Nutritional Assessment of under Five years Children in Mygoma Orphanage Home, Sudan

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Received: December 2018; Accepted: January 2019; Published: February 1, 2019
Citation: Niemat Mohammed Tahir Ali et al. Nutritional Assessment of under Five years Children in Mygoma Orphanage Home, Sudan. World Family Medicine. 2019; 17(2): 20-28 DOI: 10.5742/MEWFM.2019.93613

Abstract

Background: Adequate nutrition during infancy and early childhood is essential to ensure the growth, health, and development of children to their full potential. Malnutrition is globally the most important risk factor for illness and death, contributing to more than half of deaths in children worldwide. Orphanages are one alternative for the survival of children without parents able to care for them. Attention to them, support of their activities, and improvement of the living conditions there are all important. The orphan children are the most vulnerable section to malnutrition in our society. Causes of death of children placed in orphanages are largely preventable and thousands of children can be saved if their nutritional needs are catered for.

Objective: To assess the nutritional status in relation to clinical presentations, anthropometrical measurements and hemoglobin level and to determine the adequacy of food given in energy in orphan children under 5 years old at Mygoma orphanage in Sudan. Materials and Methods: This Cross-sectional, descriptive, institution based study includes 123 children living in Mygoma orphanage during the study time. The planning of the study included the development of questionnaires in order to determine nutritional status and food offered, then to perform anthropometric measurements and take a sample for hemoglobin level.

Results: Although the energy was adequate in 100% of the population according to the caloric requirement of each age group, underweight, < -2 SD was found in 30 children (24.4%). Severe underweight, -3 SD was found in 59 children (48%). When assessing height/length for age, Stunting (chronic malnutrition), <-2 SD was found in 25 orphans (20.3%), and severe stunting was found in 31 (25.2%). In regard to weight for height/length: Wasting (acute malnutrition) <-2 SD was found in 23 (18.70%), while severe wasting<-3 SD was found in 53 (43.10%). 41.5% of the children in Mygoma were symptomatic. Investigating hemoglobin level revealed that all children in the early neonatal period (<7 days) had below normal levels.

Conclusion: The incidence of malnutrition is high in Mygoma orphanage. Further studies are needed to determine the causes of malnutrition in this section of the community.

Key words: Nutritional assessment, Children, Orphanage home, Mygoma, Sudan

Introduction

In 2006 an estimated 9.5 million children died before their fifth birthday, and two thirds of these deaths occurred in the first year of life. Under nutrition is associated with at least 35% of child deaths. It is also a major disabler preventing children who survive from reaching their full potential development(1). The effects of poor nutrition continue throughout their life, contributing to poor school performance, reduced productivity, and impaired intellectual and social development. Nearly 20 million children under five suffer from severe acute malnutrition. Most of them live in South Asia and in sub-Saharan Africa(2).

According to the World Health Organization (WHO), (2000), 49% of 10 million deaths among children each year in the developing world, is associated with malnutrition states, and that malnutrition in all its forms, exacts a heavy toll among children, in addition to causing the deaths of more than seven million children a year(3). It also impairs the development of millions of other young children throughout the world and continues to be an obstacle to human rights, quality and the dignity of life. Promoting children's health and nutrition in orphanages is a priority and requires attention by all. Causes of death of children placed in orphanages are largely preventable and thousands of children can be saved if their nutritional needs are catered for. The family has the responsibility of nurturing and protecting children from infancy to adolescence and children should be introduced to cultural values and norms of society and grow up in an environment and atmosphere of happiness, love and understanding so as to ensure they fully feel safe and develop their personalities. In this light, parents and caregivers need the support of institutions and society(4,5).

Past problems related to being raised in orphanage, especially if one was placed there as a young infant, are fivefold and clearly defined by Frank, who wrote in a scholarly manner about the adverse aspects of orphanages. This special article explores a century of pediatric and child psychiatry research covering five areas of potential biologic and social risk to infants and young children in orphanage care: (1) infectious morbidity, (2) nutrition and growth, (3) cognitive development, (4) socio affective development, and (5) physical and sexual abuse(6).

This study was undertaken to assess the nutritional status in relation to clinical presentations, anthropometrical measurements and hemoglobin level and to determine the adequacy of food given in energy in orphan children under 5 years old at Mygoma orphanage in Sudan.

Materials and Methods

This is a cross-sectional, descriptive, institution based study done at Mygoma Home for Orphans. It is the only orphanage in Khartoum province which receives young age groups up to the age of 5 years. The data was collected over a period of two months from 17 April 2011 to 20 June 2011. Sample was collected from all children who were in the orphanage during the study period.

The planning of the study included the development of questionnaires in order to determine nutritional status and food offered, then to perform anthropometric measurements and take a sample for hemoglobin level. The current age at time of study was determined using the estimated age and date of admission recorded in the child's card. The weight on admission was also recorded from the child's card to compare it with the current weight measured by the author. Symptoms were revised from the nursing mothers and the doctor on duty. Examination for signs of protein energy malnutrition and micronutrient deficiency was done by the author.

Anthropometry: Recumbent length is measured using a length board for children from birth to 2 years. The measurements of length were done by the author with assistance of one of the staff members of Mygoma home. For children able to stand independently and cooperate, height was measured using a stadiometer, with a moveable headboard at a fixed 90° angle to the back of the stadiometer. Both length and height measurements were recorded to the nearest 0.1 cm.

Weight was determined using a digital balance scale for those less than 24 months. A pan version was used for those who could stand independently. Weights were recorded to the nearest 0.01 kg in infants and 0.1 kg in older children.

The World Health Organization (WHO) child growth indicators were used for this analysis(7). Indicators were based on the following anthropometry indices: height-for-age z-scores (HAZ), weight-for-age z-scores (WAZ), weight-for-height z-scores (WHZ)

The various aspects of malnutrition for children 0-59 months of age were reported following the internationally recognized definitions proposed by WHO/UNICEF(8,9).
The type of milk, quantity, and method of feeding were reviewed from the nursing mothers and nutritionists. For those taking additional food, a list offered from the nutritionist containing the type and quantity of food offered for a week for each age group and for special babies like those with cerebral palsy, was reviewed together with asking the nannies about the amount offered and consumed. Then the energy content of food offered through a 24 hours period was calculated using calories calculation tables and compared to the recommended daily dietary intake of the same age group(10,11). The energy content of each type of formula was also calculated knowing the composition of kilocalories per millimeter(12).

Blood samples were collected by the author with the help of a lab assistant from a peripheral vein and estimation of blood hemoglobin level was done by the Sysmex by the lab technician.

Results

The study included 123 children living in Mygoma during the study time. Sixty-one were males representing 49.6% of the total number and 62 were females representing 50.4% (Figure 1). Mygoma home consists of 12 rooms with good cleaning. The hygiene in the kitchen and sterilization and preparation of milk was good.

Figure 1: Children living in Mygoma Home for Orphans by gender distribution (N=123)

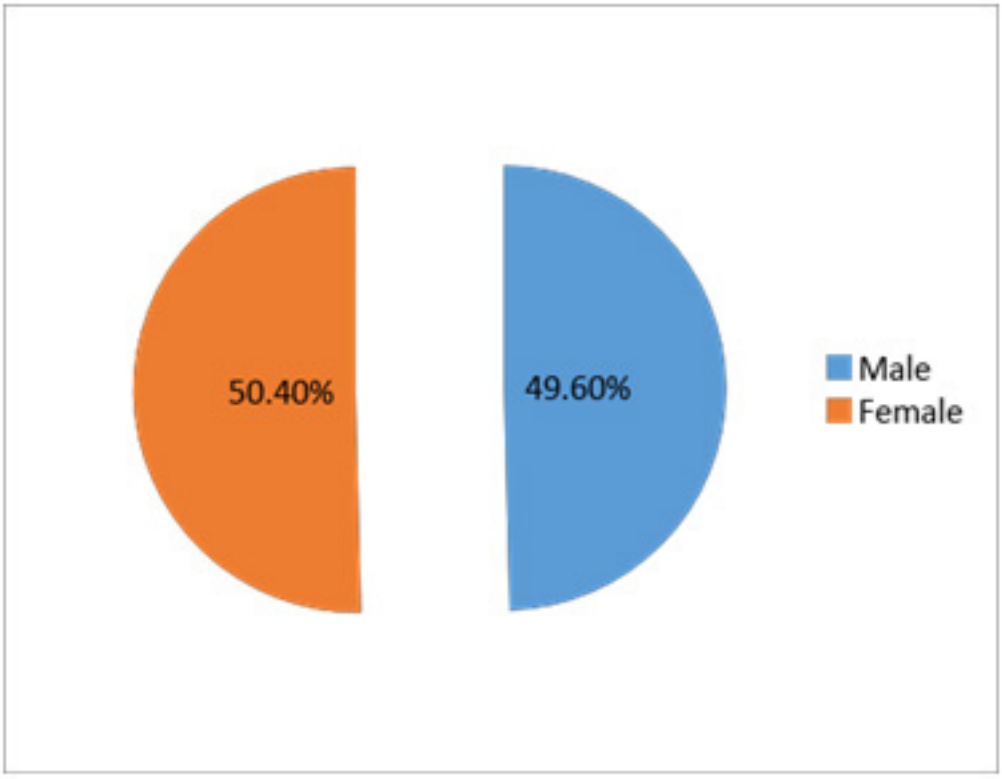


Figure 2: Children in Mygoma Home for Orphans by Age distribution (N=123)

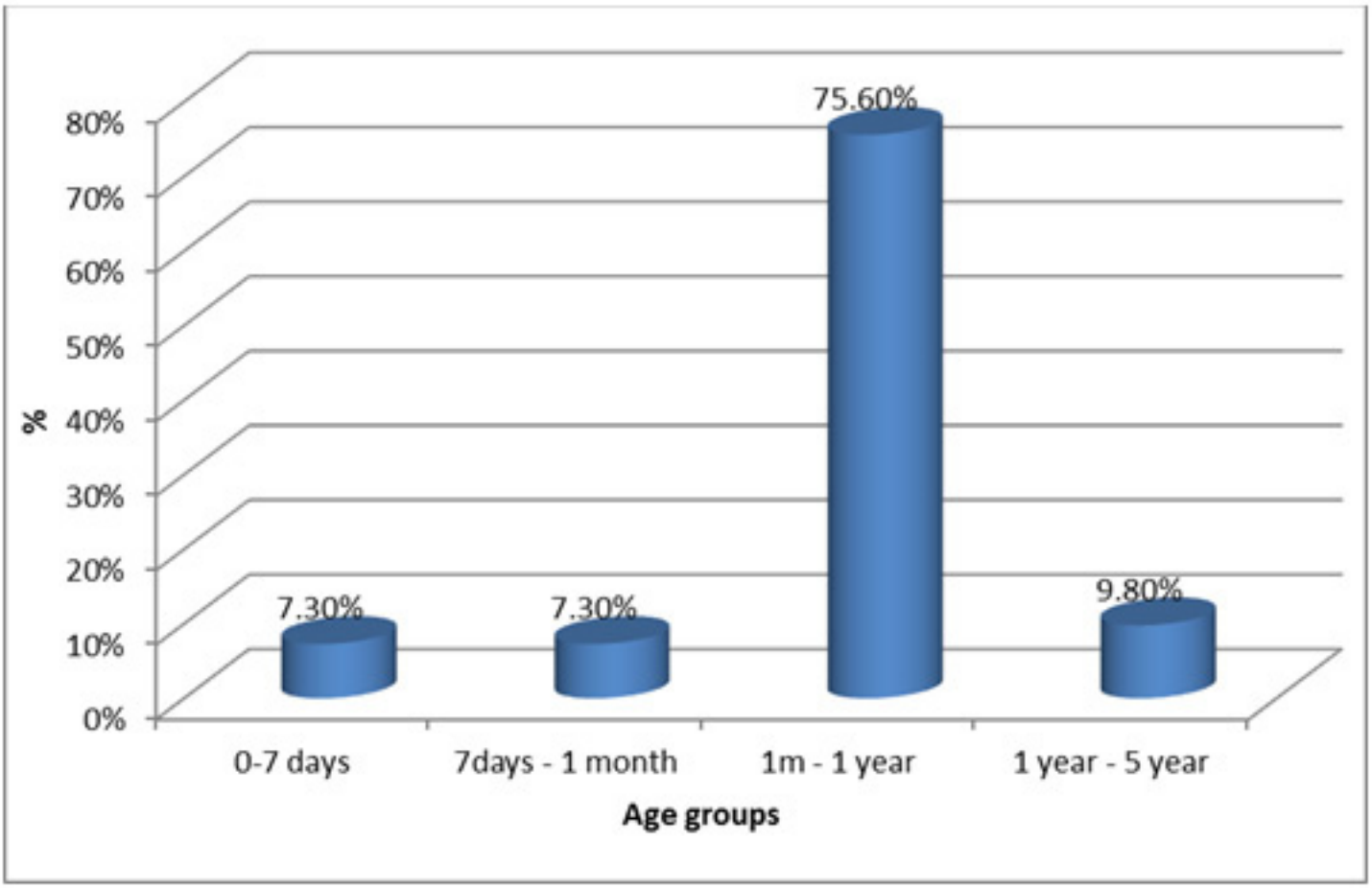
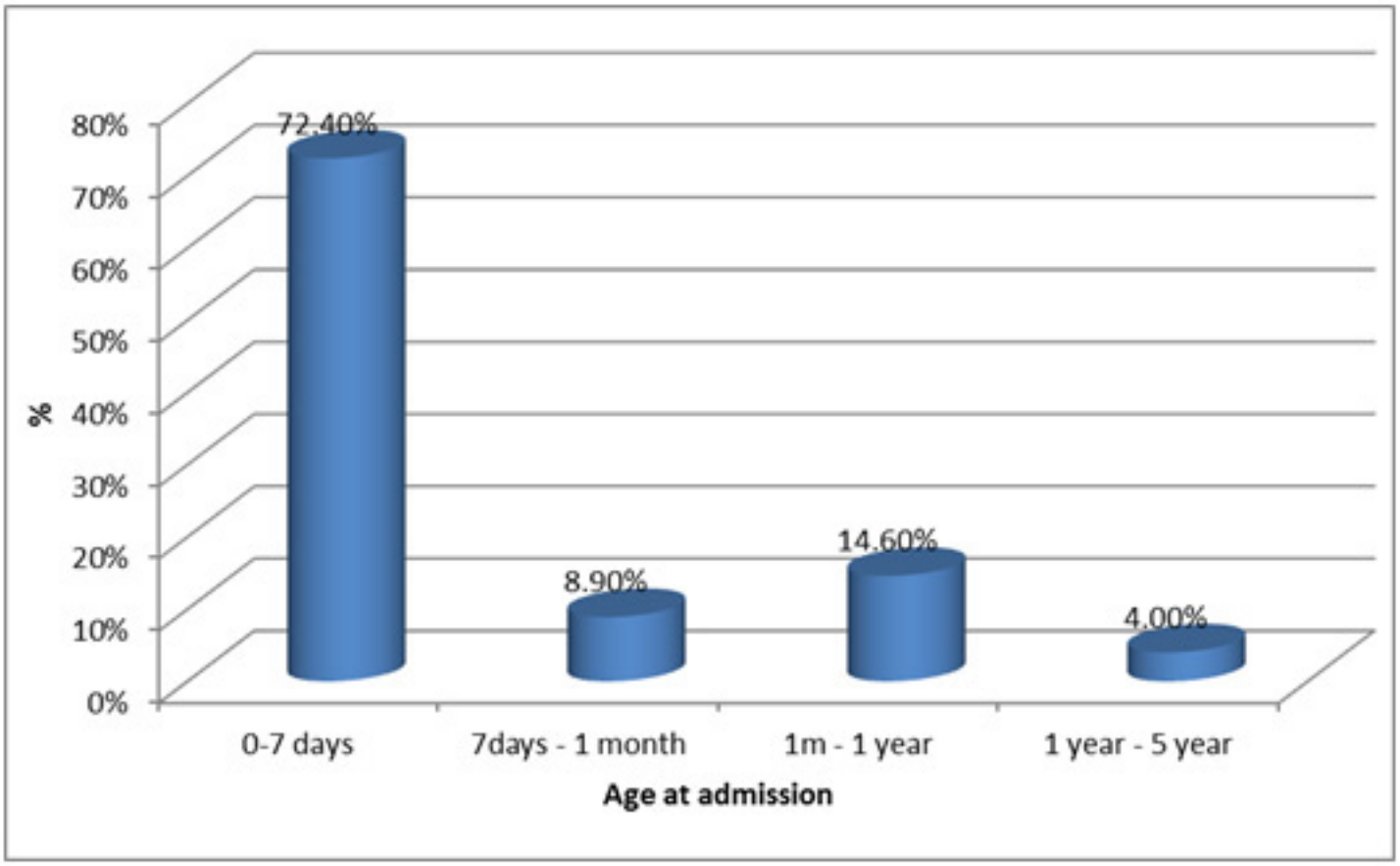


Figure 3 shows that children who were brought to the home during their first week of life accounted for 89 from the 123, representing 72.4 %; most of the children living in the home were infants, and they were 97 children, representing 75.6% of the total number.

Figure 3: Children's age in Mygoma Home for Orphans at admission (N=123)



According to definitions proposed by WHO/UNICEF, 28 (22.8%) of the study group was underweight (< -2 SD) at time of admission, and only 10 (8.1%) was severely underweight (<-3 SD). 10.4% of the study group was underweight and only 8.1% was severely underweight (Figure 4 - next page).

Stunting (chronic malnutrition), <-2 SD was found in 25 orphans (20.3%), and severe stunting was found in 31 (25.2%). Wasting (acute malnutrition) <-2 SD was found in 23 (18.70%), while severe wasting <-3 SD was found in 53 (43.10%). There is a significant association between weight for height and different age groups was $p < 0.05$.

In the present study, 24.4% were underweight and 48% were found to be severely underweight which indicates that underweight is more prevalent in the under-five age group in orphans. 50 children out of 123 (41.5%) were symptomatic during the study period. The symptoms included diarrhea and/or vomiting in 26 (21.10 %), cough and/or shortness of breath in 15(12.2%)., poor feeding or refusal of feeding in 10 (8.1%), fever in 8 (6.5%) and convulsions in 5 (4.1%). Other symptoms, which were jaundice, skin rash, eye infection, and abdominal distension accounted for 4 (3.2%) children (Figure 6).

On examination, 3 children (2.4%) had edema, 40 (32.5%) had wasting, 7 children (5.7%) had hair signs of malnutrition, 31 (25.20%) were pale, and 2 (1.60%) have signs of vitamin A deficiency. Angular stomatitis was found in 12 (9.8%), Smooth tongue in 1(0.80%), Glossitis in 1 (0.80%), and kolinychia found in 2.4%. Dysmorphic features were found in 4 of the children (3.2%). Those were as follows; one with microcephaly with squint, two with hydrocephalous and one with deformed skull and chest.

Distribution of signs of rickets was Wide anterior fontanel which was found in 3 children (2.40%), Frontal bossing in 2 (1.60%), Wide wrist joint in 1(0.80%), Rachitic rosary in 1 (0.80%), leg bowing in 1 (0.80%), and Harrison sulcus in 0 (0.00 %).

Oral thrush or herpetic stomatitis was found in 7 children (5.7%), while Lymphadenopathy was found in 6 (4.90%).

Figure 4: Comparison between wt/age on admission and wt/age on examination (N=123)

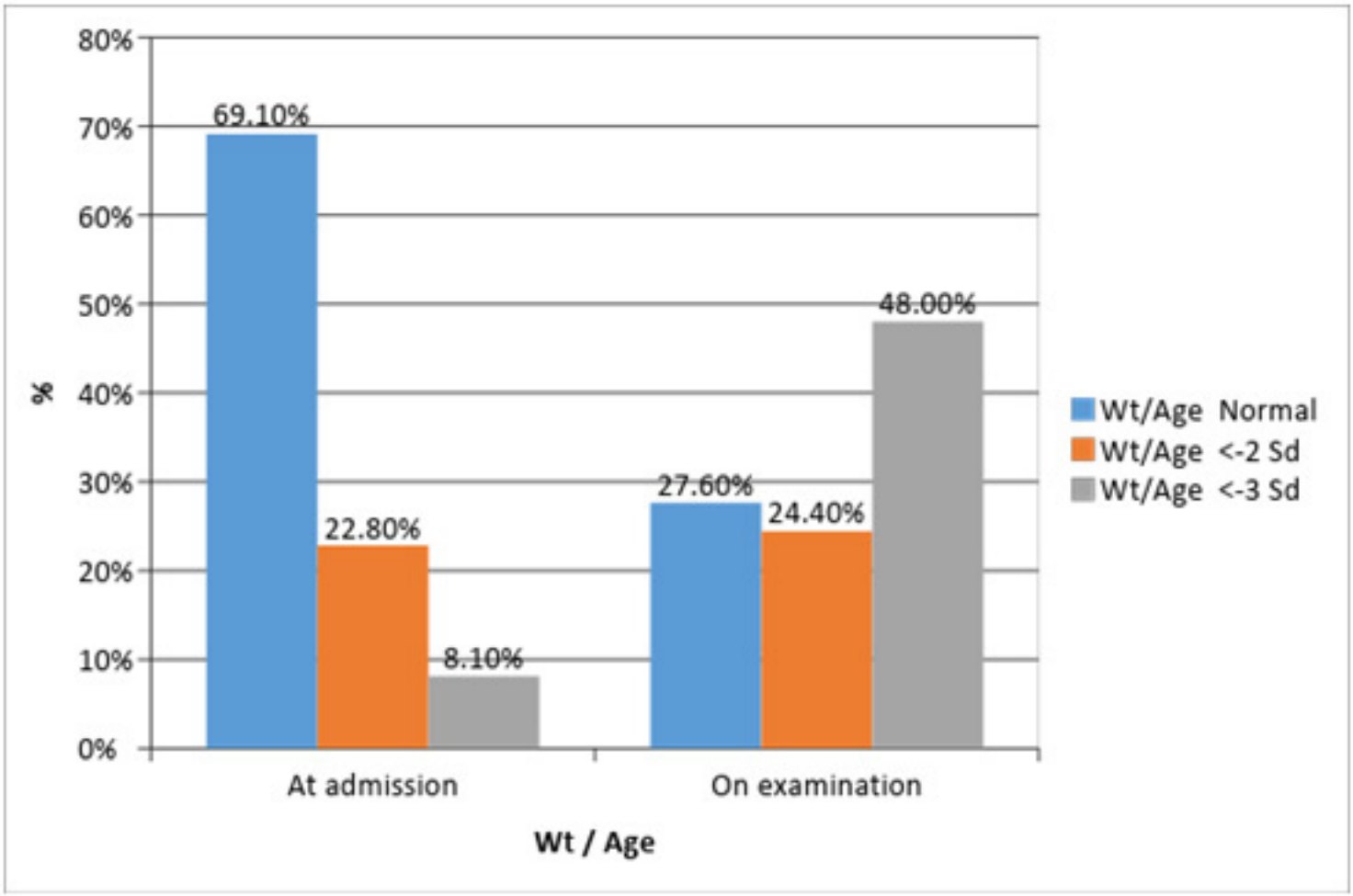


Figure 5: Association between wt/ht or length and age groups in Mygoma Home for Orphans

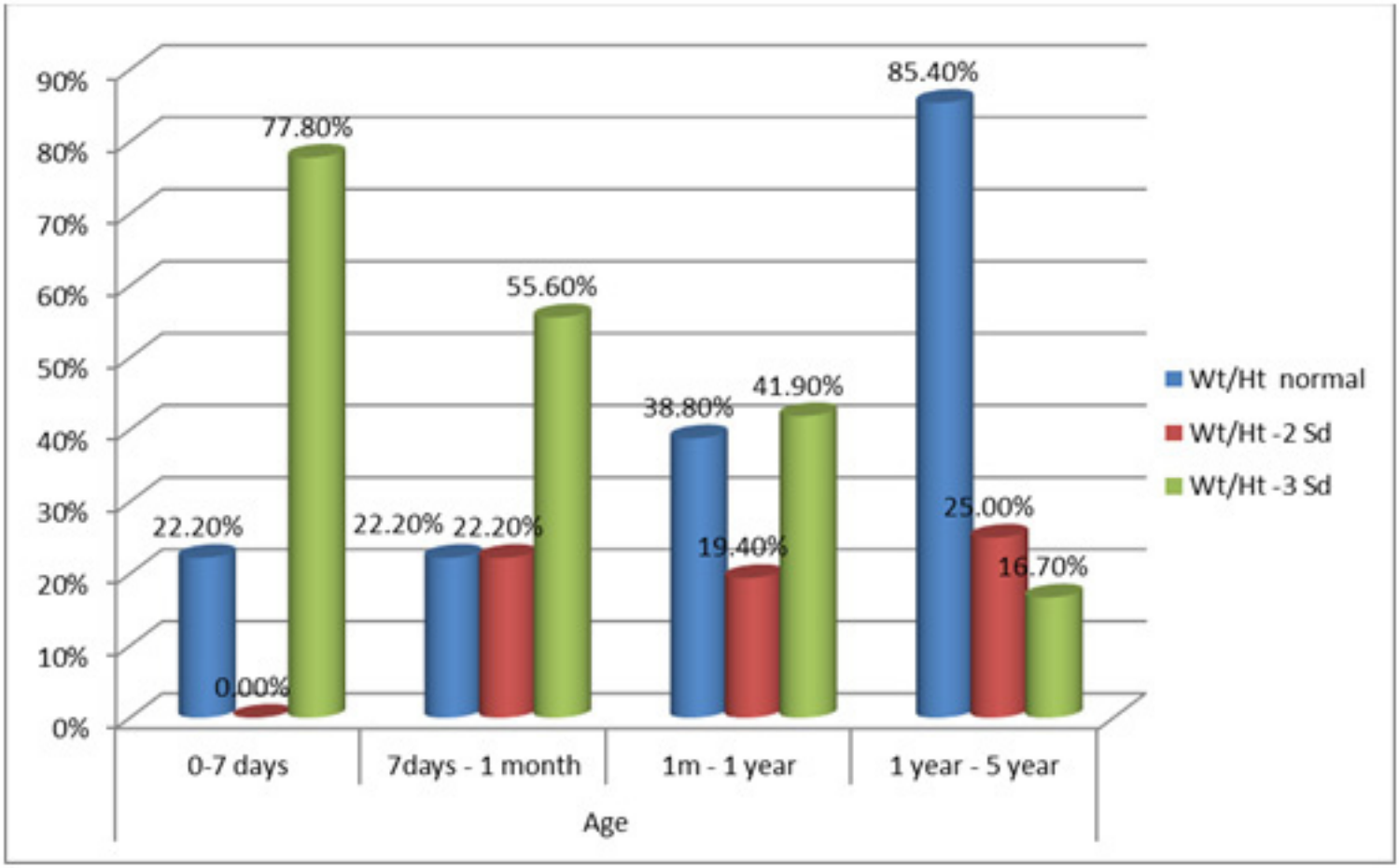


Figure 6: Symptoms during the study period in Mygoma Home for Orphans (N=50)

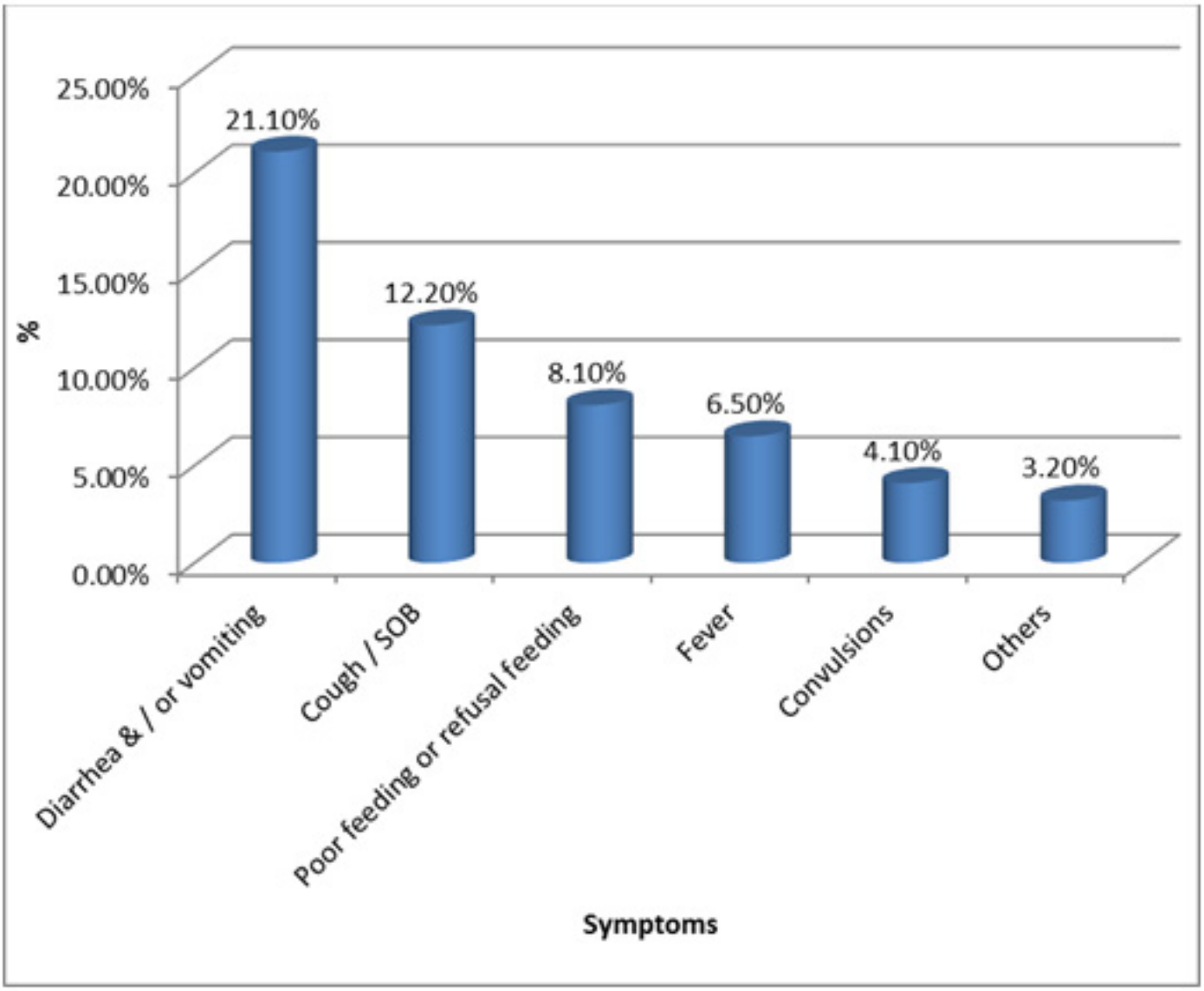


Table 1: Haemoglobin levels of Children in Mygoma Home for Orphans

Age groups	Hb level				Normal Range gm/dl
	Normal		Below normal		
	N	%	N	%	
1 - 7 days	0	0.00	9	100.00	14.8 - 22.0
>7days - 2 weeks	1	16.7	5	83.3	13.8 - 19.8
>2 weeks-month	3	60.00	2	40.00	11 - 14.3
> 1 - 4 months	34	48.60	36	51.40	09.5 - 14.5
>4 months-5yrs	21	63.60	12	36.40	10.5 - 14.0

Regarding investigating of hemoglobin level revealed that all children in the early neonatal period (<7 days) had below normal levels (<14.8 g/dl). For those more than one week to two weeks only one (16.7%) had normal level (13.8-19.8 g/dl) and the other five 83.3% had below normal levels. (< 13.8 g/dl). For those more than 2 weeks to one month 3 (60%) had below normal (<11 g/dl) levels and 2 (40%) had normal levels (11-14.3g/ dl). In the age group from more than one month to 4 months 34 (48.60%) had normal levels (9.5-14.5 g/dl) while 36 (51.40%) had below normal levels for the same age (<9.5 g/dl). For the oldest age groups from more than 4 months to five years 21 children had normal levels (10.5-14.5 g/dl) representing 63.60% of the total number in this age group, while 12 (36.40%) children had below normal levels(<10.5g/dl) (Table 1).

Discussion

There are twelve nutritionists, and 16 nutritional assistants in the Mygoma home. The calculations of milk given to children and the supplementing food were adequate in energy. The dieticians prepare a weekly menu for each age group separately including the meals and snacks offered. Also there was a menu for those with especial needs like those with cerebral palsy; a special semi-fluid food is prepared for them because of swallowing problems. When calculating the total calories of food and milk offered to each child during a 24 hours period, the energy was adequate in 100% of the population according to the caloric requirement of each age group(10-12).

The food offered was adequate but the amount consumed by the children was difficult to be assessed because the nursing mothers are not consistent in giving details about the amount consumed throughout a day.

The number of children admitted to the home is increasing; average admission of ten per week, and the staff is deficient, especially the nannies. There is no especial mother for each child; they work in shifts so that they may be in a different room in the second day according to the need.

The babies are fed very quickly and put in their beds because the nursing mothers are in a hurry to feed many babies for a short duration. When comparing the current situation of the Home with the study done by Dr.Niemat Elshafie in 1997(13) the situation of the cleaning and general hygiene of the home seems to have improved currently, but the nursing mothers are still deficient.

Most of the children were brought to the home during their first week of life. This is thought to be the result of a high rate of death during the neonatal period. If they survive it, their chance to live improves. This is to a great extent in agreement with the study done in 1997 were 77% died during the early neonatal period and 19% died during the late neonatal period(13).

The current weight for age assessed during the study revealed that Underweight, < -2 SD (mixed acute and chronic malnutrition) was found in 30 children and Severe underweight, -3 SD was found in 59 children (48%). In comparison, a significant difference was found, this reflects the deterioration of the nutritional status of children after admission to the orphanage. Again this result goes with the former study which states that after admission to Mygoma home the majority of children (54.3%) lost weight(13); this is also in agreement with growth assessment in an orphanage in Romania, which concluded that growth in institutionalized children was compromised, particularly in infants weighing less than 2500 g at birth(14).

Frank and Klass,(6) indicated, that growth failure observed in institutionalized children, did not necessarily reflect an insufficient quantity and quality of available food, but rather too few caregivers to ensure that the available food was fed to those too young to feed themselves, a lack of tactical stimulation and care during the planning of meals for infants, children and adolescents(6).

This is also in agreement with a study that states that poor feeding practices may contribute to high risk of malnutrition in Khartoum(15).

Another study done also in Ghana in two orphanages(16) found that underweight represented 17.1% in one and 34.6% in the other. Stunting was 17.1% in the first and 15.4% in the second, and wasting was found in 2.9% in the first and 11.5% in the other. The results in both orphanages are better than in Mygoma home.

So malnutrition seems to be a significant problem in orphanages worldwide but to a greater extent in developing countries.

A study done in SOS village in Khartoum that receives the oldest age groups of orphans revealed that about half the children [n = 55, (44%)] were under weight(17) compared to 24.4% who were underweight and 48% who were found to be severely underweight in our study, indicates that underweight is more prevalent in the under-five age groups in orphans.

Previous study done in Mygoma showed that infants had poor feeding, more than the current study, while diarrhea and vomiting collectively was found to be approximately the same(13).

The arrangement of symptoms depending on the more prevalent ones is in agreement with the current situation in Mygoma (poor feeding, diarrhea, vomiting, fever, shortness of breath, and lastly convulsions).

In a study done in Ghana in two orphanages, the distribution of symptoms showed that they have more fever, skin Infection, and fewer diarrhea cases and/or vomiting than children in Mygoma(16).

In the study done in Dakka city(18) 58.3% children were malnourished, 49% were anemic, 1.9% orphans had goiter, 91.3% were suffering from respiratory tract infection, 3.9% had xeropthalmia, 18.4% were suffering from angular stomatitis, 29.1% had cheliosis, 58.3% had glossitis, 1.9% were kwashiorkor, and 1% were marasmic, and only 9.5% had signs of other deficiency diseases. This indicates that signs of vitamin B and Iodine deficiency are less in Mygoma home.

Symptoms suggestive of HIV were less than expected. Similarly, HIV was tested for in all the children living in Mygoma home and SOS children's village and was negative(13,17,19).

The highest percentages of low hemoglobin (100%) were found in the early neonatal period which is the same percentage that resulted 14 years ago in the same home(13). The result seems to improve in older age

groups in our study (36.4% have below normal levels), but in the ages more than 5 years in SOS village three quarters had anemia(17).

Outside Sudan, anemia is also a significant finding in orphanages. In Dakka, it was found that 92.2% had below normal level of hemoglobin for age(18).

Conclusion

Mygoma home, the only orphanage in Khartoum, was found to be very crowded, and understaffed. This situation has not improved since 1997(13). Although the amount of food offered is well planned and calculated by nutritionists, the prevalence of malnutrition is high. The causes of malnutrition might be attributed to maternal deprivation, and psychosocial instability(20,21). In addition illness like diarrheal diseases and respiratory tract infections play a major role in such a crowded environment. There are many children with special needs, like CP and hydrocephalous where their health condition can be a cause for malnutrition. The commonest signs of micronutrient deficiencies where those suggesting vitamin B and iron deficiency. Hemoglobin was below normal especially for those in their early neonatal period.

Recommendations

• According to this study action should be taken to improve the nutritional status and the overall health conditions of the children in Mygoma home.

• A training program has to be conducted for the nursing mothers, their numbers should be increased and they must be closely supervised and evaluated.

• They should be encouraged by giving incentives to the nannies that perform their jobs perfectly to motivate the others, and create a competition for the benefit of the children. This needs financial support; both the government and the community should participate in this.

• The staff have to be consistent, a program has to be established so that the child is attached to one, or maximally two caregivers.

• The nutritionists have to put in more effort in observation of feeding especially for the neonates and infants. Follow up should be in place for each individual child to estimate the amount consumed.

• More medical staff are needed for close observation and early management.

• Adoption has to be encouraged. The public media and mosques can play a big role in this.

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