

Adherence of Healthcare Professionals to Guidelines on Inpatient Management of Children with Severe Acute Malnutrition at the Upper East Regional Hospital in Ghana

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Authors' contributions

This work was carried out in collaboration among all authors. Author FKW conceived, designed, analyzed and interpreted the data under the supervision of authors MWK and HNKA. Authors FKW and ROP drafted the manuscript and managed the references. Authors MWK and HNKA reviewed the content of the manuscript. All authors read and approved the final manuscript.

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Short Research Article

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ABSTRACT

Aim: To assess the adherence of health professionals to guidelines on inpatient management of children aged 6-59 months admitted with severe acute malnutrition (SAM)

Study Design: Retrospective descriptive study

Place and Duration of Study: Paediatric Unit of the Upper East Regional Hospital, Ghana. Records of children seen from 1st January, 2016 to 30th April, 2018 were reviewed.

Methodology: Hospital records of 75 children discharged after treatment for SAM were assessed in the study. The records were selected using convenient sampling. Data analysis was done with SPSS version 20 and results presented using descriptive statistics.

Results: Eighty-eight percent (88%) of the patients were treated for presumed infections. Of this, only 8% of the children received the recommended Ampicillin and Gentamycin therapy. Over 97%

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of patients were given therapeutic diets (F-75), and 90.7% of patients were assessed for dehydration. However, only one (1.3%) of the children had their blood glucose levels checked on admission. None 0(0%) of the children were given 10% IV glucose to prevent hypoglycaemia on admission and only 21.2% of patients with dehydration received the recommended ReSoMal

Conclusion: There is inadequate adherence to the recommended guidelines for inpatient management of children with SAM. This requires exploring explanations to inform strategies that promote compliance.

Keywords: Severe acute malnutrition; children; inpatients; guidelines; adherence.

1. INTRODUCTION

Severe acute malnutrition (SAM) in children aged 6-59 months is described as mid-upper arm circumference less than 115mm, or weight for length or height Z-score of < -3 , or bilateral oedema [1]. Thus, children with severe acute malnutrition may present with a very low weight for height, obvious severe wasting, or presence of nutritional edema [2]. It is estimated that about 13 to 21 million children under five years suffer SAM, and over 4 million are from Africa [3]. SAM contributes to 1.7 million child deaths per year in sub-Saharan Africa [4]. SAM remains a serious health challenge in Ghana, especially in the three Northern Regions. In Ghana, 6.2% of children under five years suffer from SAM in the form of wasting; the three northern regions having 8.2% of its children under five years affected [5].

The World Health Organization (WHO) guidelines for managing SAM in the inpatient setting aims at improving the recovery of children and reducing the impact of SAM [6]. Care in the inpatient setting focuses primarily on stabilization of the child with SAM. In the stabilization phase, the goals of care are to manage hypoglycemia, hypothermia, dehydration, infections and electrolyte abnormalities. All children with SAM should be assumed to have hypoglycemia, unless a blood glucose test shows otherwise, and managed with 50mls of 10% dextrose given orally or via NG-tube, or F-75 therapeutic milk if quickly available and continued 2hrly 24 to 48hours [7]. Hypothermia must be confirmed by rectal temperature check and managed by regular feeding and re-warming of the child as well as administration of appropriate antibiotics [7]. All children with SAM who present with watery diarrhea or reduced urine output must be assumed to have a degree of dehydration and managed on ReSoMal rehydration fluid orally or via NG-tube [7]. All children with SAM present with potassium and magnesium deficiencies and must be managed with supplementary potassium and magnesium added to their diet [7]. The

guideline further states that, all children with SAM must be assumed to have an infection and managed on a broad-spectrum antibiotic such as amoxicillin [1].

Several studies have demonstrated that adherence to the guidelines has a positive effect on mortality and recovery rate of children with SAM [7–9]. Briend & Collins (2010) demonstrated that with adequate utilization of the guidelines, mortality associated with SAM should not surpass 10% in practice [10]. Although the Ministry of Health in Ghana and its agencies have adopted the WHO guidelines for the management of SAM, Asafo-Agyei et al. (2013) report that mortality among hospitalized children with SAM exceeds 10% [11]. This high SAM-related mortality suggests that children may not be receiving optimal inpatient care. However, there is paucity of literature on health care professionals' adherence to the WHO guidelines for the management of children with SAM in hospitals in Ghana. This study therefore assesses adherence of healthcare professionals to the first six steps or stabilization phase of the management of children aged 6-59 months with SAM recommended by the WHO.

2. METHODOLOGY

2.1 Design

A retrospective descriptive design was employed in reviewing hospital records of children aged 6 – 59 months who were admitted and treated for SAM at the Upper East Regional Hospital. Selection of patients records for the study was by convenient sampling. The use of a retrospective approach enabled the collection of a large amount of required data over a brief period of time, to help understand the phenomenon under study over time [12]. Secondly, this study was undertaken as part of an academic exercise with limited time available; a retrospective approach was therefore most suitable to study adherence of healthcare professionals to SAM management guidelines.

2.2 Setting and Population

The study was conducted in the Upper East Regional Hospital in Ghana, a referral hospital for six district hospitals and serves an estimated population of 1.1million. It is 220-bed capacity hospital with 33 of its beds in the Paediatric ward. The Hospital's 2017 annual report showed an average yearly admission of 3,296 children aged 0 to 13 years to the Paediatric ward, and SAM accounted for 0.9% (30 children). The study population comprised of all children aged 6-59 months admitted with SAM to the Upper East Regional Hospital between 1st January, 2016 to 30th April, 2018.

2.3 Sampling and Sample Size

All available folders of children admitted with SAM in the facility between 1st January, 2016 to 30th April, 2018 were reviewed and those aged 6-59months were included in the study. Records of 75 children were enrolled in the study. The flow chart in Fig. 1 below illustrates the steps in sorting the folders and selecting those that were included in the study.

2.4 Data Collection

A checklist developed from the WHO guidelines was used to collect data from 75 selected records which were included in the study. A pilot review with the checklist was done in order to obtain its suitability. The first section of the checklist collected demographic and anthropometric data of participants, and the second section on the assessment, prevention and treatment of SAM related health problems: hypoglycemia, hypothermia, dehydration, infection, electrolytes, micronutrients and initial re-feeding.

2.5 Analysis of Data

This was a retrospective descriptive study. Demographic data, information on assessment, prevention and treatment of SAM related health problems were collected from patients' folders. Data was examined for completeness and statistical analysis performed using SPSS version 20. Data has been described using frequencies and presented in tables. Random data checks were performed to ensure validity.

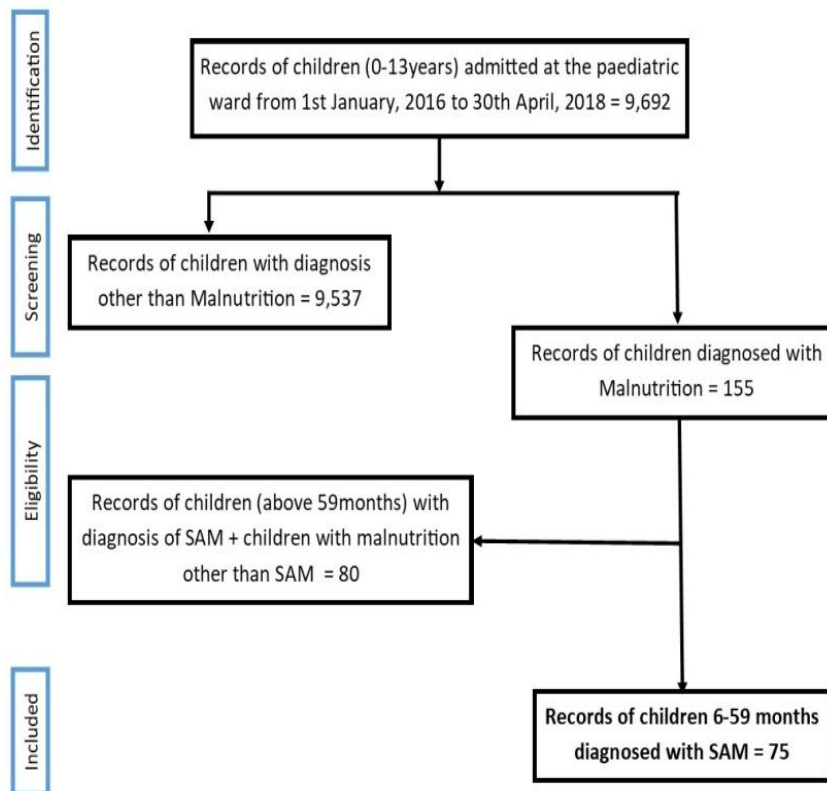


Fig. 1. Flow diagram of records searched and the selection process

3. RESULTS

3.1 Demographics and Anthropometric Data

Records of 75 children aged 6-59 months with a diagnosis of SAM were included in the study with 41 (54.7%) being females, and 57 (76%) aged 6-23 months. The mean age of the study sample was 19.2 months. Of the 75 children, documentation in their folders indicated that, at the time of admission the weight of all (100%) and the mid-upper arm circumference (MUAC) of 96% of them was measured, whereas only 5.3% had their weight-for-height/length ratio checked by clinicians. Details of these demographic and anthropometric measurements is illustrated in Table 1 below:

Table 1. Demographic characteristics of studied children (n = 75)

Demographic	Number (%)
Age in months	
6-9	17 (22.7)
>9-24	32 (42.7)
>24-59	26 (34.6)
Sex	
Female	41 (54.7)
Male	34 (45.3)
Measurement	
Weight	75 (100.0)
MUAC	72 (96.0)
Weight-for-height/length	4 (5.3)

3.2 Adherence to SAM guidelines

The WHO guidelines on SAM recommend careful clinical assessment of health problems of children with SAM. This is to ensure early

prevention or treatment of health issues common to children with SAM, such as hypoglycaemia, hypothermia, dehydration, electrolytes imbalance, infections and micronutrient deficiencies [1].

3.2.1 Assessment of SAM related health problems

The first activity in the management of SAM is to assess the sick child for health problems that commonly result in SAM related complications and death. There was general mixed level of assessment of the health problems of the children. Whereas 75 (100%) of the children's temperatures were checked on admission, the blood glucose level of only 1(1.3%) child was checked. Table 2 shows details of the SAM related health problems that were assessed.

3.2.2 Prevention of SAM related health problems

In order to prevent developing complications, the WHO recommends that children with SAM must be given 10% glucose solution immediately on admission, supplemental potassium, antibiotics for presumed bacterial infections and vitamin A supplements, in addition to undergoing an HIV test on admission [1]. Table 3 illustrates that, following a review of folders of all 75 children admitted with SAM over the period of the study, none of the children were given the recommended Vitamin A supplementation nor the 10% glucose solution. However, 66 (88%) of these children received antibiotics for presumed bacterial infection, though only 8% of these 66 children were administered the recommended antibiotic combination of ampicillin and gentamicin, as illustrated in Table 4 below.

Table 2. Assessment of SAM related health problems

Recommended Guideline Activity	Yes (%)	No (%)
Blood glucose level measured on admission	1 (1.3)	74 (98.7)
Child temperature check on admission	75 (100.0)	0 (0.0)
Assessment for dehydration	68 (90.7)	7 (9.3)
Checking of electrolytes	2 (3.0)	73 (97.0)
Child assessed for vitamin A deficiency on admission	1 (1.3)	74 (98.7)

Table 3. Prevention of SAM related health problems

Recommended Guideline Activity	Yes (%)	No (%)
Child given 10% glucose or sucrose solution immediately on admission	0 (0.0)	75 (100.0)
Extra potassium	2 (3.0)	73(97.0)
Antibiotics given for presumed bacterial infection	66 (88.0)	9 (12.0)
HIV testing done on admission	41 (54.7)	34 (45.3)
Vitamin A given to patient on admission	0 (0.0)	75 (100.0)

Table 4. Antibiotic used in treatment of presumed bacterial infection

Recommended Guideline Activity	Yes (%)	No (%)
Combination of ampicillin and gentamycin	5 (8.0)	61 (92.0)
Ceftriaxone, cefuroxime, metronidazole or amoxicillin-clavulanic acid	61 (92.0)	5 (8.0)

3.2.3 Treatment of SAM related health problems

The WHO guidelines recommend that SAM related health problems be treated as early as possible, to take advantage of the window of opportunity to prevent malnutrition complications and mortality [1]. Data obtained from a review of folders of 75 children in this study showed a high adherence with the guidelines. From Table 5 below, 33/75 children were found to be dehydrated and were managed with either ReSoMal (21.1%), intravenous fluids (42.4%) or oral rehydration salt (36.4%). Additionally, 48 of the 75 children were identified to have comorbidities and were all given appropriate treatment.

The results generally suggest that there is low level of adherence to assessment standards but generally good level of adherence to treatment recommended for management of SAM in the stabilization phase as stipulated in the WHO guidelines.

4. DISCUSSION

The study found that 97% of the 75 children with SAM were neither assessed for hypoglycaemia nor deficiency of vitamin A and serum electrolytes. This state of inadequate assessment of SAM related health problems is calculated to negatively affect their management which may result in poor recovery of altered physiological function and increased risk of development of complications [12,13]. A similar

study in South Africa also found that over 40% of children with SAM did not have a blood glucose check at the time of admission [14].

Hypoglycaemia is one of the most common causes of death in children admitted with SAM [15]. It is, therefore, essential that a blood glucose test is done at the time of admission for measures to be undertaken to restore normal physiological function and reduce risk of mortality [1,10]. In this study, the blood glucose level of only 1 out of 75 children was checked but 73 (97%) of children were given F-75 immediately at the time of admission and 49 of them were fed every 2-4 hours as recommended. A prior study conducted in Kenya also showed a high level of adherence with the feeding guidelines recommended by the WHO [16].

Identification and appropriate treatment of electrolyte imbalance (mostly hypokalaemia) is also crucial to maintenance of normal neuromuscular activity in children with SAM [1]. A serum electrolyte test is therefore required in the management of children with SAM [14]. In this study, the electrolyte profile of 2 (3%) out of 75 children was done at the time of admission, with the same number receiving potassium supplementation as part of treatment. A study in Sudan similarly found that just about 3.1% of admitted children with SAM received potassium supplementation as part of their initial management [16]. It may be inferred that, majority of children in the present study did not receive extra potassium because their blood electrolyte test was not done.

Table 5. Treatment of SAM related health problems

Recommended Guideline activity	Yes (%)	No (%)
Patients treated for dehydration on admission	33 (44.0)	43 (56.0)
Use of ReSoMal to rehydrate patients	7 (21.2)	26 (79.0)
Use of IV fluids to rehydrate patients	14 (42.4)	19 (58.0)
Use of ORS to rehydrate patients	12 (36.4)	21 (64.0)
Administration of extra magnesium	0 (0.0)	75 (100.0)
Co-morbidities in the child treated	48 (100.0)	0 (0.0)
Iron given during stabilization phase	1 (1.3)	74 (98.7)
Child started on therapeutic diet	73 (97.3)	2 (2.7)
Use of F-75	73 (97.3)	2 (2.7)
2-4 hourly feeding	49 (67.1)	24 (32.9)
Body weight monitored daily during initial re-feeding	64 (87.8)	9 (12.3)

The WHO guidelines recommend that all children admitted and diagnosed with SAM receive prophylactic antibiotic therapy for presumed sepsis because children with SAM mostly have other comorbid bacterial infections without manifesting any clinical features [1,17–19]. The WHO recommends the use of ampicillin and gentamicin combination for management of presumed sepsis in children with SAM [6], and this regimen has been found to reduce mortalities, speeds up recovery and decreases days of inpatient treatment in these children [20,21]. In this study, 66 (88%) of the 75 children received antibiotics for the management of presumed sepsis, though only 8% of those who received antibiotics were given ampicillin and gentamicin therapy; the remaining 92% were treated with either ceftriaxone, cefuroxime, metronidazole or amoxicillin-clavulanic acid. Thus, clinicians generally adhered to the use of antibiotics in the management of children with SAM, but mostly chose different antibiotics from those stated in the guidelines. A study in Uganda by Mbugua (2015) which found that all inpatient children with a diagnosis of SAM were put on antibiotic therapy corroborate the present study [17].

Fluid therapy with ReSoMal is also critical to inpatient management of the child with SAM who is dehydrated. In this study, 33 (44%) of the 75 children were managed for dehydration but only 7 (21.2%) of them were given ReSoMal. The remaining 26 (78.8%) were given either oral rehydration salts or intravenous fluids. The guidelines recommend strongly against the use of intravenous fluids unless the child is in shock, though no evidence of intravenous fluid-related complications has been found in systematic reviews [22,23]. A study in Kenya similarly found that 19% of children with SAM were managed with intravenous normal saline [16]. The random administration of intravenous fluids and ORS, contrary to the WHO guidelines, may be due to inconsistencies in the literature [6,22,24]. Further studies may be required to clarify the benefits or otherwise of various intravenous fluids in the management of SAM.

5. CONCLUSION

There was poor adherence to the WHO guidelines for assessment and prevention of health-related problems in admitted children with SAM. However, guidelines for treatment of health-related problems such as early initiation of feeding for children with SAM, weight monitoring

and administration of antibiotics were generally adhered to. It is important that healthcare professionals are well informed and knowledgeable about these standard guidelines to streamline and provide evidence-based care.

6. STUDY LIMITATIONS

Further studies to identification factors that may have contributed to the poor adherence to the WHO guidelines is needed to guide further strategies at helping address them. Secondly, this study was carried out in one referral facility and so may not be generalizable to the entire country. Further studies from other hospitals may be required to create a true reflection of current management practices for caring for children with SAM. This study was carried out in a low-resource setting where healthcare financing is very challenging on account of poor socioeconomic situation of majority of the population. Laboratory investigations are carried out only when absolutely necessary; laboratory findings were therefore not included in the assessment data extracted from folders of children with SAM.

CONSENT

It is not applicable.

ETHICAL APPROVAL

Clearance to conduct this study was obtained from Academic Board Research Sub-Committee of the Ghana College of Nurses and Midwives and administrative permission from the Regional Directorate of Ghana Health Service. Families of the children whose records were used could not be traced to obtain consent for use of the information. However, confidentiality of the data was maintained by ensuring that no identifiable information of the children was extracted for the study.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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