



# An evaluation of nutritional status of children in Anganwadi Centre of Hyderabad district of Andhra Pradesh state using WHO z- score technique

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## ABSTRACT

**BACKGROUND** In India the nationwide Integrated Child Development Services (ICDS) uses the I.A.P criteria to grade under nutrition. The current WHO recommendation is to use Z score or the standard deviation system to grade under nutrition. Although widely recommended the z scores have not been widely used in India, especially in community based studies.

**AIMS & OBJECTIVES** 1. To assess the socio-demographic profile of 0-72 months age group of children. 2. To find out the nutritional status of children using WHO z- score technique.

**METHODOLOGY** A cross sectional, community-based was done in ICDS Anganwadi centers among the 400 ICDS children (0-6 years)

**RESULTS** There are (47.5%) undernourished and (16.5%) severely malnourished children according to WHO z score technique. Males (49.5%) are comparatively more under nourished than females (45.5%). Female infants (31.2%) are less undernourished when compared to male infants (50%). Literacy of mother had significance over the nutritional status of their children ( $p < 0.05$ ).

**CONCLUSION** The present study shows that there are still many children who are undernourished and severely malnourished in our country, even after 36 years of ICDS services. There is need to use WHO standards at the grass route levels to correctly identify the burden of under nutrition. Z score technique is simple to use, reliable and easy to understand at grass route level by health workers.

**Keywords:** nutritional status of children, WHO z- score technique

## INTRODUCTION

Government of India proclaimed a National Policy on Children in August 1974 declaring children as, "supremely important asset"<sup>1</sup>. This led to the birth of the Integrated Child Development Services (ICDS) in 1975, which is no doubt recognized as the world's largest early child health programme: which approaches child health holistically and comprises health, nutrition and education component for

pregnant women, lactating mother and children less than 6 years of age.<sup>2</sup>

Launched on 2<sup>nd</sup> October 1975 in 33 blocks, the Integrated Child Development Services (ICDS) scheme has emerged from its small beginnings, to become India's flagship programme for the integrated development of children from prenatal to six years of age. It represents one of the world's



largest and most unique programmes for early childhood development, adopting a multi-sectorial approach to child development, incorporating health, early education and nutrition interventions. One of the major objectives of the scheme is to improve the nutritional and health status of children in the age group of 0-6 years. This objective is sought to be achieved by providing a package of six services comprising of supplementary nutrition, early childhood education (pre-school education), nutrition and health education, immunization, health check-up, and referral services to the children below six years and pregnant women and lactating mothers<sup>3</sup>.

Despite several achievements that the ICDS scheme has witnessed during its three decades of implementation, there remain some major challenges with regard to the high burden of child malnutrition in the country. There are 45.9 per cent of children below three years are still underweight<sup>4</sup> There has been limited progress in improving the prevalence of child malnutrition of less than one percentage point per year during 1998-99 (NFHS-2: 4.7%) and 2005-06 (NFHS-3: 4.9%).

## METHODOLOGY

### Study design

The present study is a community-based, observational, cross sectional study.

### Study setting

The study was conducted in ICDS anganwadi centres which are located in Hyderabad District.

### Selection of Anganwadi centres

Initially a list of anganwadi centres was obtained after permission from the ICDS project office. Out of 5 ICDS projects in Hyderabad, 1 project was selected randomly. There are 145 anganwadi centres in ICDS IV project of Hyderabad district. 20 anganwadi centres from ICDS IV project are selected randomly using lottery method. All centres names were written on a bit of paper, blind folded and placed in a container and from this container 20 centres were picked up for the study to avoid selection bias.

### Sample size

According to NFHS- 3 in Andhra Pradesh there are 36.5% of children in age group of 0-36 months are under-nourished<sup>5</sup>.

Sample size was calculated by using the formula<sup>6</sup>:

$$n = \frac{t^2 \times p \times q}{d^2}$$

n= size

t=confidence interval (for 95% using 1.96)

d=precision (5%)

p= prevalence

q= 100-p

Substituting the values, the minimum sample size needed for the study is 356.1 But to increase the validity and for analysis convenience, 400 children were selected for the study.

### Selection of children

Twenty children's in the age group of 0-72 months are selected from each anganwadi centre using simple random sampling technique i.e. by lottery method after enlisting them from the anganwadi records from the area. Hence a total of 400 children were selected during the domiciliary visit and included for the study. Parents of selected children were interviewed for their demographic profile. Age of child was recorded from the birth certificate and anganwadi workers records, and when the date is not available then as per mother recall nearest month of birth was recorded.

A pre designed, pre tested proforma was developed and pilot tested. Weight is recorded by using Salter's weighing scale<sup>7</sup>, which is a spring balance provided with the knickers to place the child (or) weighing scale to the nearest of 100grams with minimum of clothing and bare foot at the anganwadi centres. The index of nutritional status that is weight for age, was expressed in standard deviation units (Z scores) from the reference median as recommended by the WHO<sup>8</sup> Children's who are below two standard deviation for reference medium (<-2 Z score) are considered to be under-nourished and who are below three standard deviation for reference medium (<-3 Z score) are considered to be severe malnourished. Children who

are above two Z score values ( $>-2$  Z score) are considered as normal.

### Statistical Analysis

The collected data was processed using MS office including MS Word and MS Excel. Epi info 2005 statistical software was used to derive statistical inferences (chi square test) whenever necessary. Vancouver style of citation was used for references. Percentages for comparison are bolded unless specified. Simple proportions, percentages and chi square test were used to summarise the data. WHO Anthro 2005, Anthro plus, Epi info statistical software was used for analysis.

### RESULTS AND DISCUSSION

Table 1 shows that Infants ( $\leq 12$  months) are comparatively less undernourished (40%) than those children who are in age group of 61-72 months

### ETHICAL CLEARANCE

Informed consent was taken from all the study subjects, while the purpose and general objectives of the study were explained to them keeping in mind their level of understanding and confidentiality was maintained throughout the study.

### LIMITATION OF STUDY

Only weight for age criteria was used to estimate the nutritional status of children. 2. ICDS children (0-72 months) who are registered only with the anganwadi centre are selected as the study groups.

(55.9%). There is a gradual increase in the prevalence of under-nutrition as the age increases and it is statistically significant.

**Table 1 Age-wise distribution of nutritional status among 0-72 months age group of children**

Age (months)	children	$>-2$ Z score (%)	$<-2$ Z score (%)	$<-3$ Z score (%)
$<12^*$	60	26 (43.4)	24 ( <b>40</b> )	10 (16.6)
12-24	75	31 (41.3)	33 (44)	11 (14.7)
25-36	87	37 (42.5)	37 (42.5)	13 (14.9)
37-48	57	18 (31.5)	29 (50.8)	10 (17.5)
49-60	62	17 (27.4)	34 (54.8)	11 (17.7)
61-72*	59	15 (25.4)	33 ( <b>55.9</b> )	11 (18.6)
Total	400	144 (36)	190 (47.5)	66 (16.5)

\*  $p < 0.05$

According to WHO z score, there are 47.5% of children under-nourished and 16.5% of children are severely malnourished. The study findings are similar with the findings of Bhalani et al<sup>9</sup> where more than 60% of infants are normal when compared to any other age group of children. Kumar R et al<sup>10</sup> in their study on nutritional status of children, found that under nutrition showed a significant rise after 12 months of age ( $p < 0.0001$ ).

Table 2 shows that males (49.5%) are comparatively more under nourished than females (45.5%). Similarly males (18.2%) are more severely malnourished than females (14.8%). The findings are not statistically significant.

**Table 2 Sex wise distribution of nutritional status among 0-72 months age group of children**

Sex	Children	> - 2 Z score (%)	< - 2 Z score (%)	< - 3 Z score (%)
Males	198	64 (32.3)	98 (49.5)	36 (18.2)
Females	202	80 (39.7)	92 (45.5)	30 (14.8)
Total	400	144 (36)	190 (47.5)	66 (16.5)

Chi square ( $\chi^2$ )=2.3 ; df=1;  $p>0.05$

The present study findings are similar with the studies of Kumar D et al<sup>11</sup> where there were more number of male underweight children as compared to female children by using WHO weight for age criterion (SD classification). Goel MK et al<sup>12</sup> also found that proportions of under nutrition were more among males when compared to females.

Table 3 shows that there are 31.2% of female infants ( $\leq 12$ ) are undernourished when compared to male infants 50%. Over all infants (40.0%) are less under nourished when compared to (55.9%) of children in age group of 61-72 months. As the age is increasing there is also a gradual increase in under nutrition of females.

**Table 3 Age and Sex wise distribution of under nutrition (< - 2 Z score)**

Age (months)	Males			Females			Total		
	Total	No	%	Total	No	%	Total	No	%
$\leq 12$	28	14	50	32	10	31.2	60	24	40
12-24	40	18	45	35	15	43	75	33	44
25-36	48	20	41.6	39	17	43.5	87	37	42.5
37-48	28	14	50	29	15	51.7	57	29	50.8
49-60	28	16	57.1	34	18	52.9	62	34	54.8
61-72	26	16	61.5	33	17	51.5	59	33	55.9
Total	198	98	49.5	202	92	45.5	400	190	47.5

This is similar to the findings of Deshmukh PR et al<sup>13</sup> where there are (23.1%) of infants who are under nourished when compared to (59.5%) of children who are in the age group of more than 35 months.

Table 4 shows that as the literacy of mother is in proportionate with that of nutritional status of their children. Children of illiterate mothers are more under-nourished (53.2%) when compared to children of graduate and post graduate mothers (20.8%). There are 79.2% normal grades of children among graduate and post graduate mothers when compared to 29.8% among illiterate mothers. This is statistically significant.

**Table 4 Distribution of the nutritional status of 0-72 months age group of children according to Literacy status of mother**

Literacy status	Children	>- 2 Z score		<- 2 Z score		<- 3 Z score	
		No	%	No	%	No	%
Illiterate*	154	46	29.8	82	53.2	26	17
Primary and Middle	97	29	29.9	48	49.5	20	20.6
Secondary and Higher secondary	101	31	30.6	50	49.5	20	19.9
Graduate and Post graduate	48	38	79.2	10	20.8	0	0
Total	400	144	36	190	47.5	66	16.5

Chi square ( $\chi^2$ )=4.08; df=1; \* $p<0.05$ ; literates vs. illiterates

This is similar with the following studies. Bhat IA et al<sup>14</sup>, Mittal A et al<sup>15</sup>, Goel MK et al<sup>12</sup>, Prinja S et al<sup>16</sup>, Mishra VK et al<sup>17</sup>, Brahmam S<sup>18</sup> noticed that literacy

of mother is statistically associated with status of under nutrition of their children.

**Table 5 Distribution of the nutritional status of 0-72 months age group of children according to Literacy status of father**

Literacy status	Children	>- 2 Z score		<- 2 Z score		<- 3 Z score	
		No	%	No	%	No	%
Illiterate	119	36	30.2	61	51.3	22	18.5
Primary and Middle	112	41	36.7	52	46.4	19	16.9
Secondary and Higher secondary	105	38	36.1	50	47.6	17	16.3
Graduate and Post graduate	64	33	51.6	23	35.9	8	12.5
Total	400	144	36	190	47.5	66	16.5

Chi square ( $\chi^2$ )=2.4; df=1;  $p>0.05$ ; literates vs. illiterates

As per the study, Literacy status of father is not having much effect on the nutritional status of children. Table 5 shows that there are more number of children (51.6%) belonging to normal group of nutritional status among graduates and post graduates fathers than those children who belong to illiterate fathers (30.2%).

There are 35.9% of undernourished children among graduates and post graduates fathers when compared to 51.3% among illiterate fathers. This is not statistically significant. Bhat IA et al<sup>6</sup> in their study for impact of socio medical factors on the nutritional status of preschool children in an urban setting of Srinagar noticed that parental literacy

status was most important factor in the prevalence of preschool child malnutrition.

#### CONCLUSION

The present study shows that there are still many children who are undernourished and severely malnourished in our country, even after 36 years of ICDS services. There is need to use WHO standards at the grass route levels to correctly identify the burden of under nutrition. There is paucity of community based studies on childhood malnutrition by using WHO z score technique. Z score technique is simple to use, reliable and easy to understand at grass route level by health workers.

Currently there is a use of IAP standards of growth charts available with the Anganwadi workers, using weight for age as an indicator for nutritional assessment. With the help of WHO z score technique, we can able record even other parameters like weight for height, height for age, mid arm circumference for age and skinfold thickness.

As per the current study, the use of underweight as the sole criterion for estimating undernourished children in the population may be underestimating the true overload of burden of malnutrition. There is scope of using WHO z score technique as a tool for estimating the true burden of undernourished children as it takes into consideration of all other parameters of anthropometric measurement as well.

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