

## **Nutritional Status of Pre-School Children Attending Anganwadi Centres in Tirupati, Andhra Pradesh, India**

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**Abstract: Background:** Good nutrition is essential for attainment of normal growth and development of children. We cannot hope for a healthy future for India with such a large number of malnourished children. The aim of this study is to assess the nutritional status of pre-school children attending anganwadi centres of urban and rural areas.

**Materials and Methods:** Non experimental research approach with descriptive and comparative research design. Simple random sampling technique used to select the sample size of 100 pre-school children nutritional status assessed by anthropometric measurements and clinical signs check list. The urban and rural areas children were assessed and compared.

**Results:** Pre-school children in urban areas the mean weight is at the 5<sup>th</sup> percentile of NCHS standards in rural areas majority children mean weight is at below the 5<sup>th</sup> percentile of NCHS standards. Age, gender and family income was found to be significant for both urban and rural children.

**Conclusion:** The data shows that there is a significant difference between the nutritional status of pre-school children belong to urban and rural areas.

**Keywords:** Anthropometric measurement, Growth Assessment, NCHS Standards, Preschool Children.

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### **I. Introduction**

Today's child is father of tomorrow's man. It is the child who will carry the present day's genes to future generation. Pre-school children are the most vulnerable groups constituting 36 percent of the total population of India. The rate of growth and development of pre-school children depend to a large measure on the adequacy of the diet assumed by them [1]. Growth assessment is the single most useful tool for defining health and nutritional status in children at both the individual and population levels [2]. Malnutrition of the pre-school children can be a major hurdle to socio-economic development of the nation in the future years.

Measurement of weight, height, head, chest and mid-upper arm circumference are reliable means to evaluate the progress of normal child and for early detection of health deviations. Malnutrition in early childhood affects the mental, physical and emotional development of children and their future productivity [3].

The nutritional uplift of people, especially in India, can come about only as part and parcel of an overall socioeconomic development of rural areas where 80% of people live, the government of India has initiated several large scales supplementary feeding programs aimed at overcoming specific deficiency diseases through various ministries to combat malnutrition [2]. ICDS program is organizing through Anganwadi centers in rural and urban areas hence an attempt was made to assess the growth pattern and nutritional status of pre-school children attending anganwadi centers of urban and rural areas of tirupathi through anthropometric measurement [4]. The hunger and malnutrition survey report 2011 covered 7300 households in 112 districts across 9 states and more than 1 lakh children and 74000 mothers. The key findings of the survey shows 42% children under 5 are under weight, 59% are stunted prevalence of child under weight has decreased from 53% in 2004 to 42% in 2011. Prevalence of malnutrition is significantly higher among children from low income families [5]. The child mortality estimate report 2012 released by the United Nations Children's Emergency Fund (UNICEF) shows India in a poor light. It let the whole world by recording deaths of 16.55 lakh children under the age of 5 in 2011. Among the 5 countries that accounted for more than 50% of such deaths, India's figure was more than the combined figures in Nigeria, the Democratic Republic of Congo and Pakistan [6].

### **II. Methodology**

#### **2.1. Objectives**

- To describe demographic variables of pre-school children in urban and rural areas.
- To assess the nutritional status of pre-school children in urban and rural areas
- To compare the nutritional status of pre-school children in urban and rural areas.

**1.2. Materials and Methods.** The research approach adopted for the study was non-experimental with descriptive and comparative research design. The study was conducted in urban and rural anganwadi centers of tirupati, among the 100 pre-school children of the age 3-5 years. The samples were selected by simple random sampling technique from 4 selected anganwadi centers of rural and urban areas of tirupati, chittoor district. anganwadi centers were selected by using cluster sampling technique, out of 74 urban and 37 rural centers; two were selected from urban and two from rural areas of tirupati. The sample size was 100 pre-school children. Purposive sampling technique was adopted.

**1.3.** The tools used for this study were;

**Tool 1.** A questionnaire was formulated to elicit information regarding social-economic profile like age, gender, religion, type of family, birth order of child, family size, education of mother, education of father, occupation of mother /father, annual income, place of residence.

**Tool 2.** Anthropometric measurements like weight, height, head, chest, mid-arm circumference and skin-fold thickness of the samples were recorded using standardized tools and techniques.

**Tool 3.** The Clinical check list was used to elicit detail on assessment of clinical signs of nutritional deficiency disorders.

### III. Analysis OF Data

Nutritional status of pre-school children was assessed by using IAP classification based on weight for age, water low's classification based on height for age. Kanawati index used to classify midarm circumference/head circumference [7]. MC Laren's classification used to assess nutritional status based on midarm circumference. Skin fold thickness assessed by using Gnanasundaram classification [8]. Anthropometric measurements like weight, height, and head circumference, chest circumference recorded for all the hundred subjects from rural and urban areas. The values were compared with NCHS and ICMR Standards. National Family and Health Surveys (NFHS) had used NCHS standards since 1992-1999 and later used WHO (2006) standards. NCHS (1977) gives significant difference in prevalence for under weight and stunted children across the age compared to WHO-standards [16].

Descriptive statistics of mean and standard deviations were used for anthropometric measurements and inferential statistics of chi-square was used for analyzing association between demographic Variables and nutritional status. "t-test" was used for analyzing the difference between the rural and urban areas.

### IV. Results

**TABLE-1: Demographic Variables of Preschool Children Belongs to Urban and Rural Areas of Tirupati**

S. No	Demographic Variables		Urban		Rural	
			Freq	%	Freq	%
1	Age	3-years	22	44	29	58
		4-years	28	56	21	42
2	Gender	Male	26	52	27	54
		Female	24	48	23	46
3	Type of family	Joint	18	36	17	34
		Nuclear	32	64	33	66
4	Education of Mother	Primary	2	4	9	18
		Secondary	19	38	23	46
		Collegiate	1	2	6	12
		Illiterate	27	54	11	22
5	Annual Family Income	Rs.12000-24000	49	98	44	88
		Rs.24000-36000	0	0	3	6
		Rs.36000-48000	1	2	3	6

Demographic Variables of urban and rural Pre-school children revealed that in urban area about 64% of children were from nuclear family in the rural areas majority children 66% were from joint family. About 34% mothers were in secondary education and 58% were non-literates in urban areas, 28% mothers were in secondary education and 40% were non literates in rural areas, 98% of the sample belonged to lower income group in urban areas, 88% belonged to lower income group in rural areas (Annual Income of Rs 12,000-24,000).

**TABLE-2: Nutritional Grades Based on Anthropometric Measurements of Pre-School Children**

Nutritional Grades	Weight		Height		Wt. / Ht.		MAC. / Hc.		MAC.		SFT	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Normal	43	43%	29	29%	64	64%	8	8%	26	26%	51	51%
Mild	47	47%	38	38%	33	33%	77	77%	47	47%	20	20%
Moderate	10	10%	32	32%	3	3%	15	15%	21	21%	29	29%
Severe	--	--	1	1%	--	--	--	--	6	6%	--	--

Represents nutritional status based on anthropometric measurements of pre-school children in urban and rural areas shows, based on weight for age 43%, 47%, 10%, height for age is 29%, 38%, 32%, 1%, head circumference 8%, 77%, 15%, mid-arm circumference 26%, 47%, 21%, 6%, skin fold thickness 51%, 20%, 29% belongs to normal mild, moderate and severe malnutrition respectively. Majority of children belongs to normal and mild nutrition status. Very less number of children noticed in severe malnutrition.

**TABLE-3: Nutritional Status Of Pre-School Children Based On Weight For Age (N=100 U=50 R=50)**

Age in Years	Gender	Place of Residence	Normal > 80%		Mild 71-80%		Moderate 61-70%		Severe 51-60%	
			Count	%	Count	%	Count	%	Count	%
3	Male children	Urban	5	10%	5	10%	--	--	--	--
		Rural	3	6%	9	18%	3	6%	--	--
	Female children	Urban	4	8%	8	16%	--	--	--	--
		Rural	5	10%	5	10%	4	8%	--	--
4	Male children	Urban	9	18%	3	6%	2	4%	--	--
		Rural	6	12%	6	12%	--	--	--	--
	Female children	Urban	6	12%	8	16%	--	--	--	--
		Rural	5	10%	3	6%	1	2%	--	--

(IAP Classification, 1972)

Represents nutritional status of pre-school children based on weight for age shows, in urban areas among male children of 3 and 4 years of age is 10% each, 6%, 18%, 6% where as in rural areas 6%, 18%, 6% and 12% each respectively. Among female children of 3 and 4 years of age is (8%) (16%) & (10%) (10%) (8%), where as in rural areas (10%) (10%) (8%) and (10%) (6%) (2%) belongs to normal, mild and moderate malnutrition.

**TABLE-4: Nutritional Status Of Pre-School Children Based On Height For Age (N=100 U=50 R=50)**

Age in Years	Gender	Place of Residence	Normal > 95%		Mild 90-95%		Moderate 85-90%		Severe < 85%	
			Count	%	Count	%	Count	%	Count	%
3	Male children	Urban	1	2%	5	10%	4	8%	--	--
		Rural	2	4%	4	8%	8	16%	1	2%
	Female children	Urban	4	8%	4	8%	4	8%	--	--
		Rural	5	10%	3	6%	6	12%	--	--
4	Male children	Urban	5	10%	5	10%	4	8%	--	--
		Rural	3	6%	8	16%	1	2%	--	--
	Female children	Urban	7	14%	4	8%	3	6%	--	--
		Rural	2	4%	5	10%	2	4%	--	--

(Waterlow's classification 1972)

Represents nutritional status of pre-school children based on height for age shows, in urban areas the nutritional status of male children among 3&4 years of age is 2%, 10%, 8% and 10%, 10%, 8% where as in female children 8% each and 14%, 8%, 6%. In rural areas among male children of 3&4 years of age is 4%, 8%, 16% and 6%, 6%, 2% where as in female children 10%, 6%, 2% and 4%, 0%, 4% belong to normal, mild and moderate malnutrition.

**TABLE-5: Comparison of Nutritional Status among Pre-School Children Belongs to Urban and Rural Areas of Tirupati ( N=100 U=50 R=50)**

S No	Variables	Place of Residence	N	Mean	Standard deviation	t-test	Df	Sig
1	Weight	Urban	50	12.50	1.485	2.43	98	0.017
		Rural	50	11.73	1.676			
2	Height	Urban	50	90.92	6.426	1.01	98	0.315
		Rural	50	89.64	6.249			
3	Head circumference	Urban	50	46.14	1.385	3.12	98	0.002
		Rural	50	45.12	1.848			
4	Chest circumference	Urban	50	47.58	2.167	2.45	98	0.016
		Rural	50	46.52	2.159			
5	Mid-arm circumference	Urban	50	13.86	.948	3.28	98	0.001
		Rural	50	13.26	.876			
6	Skin-fold thickness	Urban	50	12.60	1.325	3.91	98	0.000
		Rural	50	11.66	1.062			

Represents comparison of nutritional status among pre-school children belongs to urban and rural areas of tirupati shows in urban areas among pre-school children of 3 and 4 years age mean weight were at the 5<sup>th</sup> percentile of NCHS Standards and in rural areas it is below 5<sup>th</sup> percentile and it is at 5<sup>th</sup> percentile in 4 years of age children. Singh made an assessment of nutritional status of under five in Chandigarh. Sample were randomly selected from urban, rural and slum areas. Nutritional status was assessed by using weight for age criteria. Prevalence of PEM was found to be about 42% while 22.7%, 14.5%, 4.1% and 0.7% children had grade I, II, III and IV malnutrition respectively [13].

The assessment of nutritional deficiency signs among 100 per school children in urban and rural areas revealed that 31% of children had dull looking, slow activity and with poor personal hygiene. While 35% children shown that frontal / parietal bossing. Majority of children 77% has hair with thinness and sparseness. 42% child had dry skin. Face diffuse de-pigmentation 1.1% and moon face 3% were less predominant. Angular stomatitis was observed in 69% children and tongue pallor in 87% children. Mottled enamel and dental caries was found in 8%, 22% children respectively. Pallor nails found in 89% children. Muscle wasting and protruded abdomen observed in 80% and 84% children. Skin and respiratory infections were present in 42% of children.

## **V. Discussion**

The present study reveals that there is significant difference between the nutritional status of pre-school children belongs to urban and rural areas of Tirupati. The study supported by Mendoza Aldana who studied the nutritional status of pre-school children in rural and urban areas. A high prevalence of 15.2% urban and 21.8% rural children had stuntedness while occurrence of wasting was 4% in urban and 6.5% in rural areas<sup>9</sup>. National Health Family Survey 111 in 2005-2006 estimated that 42% of children are malnourished in the country [14].

The findings shows that in urban areas among pre-school children of 3 and 4 years age male and female children mean weight were at the 5<sup>th</sup> percentile of NCHS standards. In rural areas among pre-school children of 3 and 4 years age male and female children mean weight were at below the 5<sup>th</sup> percentile of NCHS standards. Bhatia conducted similar study results show the overall prevalence of PEM was found to be 51.6% of them 65.4%, 26.3%, 5.3% and 3% of children had grade I, II, III and IV PEM, respectively<sup>10</sup>. In India, Integrated Child Development Scheme uses Indian Academy of Paediatrics (IAP), 1972 classification for growth monitoring and identifying severely malnourished aged up to 5 years for supplementary food program [15].

Regarding the mean height of pre-school children of three years age male and female children was fall below the 5<sup>th</sup> percentile of NCHS standards. Among the children of 4 years age male and female children mean weight were at the 5<sup>th</sup> percentile. In rural areas 3 years age male and female children mean height was at below the 5<sup>th</sup> percentile of NCHS standards. Among the children of 4 years of age male children mean height was at the 5<sup>th</sup> percentile and female children mean height was below the 5<sup>th</sup> percentile. Nirojini Bhat Bhan assessed anthropometric measurements of pre-school children and compared with ICMR values and 50<sup>th</sup> percentile values of NCHS standards which are marginally lower levels [11].

Nutritional status of urban and rural areas of pre-school children with regard to weight for age in children of 3 years age in urban area, 18% were in normal nutritional status while 26% were in malnutrition. Children of 4 years age were better in nutritional status 30% of children were with normal nutritional status than 3 years age children. Almost a similar trend was observed in children of rural areas with 3 and 4 years of age. Based on height for age about 1/3<sup>rd</sup> of the children of 3 and 4 years of age were in malnutrition in urban and rural areas. Sehgal studied an analysis of anthropometric measurements of preschool children affected by socio economic factors. Results reported a mean height and weight of 87.49 cms and 13.65 kgs and of 84.67 cms and 12.81 kgs in boys and girls respectively. These values were significantly lower than referred values. It was observed that height and weight of children was affected by caste, income, type of house, size of family, mothers education and father education [12].

The nutritional status assessed by ratio of mid arm circumference and head circumference for age revealed that 38% and 48% children in urban areas and 58% and 42% of children in rural areas with 3 and 4 years of age children had grade I, II, III and IV PEM, respectively. Mid arm circumference for age was taken into consideration about 30% and 38% children of 3 and 4 years age were with malnutrition in urban areas as against 42% (3 years age) and 38% (4 years age) children in rural areas. Skin- fold thickness for age of the urban and rural children indicated by majority of children of 3 years age i.e., 28% were in malnutrition while a majority of children of 4 year age i.e., 36% were with normal nutritional status in urban areas. A similar trend was observed in rural children i.e., 46%, 22%. Singh studied an analysis of anthropometric measurements of pre-school children affected by socioeconomic factors, in 300 samples that were randomly selected from six villages of Haryana. Result reported a mean height and weight of 87.49 cms and 13.65 kgs and of 84.67 cms and 12.81 kgs in boys and girls respectively. These values were significantly lower than reference values. It was observed that height and weight of children was affected by caste, income, type of house, size of family, mother's education and father's education [13].

## **VI. Conclusion**

The results of the study show that age, gender and family income was found to be significant for both urban and rural children. Male children seemed to be healthier than the female children and as the level of family income raised the level of malnutrition decrease. Even though the other demographic variables were not found significant, there was an association between demographic variables with the nutritional status of the children. Child health promotion activities coupled with nutrition education programs to be directed towards the under privileged and vulnerable group, it will definitely improve the nutritional status of the children. There is a need to bring improvement in the implementation of ICDS Programs and it should cover all the rural areas.

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