



ASSESSMENT OF NUTRITIONAL STATUS BY ANTHROPOMETRY OF CHILDREN AGED 2-12 YEARS AT ORPHAN HOMES OF NELLORE DISTRICT, SOUTH INDIA.

Paediatrics

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ABSTRACT

Background: According to statistics, it is evident that developing countries cater many homeless and parentless children. These children are deprived of their childhood rights, and also more prone to malnutrition leading to morbidity and mortality. There are number of studies done on prevalence of malnutrition in the community, but only limited data is available on focussed groups like orphaned/homeless children. Hence this study was carried out. **Objectives:** 1. To estimate the prevalence of malnutrition by anthropometric data among children aged 2-12 years residing in orphan homes at Nellore district. 2. To compare the prevalence between the age groups. **Materials and methods:** The cross-sectional study was carried out at orphan homes of Nellore from January 2020 to June 2022. 250 children were included in the study, subjected to thorough anthropometric assessment. The statistical analysis of variables like proportion, mean, range, frequency, standard deviations was done by using SPSS 22.0. The p value <0.05 was taken as significant. **Results:** Out of 250 children, 118 (47.20%) were malnourished and 132 (52.80%) had normal nutritional status. Out of 118 malnourished children, 72 (28.80%) had grade I malnutrition, 39 (15.60%) grade II malnutrition and 7 (2.80%) grade 3 malnutrition. According to this study, out of 250 children, 4 (1.6%) were overweight, none were obese. Out of 250 children, 194 (77.60%) had normal height and 56 (22.40%) were stunted. Out of these, 37 (14.8%) had grade 1 stunting, 5 (2.0%) grade 2 stunting and 14 (5.6%) had grade 3 stunting. **Conclusion:** There is significant prevalence of malnutrition of varying degrees in children residing in orphan homes. It is observed that chronic malnutrition is more prevalent in older age group children. Hence it is worthwhile to intervene by implementation of nutritional programmes at the earliest age, to prevent chronic malnutrition and its long-term morbidities among orphanage children.

KEYWORDS

Anthropometry, Malnutrition, Obesity, Orphans, Overweight, Underweight

INTRODUCTION

As president John Kennedy state, "Children are the world's most valuable resource and it's best hope for the future". For proper growth of children, nutrition plays a crucial role in early years of life. Homeless and parentless children are deprived of their childhood rights and are more prone to malnutrition compared to children staying at home with their parents. Still, there's only a little data available on prevalence of malnutrition in children of orphan homes. If neglected, this could lead to more morbid conditions among these children. Hence a proper surveillance of their nutritional status is required to ensure optimum health and nutritional care.

According to UNICEF and its international partners, an orphan is a child under the age of 18 who has lost his/her parents (one or both) to any cause of death. As per this standard, there were around 140 million orphans. In Asia, 52 million in Europe, and 61 million worldwide in 2015. 10 million people reside in Latin America and the Caribbean, 7.3 million in Africa. Millions in Central Asia and Eastern Europe¹.

Malnutrition has been a problem for four decades in a row in children and is still widespread among youngsters in underdeveloped nations^{2,3}. An estimated number of 50.6 million children under 5 years age are malnourished and severely malnourished and hospital admitted children had a 30–50% case fatality rate^{4,5}.

The death rate can only be brought down for less than 5% with aggressive treatment and diet monitoring if admission was carried earlier. However, to combat the rise in diseases caused by childhood malnutrition, a public health evidence base for effective control and prevention is essential⁶.

The WHO has created child growth standards that outline how a child needs to develop. These standards are used to determine whether a child has over or under-nutrition. When a child's weight, height, or weight-for height falls significantly below the mean on the growth criteria for his/her age, the child is recognized to be undernourished⁷.

There are 42,06,78,000 people in India below the age of 18; 2,57,00% of them are orphans⁸. A facility devoted to providing for and raising children without parents is recognized as an orphanage⁹. Institutionalized children have been found to be less academically successful, to have difficulty integrating to life outside of orphanages, and to lack basic social and interpersonal skills⁹.

Anthropometry is the simplest and most useful tool for assessing the nutritional status of the children. The purpose of this study is to analyse the nutritional status among children aged 2-12 years living in orphan homes using anthropometric indices.

The findings of this study can be used by decision-makers in policy discussions and policy formulations to address significant issues relating to orphan children, such as nutritional status, disease prevalence, and the accessibility of essential services for orphan children. The government can create the appropriate policies and initiatives by using the identified issue. Similarly, non-governmental organizations that support orphans might use this study to address issues related to orphans and orphan care facilities.

AIMS AND OBJECTIVES

1. To estimate the prevalence of malnutrition by anthropometric data among children aged 2-12 years residing in orphan homes at Nellore district.
2. To compare the prevalence between the age groups.

MATERIALS AND METHODS

In this cross-sectional study done in time period of 18 months (January 2020 to June 2022), a list of orphan homes was taken and among them sample size was selected by simple randomization. 250 children were included in the study based on prevalence from other related studies.

Inclusion Criteria:

1. Children in the age group of 2-12 years residing in orphan homes of Nellore.

2. Those who are willing to take part in the study.

Exclusion Criteria:

- Children having any long-standing systemic disease and who are physically or mentally challenged.
- Children who are sick at the time of data collection.

Study Interventions:

Detailed history of all children included under the study was taken and subjected to thorough nutritional anthropometry by using stadiometer, weighing scale, inch tape, Harpenden skinfold calliper. The data was entered in a predesigned Performa.

The values were expressed in percentiles and/or based on WHO child growth standards (2006). The information on body mass index, skin fold thickness, mid arm circumference, weight for height, height for age, and weight for weight were recorded in Performa. According to the WHO categorization of malnutrition up to age 5, the nutritional status was evaluated. By measuring BMI values after five years, nutritional status was classified as either nourished or undernourished.

Statistical Analysis:

All the data was entered in the Microsoft Excel spread sheet and analyzed using SPSS Software version 22.0. Nutritional anthropometric indices were calculated by using reference median as recommended by WHO and classified according to standard deviation units termed as Z-scores. Mean, range, frequency, standard deviations, and percentiles was calculated accordingly. The primary outcome was expressed as proportion. Cross tabs, Pearson Chi Square tests, T tests are used. Pie charts, Bar diagrams are used wherever necessary. P value < 0.05 was considered significant.

RESULTS

The study comprised 250 children who met the requirements for inclusion. There were 149 females and 101 males among them. There were 35 children aged between two years and five years, 215 between six and twelve years. Out of 250 children, 47.2% were in secondary school level, while 31.2%, 13.2% were in primary and nursery school level respectively. Reason for placement in orphan home in majority i.e., 50.4% children was death of one or both the parents.

Out of 250 children, 118 (47.20%) were malnourished and 132 (52.80%) had normal nutritional status. Out of 118 malnourished children, 72 (28.80%) had grade I malnutrition, 39 (15.60%) had grade II malnutrition and 7 (2.80%) had grade 3 malnutrition. According to this study, out of 250 children, 4 (1.6%) were overweight, and none were obese. There was no significant difference in weight for age between the age groups (p value = 0.497) (Table 1).

Table 1. Frequency of malnutrition by weight for age.

SD	2 to 5 yrs.	6 to 12 yrs.
<-3	3 (8.6%)	41 (19.1%)
<-2	13 (37.1%)	92 (42.8%)
<-1	9 (25.7%)	37 (17.2%)
0	4 (11.4%)	21 (9.8%)
>1	5 (14.3%)	21 (9.8%)
>2	1 (2.9%)	3 (1.4%)

Out of 250 children, 194 (77.60%) had normal height and 56 (22.40%) were stunted. Out of these, 37 (14.8%) had grade 1 stunting, 5 (2.0%) had grade 2 stunting and 14 (5.6%) had grade 3 stunting.

Children in 6-12 years had more prevalence of stunting compared to those in 2-5 years age group. This association was statistically significant (p value = 0.020) (Table 2).

Table 2. Frequency of malnutrition by height for age.

SD	2 to 5 yrs.	6 to 12 yrs.
<-2	0 (0.0%)	14 (6.5%)
<-1	4 (11.4%)	20 (9.3%)
0	13 (37.1%)	109 (50.7%)
>1	17 (48.6%)	72 (33.5%)
>2	1 (2.9%)	0 (0.0%)
total	35 (100.0%)	215 (100.0%)

Chi square = 11.620, P value = 0.020 (S)

Out of 250 children, 29 (11.6%) children were severely wasted, out of

them, 1 (3.44%) child was in 2-5 years age group and remaining in 6-12 years age group. 73 (29.2%) children had moderate wasting, out of them 9 (12.32%) were among 2-5 years age group and remaining in 6-12 years age group. Wasting was more prevalent in 6-12 years age group. This association was statistically significant (p value = 0.032).

Out of 35 children in 2-5 years of age, 9 (25.71%) children had MAC below -1 SD. Out of 215 children in 6-12 years age group, 63 (29.30%) had BMI below -2 SD. Out of 35 children in 2-5 years age group, 10 (28.6%) children had Triceps skin thickness (TST) below -1 SD and 2 (5.7%) children had TST below -2 SD. Out of 215 children in 6-12 years age group, 121 (56.30%) children had TST below 25th centile, among which 25 (11.6%) were between 5th to 10th centile and 96 (44.70%) were between 10th to 25th centile.

Out of 117 children who were underweight, only 28 (23.9%) were stunted. There was no statistically significant association between weight for age and height for age among these children (p value = 0.586). Out of 11 children in 2-5 years age group who were underweight, 7 (63.6%) children had low MAC. There was statistically significant association between W/A and MAC (p value = 0.001). Out of 9 children in 2-5 years age group who had wasting, 8 (88.9%) children had low MAC. There was statistically significant association between W/H and MAC (p value = 0.001).

Out of 92 children with low BMI, 90 (97.8%) children had low TST. Association between BMI and TST was statistically significant (p value = 0.001). Out of 102 children with wasting, 100 (98.0%) children had low TST. Statistically significant association was found between W/H and TST among malnourished children (p value = 0.001) (Figure 1).

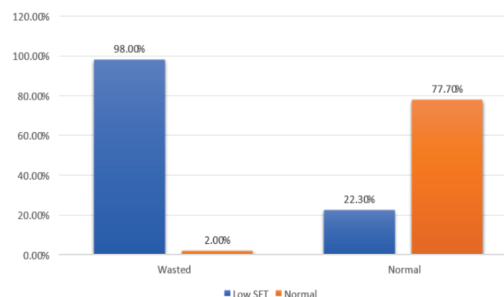


Figure 1. Bar diagram comparing frequency of low TST in normal vs low W/H.

DISCUSSION

In this study, 118 (47.20%) children were underweight. 10% of children in orphanages in Ghana, according to a survey, were underweight. But a study by Ferdoushi et al. revealed that 32.5% of participants were underweight, and a study by Reddy et al.⁸ revealed that 32.3% of participants were underweight. Reddy et al.⁸ findings that 55.7% of children in Odisha's orphanages were underweight can be justified by the orphans' superior access to nutritional assistance. In the same age group, the National Nutrition Survey 2018 found that nearly one in three children (28.9%) were underweight alongside a high prevalence of overweight (9.5%).

In contrast to Ferdoushi's⁹ study, which found that 56% of children were stunted, in our study, nearly 56 (22.40%) of the 250 participants had grade 1, 2 or 3 stunting. According to study by Reddy¹², 51.9% were stunted. Children in orphan homes are at risk of stunting due to nutritional deficits, prior stunting, and illnesses. National Nutrition Survey¹⁰ revealed that 18.7% of orphans belonging to Ghana were stunted, while another study revealed that 10% of children in orphanages in Ghana were stunted¹¹.

According to this study, 132 (52.80%) were of normal weight, while 118 (47.20%) were underweight, 4 (1.6%) were overweight, and none were obese. Findings in a study done on Ethiopia were 8.9% of orphans and vulnerable kids were underweight^{11,12}. In addition, a study of Lebanese school-age children residing in orphanages in northern Lebanon was carried out^{13,14}. The results show that 9.2% of people were overweight or obese. As opposed to this, a cross-sectional study of orphans and vulnerable children found that 3.0% of them were underweight, 5.6% were overweight, and 1.7% were obese. The rest of the children, or 89.7%, were normal weight. The results of a study done

in Nigeria showed that 18.6% of the population had stunting, and 18.6% had overweight or obesity¹⁵. Within their first five years of life, 3 (8.6%) were classified by the WHO as SAM.

This significant prevalence of malnutrition observed in orphan homes might be due to budgetary limitations, improper utilization of programmes due to unawareness or caregiver misinformation.

Limitations

This study was done on a small sample of 250 children over a limited period. Other investigations to prove the degree of malnutrition were not done in the study as only anthropometry was done.

CONCLUSIONS

There is significant prevalence of malnutrition of varying degrees in children residing in orphan homes. It is observed that chronic malnutrition is more prevalent in older age group children. Hence it is worthwhile to intervene by implementation of nutritional programmes at the earliest age, to prevent chronic malnutrition and its long-term morbidities among orphanage children. Children in orphanages must be supported by comprehensive nutritional programmes, which helps in improvement of their nutritional status.

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