Fever	151	31.5
ARI	28	5.8
Diarrhea	20	4.2
Skin infections	3	0.6
Worm infestations	1	0.2
Fever and ARI	50	10.5
Fever and Diarrhea	4	0.8
ARI and Diarrhea	2	0.4
Vomiting	1	0.2
Others	3	0.6
Total	480	100.0

**Table – 5: Association between socio-demographic factors and malnutrition.**

Age (months)	Underweight		Stunting		Wasting	
	No.	%	No.	%	No.	%
≤12	17	13.4	43	33.9%	11	8.7%
13 – 24	25	16.1	55	35.5%	15	9.7%
25 – 36	23	24.2	50	52.6%	20	21.1%
37 – 48	16	28.6	27	48.2%	18	32.2%
49 – 60	9	25.7	19	54.3%	10	28.5%
61– 72	3	25.0	4	33.3%	5	41.6%
<b>P value</b>	<b>0.08*</b>		<b>0.016*</b>		<b>&lt;0.001*</b>	
Male	49	19.8%	96	38.7%	47	20.3%
Female	44	19.0%	102	44.0%	32	13.0%
<b>P value</b>	<b>0.826</b>		<b>0.242</b>		<b>0.03*</b>	
Upper & upper middle class	2	6.7%	10	33.4%	4	13.4%
Lower middle class	31	16.0%	69	35.6%	22	11.4%
Upper lower	60	23.4%	119	46.5%	53	20.8%
<b>P value</b>	<b>0.026*</b>		<b>0.043*</b>		<b>0.026*</b>	

\*statistically significant

It is observed that prevalence of underweight was more (28.6%) among children in the age group of 37-48 months and least 13.4% among ≤12 month's children. Stunting was more (54.3%) among children in the age group of 49-60 months and about 52.6% among children of age group 25-36 months. Least (33.3%) prevalence found in 61-72 age groups. Prevalence of wasting was more (41.6%) among children in the age group of 61-72 months followed by 32.2% among children of age group 37-48 months and least (8.7%) prevalence found in ≤12 months age group. These differences were in the age group found to be statistically significant ( $p < 0.001$ ).

Prevalence of underweight is found to be nearly equal in males (19.8%) and females (19.0%). Prevalence of stunting is found to be more among females (44.0%) when compared to males (38.7%). However the differences were not found statistically significant.

Prevalence of wasting is found to be higher among females (20.3%) as compared to males (13%). Females were found to have 1.7 times risk to wasting (OR=1.71). The difference is found statistically significant ( $P=0.03$ ).

Prevalence of underweight was more (23.4%) among children belonging to families with upper lower social class, followed by about 16% in lower middle class and less (6.7%) in upper & upper middle class. Prevalence of stunting was found to be maximum (46.5%) among families belonging to upper lower class followed by lower middle class (35.6%) and less (33.4%) in upper & upper middle class. Maximum prevalence of wasting is about 20.8% in children belonging to upper lower social class, followed by upper & upper middle class (13.4%) and minimum (11.4%) prevalence found in lower middle social class. This difference with SES status was statistically significant.

## Discussion

The present study was carried out to find out the malnutrition status in the 480 children attending ICDS centre in the field practice area of tertiary care hospital. All the participants were between age group of 0 to 6 years with mean age  $24.93 \pm 16.33$  years. Male was 51.7% and female was 48.3%. Age and sex are basic demographic characteristics which play an important role in the study of health. In this study 55.2% of the study participants are Hindus, 39.2% Muslims and 5.6% was Christians. Most of the parents were illiterate father (31.7%) mother (30.2%). It was observed that most of the fathers (30.2%) and mothers (28.1%) had completed high school. 85.8% of the study participants live in nuclear families while 14.2% live in joint families. Type of family is an important predictor for assessment of matters like nutritional status and health pattern of an individual.

In this study majority of the participants 53.3% belonged to upper lower class while 40.4% belonged to lower class, 4.8% belonged to upper middle and 1.5% belonged to upper class. Socio-economic status influences not only an individual's nutrition and health status but also the environment in which one is brought up which again affects their psychological behavior and attitudes regarding perception of matters related to health.

In the present study 217(45.2%) children were normal with no morbidities in the past 1 month from the time of study. Most common morbidities are fever 151(31.5%), 50(10.5%) children were reported to have fever and ARI and a minimum of 1 (0.2%) children were reported to have worm infestation and vomiting. Other infections included diarrheal episodes in 4.2% and 0.6% skin infections.

These findings were in agreement with study by Sumedha Joshi & Santhosh S. Walgankar[13] for ARI but skin infections were more

(3%). Sunitha Mishra[14] in her study found that 17.4% of children had ARI, 2.4% had skin infections, 18.49% had worm infestations. These findings are high compare to this study, may be due to early consultation to the health care and improved facilities in urban.

Rapid survey on children in 2013-14 by Ministry of Women and Child Development-Govt.of. India, fact sheet reveals that fever in 13.2%, ARI 7.6% and diarrheal episodes in 6.3% in urban children[15].

In the present study based on mid upper arm circumference, mild malnutrition is found to be present in 150 (31.3%) children and severe malnutrition was present in 25 (5.2%) of the children. **Kumar et al.**, study to assess the validity of MAC. 33.2% of children had MAC <13.5 cm, 9.3% children had MAC <12.5 which is comparable to present study[16].

Sadaruddin Biswas et al found that age-combined rates of overall undernutrition was 35.35% which was comparable to our study[17].

**Maiti S et al** in their study found that the overall prevalence of undernutrition based on mid – upper arm circumference was 18.96% which was very less compared to our study[18].

In a study conducted by Samiran Bisai (2010) in which 52.9 % and 24.9% children were moderately and severely nourished ,respectively using WHO 1995 MUAC cut – off values .Similarly 43.9 % and 25.9% children were moderately and severely undernourished ,respectively ,when WHO 2007 cut – off points were used . The prevalence of the present study was less compared to this study[19].

In a study by Kapur D et al (2005), 383 (63.4%) children (69.9% boys and 76.8% girls) were found to be malnourished which was higher compared to the present study[20].

A study conducted by Sood AK and Kapil U (1984), in rural area in Faridabad District, malnutrition was detected in 27.2% children by using mid arm circumference. The sensitivity and specificity was found to be 34.1% and 80.8% and the authors concluded that this criteria detected moderately severe cases of malnutrition[21].

In this study Prevalence of Overall malnutrition for underweight, stunting and wasting is found to be 19.4%, 41.3% and 16.5% respectively according to WHO classification.

Prevalence of underweight (19.8%) was agreement with the results of NFHS-3, 2005-06[22] where as stunting (32.1%) and wasting (9.4%) were high. Rapid survey on children 2013-14 fact sheet by Ministry of women and child development Govt of India shows stunting 32%, wasting 15%, under-weight 24.3%.<sup>15</sup> These findings are agreement with present study wasting prevalence.

NFHS-4, 2015-16[23] –Telangana urban key indicators shows stunting 20.1%, wasting 14.6%, under-weight 22.2%. These findings were agreement with present study for prevalence of under-weight and wasting; whereas stunting prevalence is low. The present study prevalence of stunting is agreement with the study by **Bloss Emily et al[24]** stunting prevalence (47%) and Dr. **Jitendra B et al[25]** – prevalence of malnutrition is 46.6%.

Study by Dattatraya Dinna Bant[26] study showed higher prevalence of malnutrition compare to present study.

Bloss E et al[24] found that underweight is more(46.2%) in 13-24 age group children and Bloss E et al[24] found that stunting is more (60.5%) in 13-24 age group children . Ahmed M A et al[27], they found to be more (52.91%) undernutrition in 49-60 age group children. These results were agreement with study by Bant DD[26].

This study findings about malnutrition and gender, were consistent with the findings of Rao VG et al[28] i.e. prevalence of underweight was found to be similar among both males and females. However, Kumar S A et al[1], G .Enakshi and N Sudha[4], found the prevalence of malnutrition was more among girls and Banerjee B et al[29] and Ray SK et al[30] found the prevalence of malnutrition was more among males. The present study findings with stunting and malnutrition were in agreement with findings of Biswas T et al studies[31]. In contrast to these study results, Kumar S A et al[1], Rijal p et al[32], found the prevalence of wasting to be more among males as compared to females.

This study findings about SES status and malnutrition were agreement with Surwade JB et al[25] studies, that majority of the

malnourished were belonging to class IV of socioeconomic class. The difference observed in the socioeconomic class and nutritional grade of children was statistically significant.

### Conclusion

Child malnutrition is a chronic problem and a longstanding challenge for the public administration of India Despite decades of efforts to tackle this problem, India's child malnutrition rates are still one of the most alarming in the world. The present study comprised of 480 children, aged 0-6 years; 248 (51.7%) males and 232 (48.3%) females.

It was observed in study that maximum number of children was in the age group of 13-24 months i.e. 155 (32.3 %) and least number of children was observed in the age group of 61-72 months i.e. 12 (2.5%).Majority (53.3%) of subjects belonged to upper lower socio – economic status according to modified Kuppuswamy classification. Out of the 480 children 263 children were reported by their mothers to have some childhood illness. 31.5 % of the children were reported as having fever in the past one month from the time of survey. In the present study based on mid upper arm circumference, mild malnutrition was seen in 150 (31.3%) children and severe malnutrition in 25 (5.2%) children. There was statistically significant association found between age, SES status and malnutrition.

Child malnutrition in India is a very complex problem that requires a strategic and systemic overhaul of the public administration and service delivery systems. There is great need of community participation to fight against this problem. There is also an urgent need to invest in the infrastructure of ICDS and the Anganwadi centres as well as improving their coverage. There is also a need to create more public awareness, community engagement and empowerment to overcome this child malnutrition problem.

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**Conflict of Interest: Nil Source of support: Nil**