Original Research Article

A comparative study of anthropometric measurements of children attending urban and rural anganwadi centres of a coastal district in Karnataka, India

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ABSTRACT

Background: Malnutrition is defined as a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients. Weight for age, height for age and weight for height are usually used to describe the nutritional status of children. The present study was done to compare the anthropometric measurements of children attending urban and rural anganwadi centres.

Methods: A cross sectional study was carried out in children aged three to six years attending 34 anganwadi centres of a coastal district of Karnataka. Anthropometric measurements like height, weight and mid arm circumference was measured using standard methods. Malnutrition was assessed based on WHO z scores. Statistical analysis used: Data was expressed in Percentages and frequencies. Comparison of anthropometric measurements were done using chi square analysis.

Results: 25.5% of the children attending urban anganwadis were underweight, 10% severely underweight, 15.5% stunted, 2.5% severely stunted, 24% wasted and 8.5% severely wasted. 18.5% of children attending rural anganwadis were underweight, 6.8% severely underweight, 11.8% stunted, 3.2% severely stunted, 15.2% wasted and 4.5% were severely wasted. The prevalence of wasting was significantly higher (p=0.006) in children attending urban anganwadi centres compared to rural centres.

Conclusions: Urban anganwadis had a higher prevalence of underweight, stunting and wasting. Underweight and stunting was higher in females compared to males whereas wasting was found almost equally in both the genders.

Keywords: Anganwadi, Anthropometry, Nutrition, Underfive

INTRODUCTION

Malnutrition commonly affects all groups in a community, but infants and young children are the most vulnerable because of their high nutritional requirements for growth and development.[1] Malnutrition has been defined as "a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients". Undernutrition is a condition which results when insufficient food is eaten over an extended period of time.[2] Undernutrition poses a great risk of death in children from common infections, increases the frequency and severity of such infections, also contributes to delayed recovery. Nearly half of all the deaths among children under the age of five are attributable to Undernutrition.[3] Undernourished children are physically, emotionally and intellectually less productive and suffer more from chronic illnesses and

disabilities when compared to children who are not undernourished.[4]

Three standard indices of physical growth that are used to describe the nutritional status of children include:

- Height for Age
- Weight for Height
- Weight for Age.[5]

In 2013 Globally 99 million children under the age of five were underweight, 51 million were wasted, 17 million were severely wasted and one in four children under the age of five had stunted growth.[6] According to NFHS III data, 48 % of children under five years of age are stunted, 43% are underweight and 20% are wasted, 24 percent of the children are severely stunted and 16 percent are severely underweight[5].SRS based under five mortality rate in India, for the year 2010, is 59 per thousand and it varies from 66 per thousand in rural areas to 38 per thousand in urban areas.[7] Hence to overcome these problems the Government of India has introduced a number of health programmes focusing on the health and nutrition of children and ICDS project is one of the most important step towards tackling the problem of childhood malnutrition.

Although there are studies on nutritional status of children below five years of age, not many studies have been done comparing the nutritional status among the children attending Urban and Rural Anganwadi centres in Mangalore. Hence this study was carried out with the objectives of comparing the anthropometric measurements of children attending urban and rural Anganwadi centres.

METHODS

The present study was a cross sectional study carried out in the selected anganwadi centres of a coastal district in Karnataka, for a period of one year from July 2014 to June 2015.

After obtaining permission from the Urban and Rural Child Development and Project Officers of the study area, a list of anganwadis was obtained. There were total of 675 Anganwadi centres, out of which 227 belonged to urban and 448 to rural. Cluster sampling method was used where each Anganwadi centre was considered as a cluster. Considering 5 % of the total number of Anganwadis, the sample size for the study was calculated as 34 Anganwadi centres. Considering the urban: rural Anganwadi ratio of 1:2, 12 urban and 22 rural Anganwadi centres were selected randomly for the study.

All children in the age group of three to six years, both male and female attending the selected Anganwadi centres was included. Children who did not attend Anganwadi regularly (minimum of four days in a week)

and those children whose parents did not give consent for the study were excluded from the study.

The anganwadi teacher of each centre was contacted on the previous day of the visit and was informed about the study and was asked to inform the parents about the study. Written Informed consent was taken from each parent before examining the child.

Anthropometric measurements such as height, weight and mid arm circumference of the children were taken using standard procedures[8] by one of the authors. Weight for age, height for age and weight for height were calculated. The Children were considered underweight, stunted and wasted if their weight-for age, height-for-age and weight-for-height z-scores were below -2.0 Standard deviation (SD) of the WHO standards, and were considered severely underweight, stunted and wasted if the Z scores were below -3.0 Standard Deviation (SD) of the WHO standards[9-12]

This study was part of a larger study for which ethical clearance was obtained from the institutional ethical committee.

Statistical analysis

Data was entered in MS excel analyzed by Statistical Package for Social Sciences (SPSS) software version 16 and expressed as frequencies and percentages. Comparison of Anthropometric measurements were done using chi square analysis and p value of less than 0.05 was considered as statistically significant.

RESULTS

Totally 600 children were examined, 400 belonging to rural and 200 to urban anganwadi centres. In urban anganwadi centres 52% of the children were females and 48% were males whereas in rural anganwadi centres 49.5% of the children were females and 50.5% were males. In the present study majority of the children were in the age group of 36-48 months both in rural as well as in urban Anganwadi centres (73.8% and 63% respectively). The demographic characteristics are provided in (Table 1).

The mean weight of the children attending urban as well as rural Anganwadis was found to be 12.8±1.8SD. The mean height of children attending urban anganwadis was 97.2cm±6.1 SD and of rural anganwadis was found to be 96.2cm±5.5 SD.

25.5% (51) of the children attending urban Anganwadi centres where found to be underweight compared to 18.5% (74) of children attending rural Anganwadi centres who were found to be underweight. 18% (36) of the children attending urban Anganwadi centres were found to be stunted and 15% (60) of the children attending rural centres were stunted. 24% (48) of the children attending

urban anganwadi centres were wasted and 8.5% (17) were severely wasted whereas 15.2% (61) of children attending rural anganwadi centres were wasted, 4.5% (18) severely wasted and this difference was found to be statistically significant (p=0.006). 83.5% (167) of the children attending urban Anganwadi centres had mid arm circumference measuring above 13.5cms and 86% (344) of the children attending rural centres had mid arm circumference measuring above 13.5cms.Weight for age, Height for age, weight for height and mid arm circumference data is provided in (Table 2).

Prevalence of underweight and stunting based on gender in urban anganwadi centres is depicted in (Figure 1 and 2). In urban Anganwadi centres among the children who were wasted 50% (24) were males and 50 % (24) were females. Among those who were severely wasted 41.2%
(7) were males and 58.8% (10) were females. This difference was not statistically significant (p= 0.821).

In rural Anganwadi centres among the children who were underweight 41.9% (31) were males and 58.1% (43) were females. Among those who were severely underweight 51.9% (14) were males and 48.1% (13) were females. This difference was not statistically significant (p= 0.284). Among the children who were stunted 46.8% (22) were males and 53.2% (25) were females. Among those who were severely stunted 61.5% (8) were males and 38.5% (5) were females. This difference was statistically insignificant (p= 0.641). Among the children who showed wasting, 52.5% (32) were males and 47.5% (29) were females. Among those who were severely wasted, 44.4% (8) were males and 55.6% (10) were females. This difference was not found to be statistically significant (p = 0.719).

Table 1: Demographic distribution of children attending anganwadi centres.

| N= 600	Urban (n= 200)		Rural (n= 400)		Total
Gender					
Male	96	48%	202	50.5%	298
Female	104	52%	198	49.5%	302
Age					
36-48 months	126	63%	295	73.8%	421
49- 60 months	55	27.5%	98	24.5%	153
61- 72 months	19	9.5%	7	1.8%	26

Table 2: Comparison of the anthropometric measurements between children attending rural and urban anganwadi centres.

N= 600	Urban (n= 200)		Rural (n= 400)		
	Frequency	**Percentage**	**Frequency**	**Percentage**	
Weight for age					
Normal	129	64.5%	298	74.5%	
Underweight	51	25.5%	74	18.5%	
Severely underweight	20	10%	27	6.8%	p=0.06
Overweight	0	0%	1	0.2%	
Height for age					
Normal	164	82%	340	85%	
Stunted	31	15.5%	47	11.8%	
Severely Stunted	5	2.5%	13	3.2%	p=0.39
Weight for height					
Normal	135	67.5%	320	80%	
Wasting	48	24%	61	15.2%	
Severe Wasting	17	8.5%	18	4.5%	
Obese	0	0%	1	0.2%	p=0.006
Mid arm circumference					
<12.5cm	0	0%	1	0.2%	
12.5-13.5cm	33	16.5%	55	13.8%	
>13.5cm	167	83.5%	344	86%	p=0.5
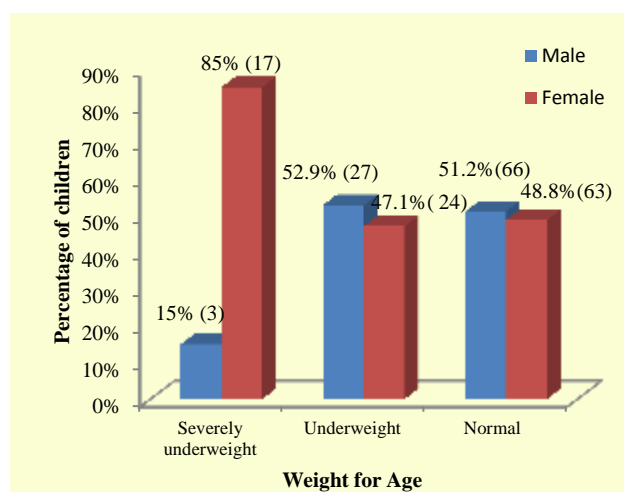
P value= 0.008.

Figure 1: Gender wise distribution of children attending urban anganwadi centres with respect to weight for age (N= 200).
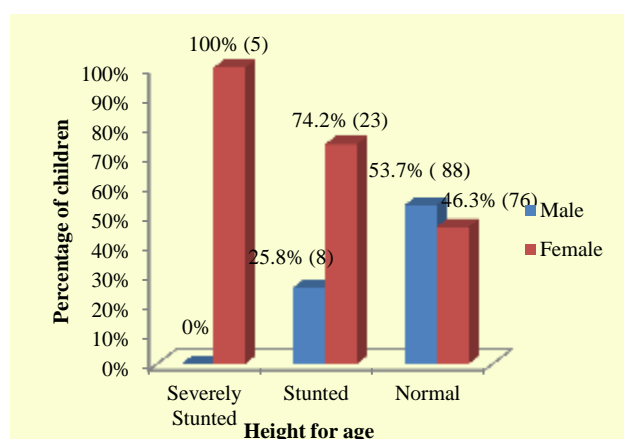
P value= 0.002.

Figure 2: Gender wise distribution of children attending urban anganwadis centres with respect to height for age (N= 200).

DISCUSSION

In the present study it was observed that majority of the children attending anganwadi centres in a coastal district of Karnataka, both urban and rural belonged to the age group of 36 to 48 months. Among the children attending urban Anganwadi centres the proportion of female children was higher compared to male children, whereas it was almost equal in rural areas, however this differences was not found to be statistically significant.

In the present study prevalence of children who were underweight was found to be higher among children attending urban anganwadi centres and these results were similar to a study done by Kavosi et al[13], whereas other studies showed that prevalence of underweight is higher in rural areas.[14-16]

Prevalence of stunting in our study was higher among children living in urban areas which was similar to a study done by Kavosi et al.[13] In contrary other studies showed that the prevalence of stunting is higher in rural areas.[14-17]

In this study the prevalence of wasting was found to be higher among children living in urban areas similar to a study done by Kavosi et al.[13] Other studies however showed that prevalence of wasting is higher in rural areas.[15,17,18]

In the present study there was no much difference between children attending rural and urban Anganwadi centres with respect to mid arm circumference measuring less than 13.5cms. However in a study conducted by Mishra and Mishra proportion of children with mid arm circumference measuring less than 13.5cms was found to be higher in rural compared to urban areas.[19]

In our study, among the children who were underweight and stunted, the proportion of female children was higher compared to male children in urban anganwadis whereas wasting was almost equal in both the genders. Similar results were observed in other studies.[15,20-26] However in rural Anganwadi centres these differences were not found to be statistically significant.

The limitations of the study was mainly due to the fact that only few Anganwadi centres were included in this study due to time constraints. Hence a more comprehensive study involving more Anganwadi centres can be done to increase the reliability of the results.

In the present study it was observed that the prevalence of underweight, stunting and wasting was higher among children attending urban Anganwadi centres particularly females as compared to rural Anganwadi centres. This indicates that although urban population is considered to be literate compared to rural population, awareness regarding adequate nutrition is extremely important to improve the nutritional status of urban under-five children.

Hence improvement in the nutritional status of the female children should be emphasized and for this creating awareness among the parents is essential. Parents should be encouraged to provide locally available, nutritionally rich food to children particularly to the undernourished.

CONCLUSION

Urban anganwadis had a higher prevalence of underweight, stunting and wasting. Underweight and stunting was higher in females compared to males whereas wasting was found almost equally in both the genders.

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