Assessment of nutritional status in children of an orphanage

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Abstract

Introduction: Children of orphanages are more prone to malnutrition compared to children staying at home with their parents. Four out of ten malnourished children in the world live in India. Malnutrition and anemia are the most widespread nutrition related public health problems in developing countries, yet only little data is available on its prevalence in children of orphanages.

Objectives
1. To assess nutritional status among children of an orphanage by anthropometry
2. To diagnose signs of nutritional deficiency among the study group by clinical assessment.

Materials and Method: This cross sectional study was conducted in an orphanage in Kasaragod. Data was collected from 100 students of the age group 5 to16 years. Weight and height was measured. BMI was calculated. Nutritional status was assessed and categorized using BMI chart. Nutritional deficiency assessment was done by clinical examination of hair, nail, oral cavity and skin.

Results: The data was analyzed using appropriate method. It was found that 23% of students were in underweight category (<5th percentile). 95% of students had nutritional deficiency, among those 60% had pallor 34% had nail changes (platynychia and koilonychia) and 31% had angular stomatitis suggestive of iron deficiency anemia.

Conclusion: In this study we observed that children residing in orphanage were having healthy weight but nutritional deficiency signs were present. The findings highlight the need for health education regarding balanced diet and more attention may be required from medical practitioners.

Keywords: Iron deficiency anemia, Malnutrition, Orphanage, Underweight.

Introduction

Child undernutrition is a major public health problem. Globally 5 million child death occur every year due to malnutrition, of which 2 million are from India.[1] Studies indicate that 42-57 per cent of all child deaths in developing countries are due to the effects of malnutrition on infectious disease, of which major part can be attributed to mild-to-moderate malnutrition.[2] Malnutrition arises due to reduced dietary intake, malabsorption, increased nutrient losses or altered metabolic demands. Children with malnutrition have high morbidity and mortality.[3,4] Severe malnutrition results in immune response dysfunction.[5] Undernutrition compromises a child's immune system and interferes with the body's ability to produce humoral antibodies, T cell lymphocytes, and complement.[6] Early malnutrition can have severe effects on growth and functional status of the child.[7]

Signs and symptoms of nutritional deficiencies are an aid in detecting malnutrition. Cases with mild to moderate under nutrition may remain unrecognized because clinical criteria for their diagnosis are imprecise and difficult to interpret accurately.[7]

Estimates indicate that up to 151 million children globally have experienced the death of one or both parents before 18 years of age, with the vast majority of these children living in low-income and middle-income countries.[8] Children residing in Social Welfare Hostels/orphanages are more prone to malnutrition compared to children staying at home with their parents. This could lead to more morbidity conditions among these children.[9] Hence a proper surveillance of their nutrition status is required to ensure optimum health and nutrition care. The purpose of this study is to study the nutritional status among children living in an orphanage.

Materials and Method

This study was conducted in an orphanage at Kasaragod district of Kerala. It was a cross-sectional study. The research proposal was approved by institute's Ethical Committee. Prior permission was obtained from the principal of orphanage where the study was carried out.

The study subjects were the 100 children (6-14years) residing at orphanage. Children were classified into group A and Group B. Group A consist of girls and boys aged 4 to 9 years, and group B consist of girls and boys aged 10 to16years. Children with congenital illness and Children with history of acute gastroenteritis in last 2 weeks were not included in the study.

The variables included were height, weight and BMI. General physical examination of each child was done using clinical data proforma to diagnose the signs of malnutrition. Nutritional supplements were

distributed for children having mild malnutrition and those having moderate and severe malnutrition are referred to YMCH.

Nutritional Status Assessment was made in terms of measurement of height, weight and skin fold thickness and calculation of Body Mass Index (BMI).

1. **Weight:** Subjects weighed in light clothing using a bathroom scale which has a precision of +/- 100gms. Children were asked to step on the scale and stand motionless in the middle of the scale platform with the feet slightly apart and the body weight distributed equally on both feet.
2. **Height:** Heights were recorded with children barefoot, the back of feet, buttocks, shoulders, and head touching the wall, looking straight ahead with chin tucked in such a way that Frankfurt's plane is achieved and height is measured using a vertically mobile scale, stadiometer with a precision of +/- 0.1 cm.[10]
3. **Body Mass Index:** BMI was calculated from the height and weight by using Quetlet's formula-weight in kilogram divided by height in meter square.

Participants were categorized into underweight, healthy weight and obese using BMI for age percentiles growth charts.[11]

General physical examination of each child was done using clinical data proforma.

Results

In this study we did nutritional assessment of 100 children of an orphanage. Data analysis was done using SPSS.

Among 100 children 50 of them were girls and 50 were boys. The mean age of participants was 11.380± 2.73 years. The mean height and weight was 137.67 ± 15.36 cms and 31.92 ± 11.19 kgs respectively. The mean BMI of participants was 16.28 ± 2.65 kg/m². (Table 1)

Table 1: Baseline characteristics of study group

Characteristics	Mean ± standard deviation
Age (years)	11.380± 2.73
Height (cms)	137.67 ± 15.36
Weight (Kgs)	31.92 ± 11.19
BMI (Kg/m²)	16.28 ± 2.65

It was found that 23% of students were in underweight category, 74% had healthy weight and 1% was obese.(Fig. 1)
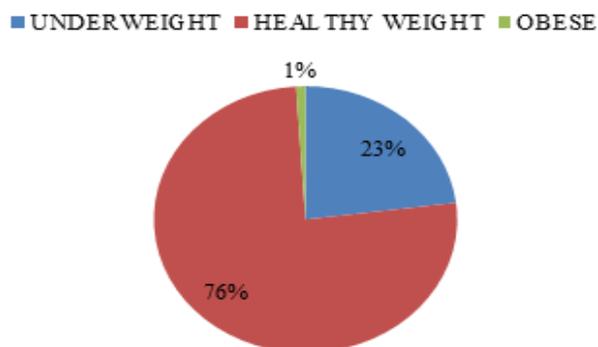
Fig. 1: Incidence of underweight

In our study it was found that 95% of participants had signs of nutritional deficiency. Among those 68% had signs of anemia. Among signs of anemia pallor (60%) had higher incidence, followed by nail changes (platynychia and koilonychia) and angular stomatitis which was 31% and 34% respectively as shown in Fig. 3.
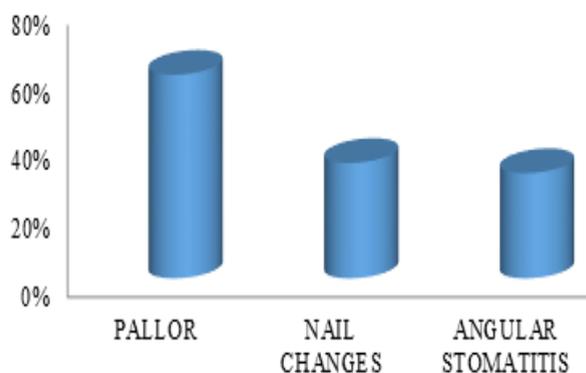
**Fig. 2: Incidence of signs of malnutrition**

We found that 8 students had pallor and nail changes, 16 of them had pallor and angular stomatitis, and 14 had all three signs suggestive of iron deficiency anemia.

The signs of anemia were compared between girls and boys. Pallor was higher among girls than boys which was statistically significant (p<0.05). There was no significant difference in other signs of anemia (Table 2).

In this present study we also compared the signs of anemia in different age groups (Table 2). Among the groups, group A (4-9years) had higher incidence of all signs of anemia.

Table 2: Comparison between boys and girls and group A and B; Chi-square test **p<0.01 significant.

Clinical signs	Boys (n=50)	Girls(n=50)	Group A(n=30) 4-9 years	B(n=70) 10-16 years	Total(n=100)
Pallor	24(48%)	36(72%) **	21(70%)	39(56%)	50(50%)
Nail changes	19(38%)	15(30%)	11(37%)	23(33%)	34(68%)
Angular stomatitis	14(28%)	17(34%)	11(37%)	20(28%)	31(62%)
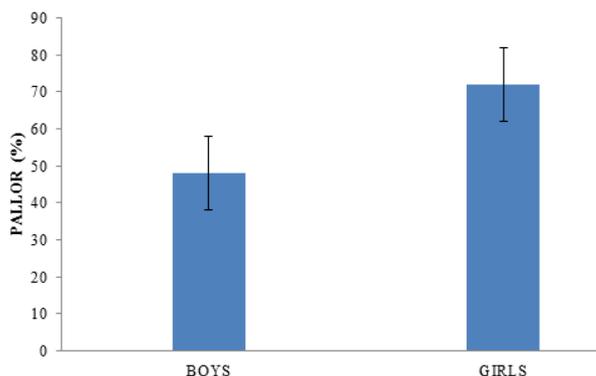
Fig. 3: Comparison of incidence of pallor among boys and girls. **p<0.01 significant

Discussion

Orphanhood can influence schooling as well as health of the child.[12] In this present study we assessed nutritional status of 100 children of an orphanage in kasaragod district of Kerala.

Secker D J et al. carried out a study in 2007 in which they evaluated preoperative nutritional status of children (n=175) and nutrition associated complications were documented 30 days postoperatively. Malnourished children had higher rates of infectious complications than well-nourished children (P 0.042).[13] A study done by Sharada R et al. in the age group of 5-9 years reported that proportion of underweight was 35.07% and 35.5% had stunting.[9] In our study we noticed that 23% of students were in underweight category, 74% had healthy weight and 1% was obese.

We also found that 95% of participants had signs of nutritional deficiency. Among those 68% had signs of anemia. We compared signs of anemia between girls and boys. Girls had higher incidence of pallor which was statistically significant (p<0.05). A study done in Istambul among school children (n=1531) in the age group of 6-16 years revealed that 27.6% had anemia.[14] The main cause of anemia may be lack of iron, Vitamin B_{12} and folic acid in their food.

In our study we compared signs of anemia in different age group and it was found that participants between 4-9 years had higher incidence of all signs of anemia. This may be due to insufficient nutritious food intake in small orphan children.

We could not take nutritional history of participants which would give more details about the cause of nutritional deficiency. Our sample size was less. So these results may represent a small community. Further studies have to be conducted to compare the nutritional status among orphanage children and children living with parents including nutritional history.

Conclusion

In this study we found that majority had healthy weight and had signs of nutritional deficiency. Among the children with nutritional deficiency signs of anemia were predominant.

In this study we observed that children residing in orphanage were having weight within normal range but nutritional deficiency signs were present. The findings highlight the need for health education regarding balanced diet and more attention may be required from medical practitioners.

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