

Audit of care of severely malnourished children aged 6 - 59 months at Al-Sabah Children Hospital, Juba, South Sudan

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BACKGROUND: Malnutrition is a critical public health concern in South Sudan where an estimated 200,000 children aged under five years are at risk of being malnourished. Studies have shown that adequate and timely treatment of these children leads to reduced mortality.

OBJECTIVE: To determine the proportion of children aged 6 – 59 months diagnosed with severe acute malnutrition (SAM) who were appropriately managed according to World Health Organization (WHO) guidelines.

METHODS: A short hospital-based prospective longitudinal survey of children admitted with a diagnosis of SAM to Al Sabah hospital, Juba. One hundred children were enrolled.

RESULTS: Overall, 49% of children had marasmus and tended to be older than those who had kwashiorkor. Common comorbidities at admission were malaria (42%) and gastroenteritis (39%). Of the eight steps of care evaluated, five steps were correctly followed in more than 70% of cases. The proportion of children appropriately managed were 77% in step 1, 59% in step 2, 85.4% in step 3, 98% in step 4, 58% in step 5, 6. 97% in step 7 and 86% in step 8.

CONCLUSION: Adherence to the WHO guidelines for treating SAM in this center was moderate.

Key words: Malnutrition, severe acute malnutrition, audit

Introduction

Severe acute malnutrition (SAM) is the most important risk factor for illness and death among young children being responsible for about half of all their deaths [1].

In the developing countries, 50.6 million children under the age of 5 years are malnourished [2]. One in seven South Sudanese children die before their fifth birthday, mainly from preventable diseases such as diarrhoea and malaria. The burden of disease attributable to malnutrition is also substantial with the malnutrition rate exceeding the World Health Organization (WHO) emergency threshold of fifteen percent [3].

According to the South Sudan Household survey 2010, 31% of South Sudanese children aged under five years are stunted, 23% are wasted and 28% are underweight with wide variations across the states [3]. South Sudan ranks 15th highest in the world in terms of mortality rates for children aged under five years [4].

WHO has developed guidelines which includes 10 steps for the stabilization and rehabilitation of children with SAM [5]. Studies have shown that implementing these WHO evidence-based guidelines can reduce mortality rates to less than 5%, and they have contributed

substantially towards the Millennium Development Goal of reducing the under-five mortality [6,7].

Methodology

The study is a short prospective longitudinal survey that audited the implementation of the WHO guidelines on the management of SAM in children aged 6-59 months during the study period of two months (4th February to 4th April 2015). Children with chronic medical conditions such as cardiac, renal diseases, and cancer that predispose them to malnutrition and patients whom the principal investigator participated actively in their emergency treatment were excluded.

The WHO formula were used to calculate the sample size [8] giving a minimum number of subjects of 96. Consecutive enrolment of the patients who satisfied the study criteria and for whom parents/guardians gave written consent, was done until the desired sample size was achieved.

The collected data were entered using Microsoft Access and analyzed using IBM Statistics® V20. Confidentiality was observed, names did not appear on collected data. Data were checked for wrong entry, double-entered and corrected. Back up was created in an external hard disk,

Table 1. Demographic characteristics of 100 children admitted with SAM

Variable	Frequency
Age, months:	
Below 24 months	82
24 months and above check	18
Gender:	
Male	59
Female	41
Type malnutrition:	
Marasmus	49
Kwashiorkor	36
Marasmic-kwashiorkor	15
	Mean (SD)
Age, months:	
All children	17.0 (± 10.9)
Children with marasmus	25.0 (± 13.7)
Children with kwashiorkor	16.0 (± 10.6)
Children with marasmic -kwashiorkor	20.0 (± 7.0)

only coded data were used to ensure confidentiality. Descriptive data were presented as frequency tables, bar graphs, pie charts and cross tabulation. An outcome was considered significant if the p value was equal or less than 0.05.

Ethical considerations

Approval to carry out the study was given by Kenyatta National Hospital Ethics Review and Research committee and the Directorate of Research and Planning, Ministry of Health, Republic of South Sudan. A written consent was obtained from parent/ guardian for any child to be enrolled into the study.

Results

A total of 102 children with an admission diagnosis of SAM were recruited. Two were excluded: one died within 24 hours of admission and for one the principal investigator actively participated in his emergency treatment.

Out of the 100 remaining children 59 were boys and 41 were girls with a male to female ratio of 1.4:1. Table 1 shows their demographic characteristics. Common co-morbidities at admission were malaria (42%) and gastroenteritis (39%).

The most common co-morbid conditions at admission were malaria and gastroenteritis. Many children presented with more than one co-morbidity, including anaemia and pneumonia. At the out-patient department 64% of children were triaged as priority cases and 19% as emergency cases. Overall 83% of children were appropriately triaged.

Table 2. Management of dehydration in the ward

Management of dehydration n=67

Variable	N (%)
IVFs given wrongly	2 (2.9%)
ReSoMal given (Rehydration solution for Malnutrition)	55 (82%)
Correct volume of ReSoMal given	47 (70%)
Number correctly managed for dehydration. (ReSoMal 10mls/kg)	47 (70%)

Comparing the procedures carried out on the 8 steps on the 100 selected children with those in the WHO guidelines the following results were obtained.

Step 1: Treatment or prevention of hypoglycaemia in the wards

Twenty-seven children had a random blood sugar done. Four had random blood sugars of less than 3 mmol/l and all were given 10% dextrose correctly. Immediate feeding was routinely given with 83 children fed within 30 minutes of arrival in the ward. Therefore, 83% of children were appropriately managed for step 1 according to WHO guidelines (95% CI 76-90).

Step 2: Treat / prevent hypothermia in the wards

Only 54% of children had their temperature taken, of these 41% had a fever and so were not provided with extra warmth. The remaining 59% of children were kept warm as recommended by WHO (95% CI 71%-87%).

Step 3: Treat and prevent dehydration in the wards

The management of dehydration is shown in Table 2. Of the 10 children diagnosed with shock all were given the correct type and volume of intravenous fluids (IVF) and so treated correctly.

Step 4: Correct electrolyte imbalance

All 100 children were fed ready-to use-formula F75 that contains extra potassium and magnesium, and so followed the WHO guideline

Step 5: Treat infections routinely

Ninety-two children were managed with broad spectrum antibiotics but only 58 had correct doses as per WHO guidelines.

Step 6: Correct micronutrient deficiencies

Of the 100 children, 62 (62%) received a high dose of vitamin A on day one, and 58% of them were given the correct dose. Overall 58% of children were appropriately managed for step 6. (95% CI 48.33-67.67)

Step 7: Start feeding cautiously

Table 3. Proportion of children managed according to 8 steps of the WHO guidelines for treating Severe Acute Malnutrition

Step	Percent
Step 1: Treat and prevent hypoglycaemia	83%
Step 2: Treat and prevent hypothermia	59%
Step 3: Treat and prevent dehydration	70%
Step 4: Correct electrolyte imbalance	100%
Step 5: Treat infections routinely	58%
Step 6: Correct micronutrient deficiencies	58%
Step 7: Feed cautiously	97.9%
Step 8: Catch up feeds	97%

Ninety nine children (99) were initially fed F75 (as recommended by WHO). Of these: 97 were fed the correct volume in the initial phase; 88 were fed within 30 minutes of admission; 84 has the route of feeding specified and 94 had their food intake monitored.

Step 8: Rehabilitation / catch up feeds

Nine of the 100 patients died within the first 7 days of admission, and case fatality rate was therefore 9%. Of the 91 patients who were alive on day 7 after admission, 88 were prescribed F100 and 86 were given the correct volume, so 97% were appropriately managed according to the WHO guidelines (95% CI 93.66%-100.34%). Two patients absconded before day 7 after admission, and were therefore lost to follow-up. Table 3 shows the proportion of patients appropriately managed in 8 of the steps of the WHO guidelines.

Discussion

This study compared current practices of care of children with SAM in the malnutrition wards at Al-Sabah Children's Hospital with the WHO guidelines [5].

Prompt diagnosis, treatment and prevention of hypoglycaemia was inadequately done at with 83% who were treated appropriately. Eighty two percent of children were fed within one hour of admission. A higher percentage of patients were appropriately triaged at OPD.

Children with severe malnutrition are susceptible to hypothermia. During this study, temperatures were not routinely taken in critically ill children

Because of the difficulty in diagnosing dehydration and its severity in malnourished children, rehydration fluids should only be given intravenously if children are in shock [5]. Severely malnourished children not in shock should be rehydrated orally using ReSoMal which has low

sodium and high potassium levels [5]. These guidelines were not adequately followed and a number of children not documented to be in shock were prescribed IV fluids both in OPD and the ward. Choice of IV fluids for shock was unsatisfactory in OPD compared to the wards with 11.2% of children being resuscitated with normal saline. Although we do not have evidence for this, it is likely that the use of the wrong rehydration fluids could be explained by differences in knowledge and skills of health workers.

Children with SAM should be given small frequent feeds of a starter formula and continue breastfeeding where applicable. In this study 99% of children were fed with ready-to-use starter formula (F75) and those breastfeeding continued to do so. Constant availability of the RUTF and well-trained professionals to guide their use may explain the success in this case. F75 was always available in the ward unlike in South Africa [6]. Monitoring and computing daily feeds was done for 94% of children unlike Nzioka finding at Kenyatta National Hospital (Kenya) where monitoring of feeds were rarely done [9]. Studies done in other places have shown that activities that require frequent physician and nursing staff bedside presence are often poorly done [10]. Constant availability of the RUTF and well-trained nutritionists to guide their use may explain the success in this case.

In our study most of the children were accompanied by caregivers who were responsible for feeding their children; charting and supervision was done by the nurses and the nutritionists. For the duration of the study, most of the caregivers learnt how to feed their children competently. However, a few were sharing their ward diet with the children. Although the caregivers' diet was not designed for treating malnutrition, we infer that there is a great potential for caregivers to contribute to care of children in view of the shortage of nursing staff, especially if the caregivers are properly counselled and supervised.

The study was not designed to assess staff's knowledge of the WHO guidelines. Study exclusion criteria biased the study towards survivors.

Conclusion

Overall, severe malnutrition was moderately managed at Al Sabah Children's hospital with patients being managed appropriately in more than 50% of cases, poor management was noted in steps concerned with clinician prescription. Major shortfalls in care include delayed seeking of medical care, treatment of hypoglycaemia and hypothermia, and inadequate and basic nursing care such as monitoring of fluids and vital signs. Supply of major commodities was good most of the time.

Shortage of nurses, Doctors and nutritionists and low morale noted in this study compromised quality of care. Availability of adequate skilled, motivated, well trained staff is vital determinant of successful implementation.

There is need to assess the knowledge of the staff of the guidelines and carry out training according to the gaps identified; infrastructural improvement for the malnutrition rooms and improving staffing levels are key to proper implementation of the WHO guidelines and therefore improve quality of care. A follow up study will be needed to find out the level of implementation of WHO guidelines after training.

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