**MANAGEMENT OF MALNUTRITION AND DISEASE CONTROL AMONG CHILDREN UNDER 5 YEARS OF AGE IN JUBA (CASE STUDY OF AL-SABAH CHILDREN HOSPITAL(ACH)) JUBA SOUTH SUDAN**

by

**FRANCIS PAUL GALERIO**

**REG NO: AIPMS/216/002/2019**

submitted in accordance with the requirements

for the degree of

**POSTGRADUATE DIPLOMA IN PUBLIC HEALTH**

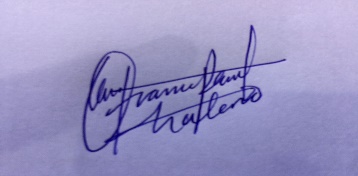
at the

***AFRICA INSTITUTE FOR PROJECT MANAGEMENT STUDIES***

***31th, JANUARY 2020***

**DECLARATION**

I declare that **MANAGEMENT OF MALNUTRITION AND DISEASE CONTROL AMONG CHILDREN UNDER 5 YEARS OF AGE IN JUBA (CASE STUDY OF AL-SABAH CHILDREN HOSPITAL(ACH)) JUBA SOUTH SUDAN** is my own work andthat all the sources that I have used or quoted have been indicated and acknowledged by means of complete references and that this work has not been submitted before for any other degree at any other institution.



|  |  |  |
| --- | --- | --- |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 29 JANUARY 2020 | |
| **SIGNATURE** | **DATE** |  |
| FRANCIS PAUL GALERIO |  |  |

**Table of Contents**

**DECLARATION………………………………………………………………………………..I**

**ACKNOWLEDGEMENTS……………………………………………………………………...IV**

***DEDICATION…………………………………………………………………………..…………V***

**DEFINITIONS: COMMONLY USED TERMS……………………………………………….VI**

**ABSTRACT…………………………………………………………………………………..…VII**

**CHAPTER ONE…………………………………………………………1**

**1.0 INTRODUCTION……………..……………………………………………………………….1**

**1.1 STUDY JUSTIFICATION AND UTILITY ……..…………………………………………..1**

**1.2 RATIONAL OF STUDY……..………………………………………………………………..1**

**1.3 STATEMENT OF THE PROBLEM………………………………………………………….1**

**1.4 STUDY/RESEARCH QUESTION…………………………………………………………….2**

**1.5 OBJECTIVE……………………………………………………………………………………2**

**1.5.1 SPECIFIC OBJECTIVE……………………………………………………………………..2**

**1.6 SIGNIFICANCE OF THE STUDY……………………………………………………………2**

## **1.7 DEFINITION OF TERMS……………………………………………………………………..3**

**1.8 VALIDITY AND RELIABILITY……………………………………………………………..4**

**1.9 STRUCTURE OF THE DISSERTATION…………………………………………………...4**

**­1.10 CONCLUSION………………………………………………………………………………..5**

**CHAPTER TWO………………………………………………………………...6**

**LITREATURE REVIEW………………………………………………………………………….6**

**2.0 INTRODUCTION……………………………………………………………………………...6**

**2.1 BURDEN OF MALNUTRITION……………………………………………………………..6**

**2.2 MALNUTRITION IN SOUTH SUDAN………………………………………………………6**

**2.3 SEVERE ACUTE MALNUTRITION CAUSES, PATHOPHYSIOLOGY AND COMPLICATIONS………………………………………………………………………………..6**

**2.3.1 CAUSES OF MALNUTRITION……………………………………………………………6**

**2.3.2 PATHOPYSIOLOGY………………………………………………………………………..6**

**2.3.3 COMPLICATIONS OF MALNURITION………………………………………………….6**

**2.3.3.1 MANAGEMENT OF COMPLICATIONS OF MALNUTRITION…………………….6**

**2.4 MALNUTRITION CASE MANAGEMENT………………………………………………….8**

**2.5 SEVERE ACUTE MALNUTRITION CASE FATALITY…………………………………..9**

**2.5.1 General treatment……………………………………………………………………………11**

**2.6 QUALITY OF CARE………………………………………………………………………….11**

**2.6.1 Assessment of quality of care……………………………………………………………….11**

**2.7 ORGANIZATION OF HEALTH CARE IN SOUTH SUDAN…………………………….12**

**CHAPTER THREE……………………………………………………………14**

**RESEARCH METHODOLOGY………………………………………………………………..14**

**3.0 INTRODUCTION…………………………………………………………………………….14**

**3.1 STUDY DESIGN……………………………………………………………………………...14**

**3.2 STUDY AREA………………………………………………………………………………...14**

**3.3 STUDY POPULATION………………………………………………………………………15**

**3.4 STUDY PERIOD……………………………………………………………………………...15**

**3.5 INCLUSION CRITERIA……………………………………………………………………..15**

**3.6 EXCLUSION CRITERIA……………………………………………………………………15**

**3.7 SAMPLE DESIGN AND PROCEDURE……………………………………………………15**

**3.7.1 Sample Size Determination…………………………………………………………………15**

**3.8 DATA COLLECTION………………………………………………………………………..16**

**3.9 DATA MANAGEMENT AND ANALYISIS PROCEEDURE…………………………….17**

**3.10 ETHICAL CONSIDERATIONS…………………………………………………………...17**

**3.10.1 CONFIDENTIALITY……………………………………………………………………..17**

**3.10.2 ANONYMITY……………………………………………………………………………...17**

**­CHAPTER FOUR…………………………………19**

**RESULTS………………………………………………………………………………………….19**

**4.0 INTRODUCTION…………………………………………………………………………….19**

**4.1 RESULTS……………………………………………………………………………………...19**

**CHAPTER FIVE………………………………………………………………………………….20**

**5.0 INTRODUCTION…………………………………………………………………………….20**

**5.1 DISCUSSION………………………………………………………………………………….20**

**5.1 STUDY LIMITATION……………………………………………………………………….23**

**5.2 CONCLUSION………………………………………………………………………………..23**

**5.3 RECOMMENDATIONS……………………………………………………………………..24**

**REFERENCE……………………………………………….25**

**APPENDENCIES………………………………………………………………………………...27**

**APPENDENCIES I……………………………………………………………………………….27**

**APPENCIES II………………………………….……………………………………………….28**

**APPENDEXES III…………………………………………………………...……………….29**

**APPENDEXES IV…………………………………………………….……………………...31**

**APPENDEXES V…...………………………………………………………………………...32**

## **LIST OF TABLES**

**Table 1: Sex distribution according to type of malnutrition N=100 ........................................ 18**

**Table 2: Anthropometric measurements ................................................................................... 20**

**Table 3: Classification of severe malnutrition……………………………………………21**

**Table 4: Triage at OPD ............................................................................................................. 23**

**Table 5: Management of dehydration in the ward .................................................................... 23**

**Table 6: Treat infections routinely ............................................................................................. 24**

**Table 7: Correct micronutrient deficiencies ...................................................................... ……25**

**Table 8: Initiate feeding cautiously ........................................................................................... 26**

**Table 9: Rehabilitation/catch up feeds ....................................................................................... 27**

**Table 10: Summary of the steps………………………….…………………………..…...…….27**

**Table 11: Outcome……………………………….……….……………………………..………28**

**LIST OF FIGURES**

**Figure 1: Map of Juba Town (position of study site shown in red circle) ..................... …….14**

**Figure 2: Malnutrition ward from outside ............................................................................... 18**

**Figure 3: Comorbid conditions on admission ......................................................................... 19**

**Figure 4: Classification by point of service (Outpatient and inpatient) ....................................... 20**

**Figure 5: Diagnosis and treatment of hypoglycemia at OPD and in the ward…………22**

**ACKNOWLEDGEMENTS**

I would like to thank the following individuals for their respective contributions to this dissertation:

* A special thanks To the Institution for the guidance, support, and encouragement.
* Al-Sabah Nutrition, Health’s, Nurses and Doctors Teams and programme manager at Hospital for their support.
* All the parents and children who agreed to participate in this study.
* A special thanks to my Supervisor/Line Manager who encouraged and gave me time to do the assessment while am still at work

***DEDICATION***

*This dissertation is dedicated to my Mother Rose Abau Marcello for her support in everything that am ding in life*

**DEFINITIONS: COMMONLY USED TERMS**

**Chronic malnutrition (stunting).** Chronic malnutrition, also known as stunting, is a form of growth failure which develops over a long period of time. Inadequate nutrition over long periods of time (including poor maternal nutrition and poor infant and young child feeding practices) and/or repeated infections can lead to stunting. In children, it can be identified using the height-for-age nutritional index.

**Acute malnutrition (wasting).** Also known as wasting, acute malnutrition is characterized by a rapid deterioration in nutritional status over a short period of time. In children, it can be identified using the weight-for height nutritional index or with mid-upper-arm circumference, or identified based on the presence of bilateral pitting oedema. There are different levels of severity of acute malnutrition: moderate acute malnutrition

(MAM) and severe acute malnutrition (SAM).

**Undernutrition.** The outcome of insufficient food intake and/or inadequate absorption of nutrients, inadequate feeding and care and infectious illness. Undernutrition includes being underweight, stunted, acutely malnourished or deficient in vitamins and minerals.

**Underweight.** A composite form of undernutrition that includes elements of both wasting and stunting or a combination of both. In children, it can be identified using the weight-for-age nutritional index.

**Severe acute malnutrition (SAM).** Defined in children 6–59 months old as weight-for-height z-score of <-3 standard deviations of the WHO standards and/or bilateral pitting oedema and/or MUAC <11.5cm

**Moderate acute malnutrition (MAM).** Defined in children 6–59 months old as weight-for-height z-score <-2 and ≥ -3 standard deviations of the WHO standards and/or MUAC <12.5cm and ≥ 11.5cm

**Community-based management of acute malnutrition (CMAM).** An approach that includes community engagement and mobilization for early detection and referral of cases of acute malnutrition; outpatient management of SAM for children 6–59 months without medical complications; inpatient management of SAM for children 6–59 months with medical complications, and in some cases management of MAM for children 6–59 months. Where management of MAM is not included the term CMAM has been used to describe the approach. The approach may also be called community-based therapeutic care in some contexts**.**

**Integrated management of acute malnutrition (IMAM).** Another specific term used in some contexts for CMAM programmes that have a primary objective of integration within the existing health and community systems; used to emphasize this objective

**ABSTRACT**

**Background:** Malnutrition, and nutrition related diseases are the major, public health concern or global health problem. Children are particularly vulnerable since adequate nutrition is essential to ensure healthy growth and development. Africa is severely affected and in South Sudan where an estimated 1,000,000 children under the age of five chronically malnourished, affected with disease and also have poor health services. With the ongoing conflict, the number is expected to rise due to displacement and food insecurity. Studies have shown that adequate and timely treatment of these children will lead to reduced mortality. The shortage of health care professionals and lack of access to health care services makes the situation even worse.

**Aim:** To illuminate the malnutrition cases and diseases from malnourished children at Al Sabah Children Hospital and in South Sudan at large.

**Method:** A hospital based longitudinal survey was conducted and Qualitative method with an ethnographical design.

**Study area:** Al-Sabah Children Hospital (ACH) Outpatient department and Malnutrition wards.

**Study Population and duration:** Nutritionist, Nurses, Doctors andChildren admitted with diagnosis of severe acute malnutrition from 1, December 2019 to 15, January 2020.

**Data collection procedure:** The principal investigator visited the outpatient Department and malnutrition ward daily to recruit patients. The nutritional status of the child was assessed, this included measuring the height, weight and mid upper arm circumference. A data pro forma sheet was prepared according to steps in the WHO guidelines and applied to each patient thus assessing care provided during hospitalization. Information collected was supplemented with information obtained through a structured interview with the care givers and direct, daily observations on the wards.

An inventory of commodities necessary in the management of severe malnutrition, availability and reliability of supplies was done using a self-administered questionnaire with the nurses and nutritionist.

**Results:** The WHO Child Growth Standards, MUAC tape and clinical examination of bilateral edema, were used to determine the nature and severity of malnutrition. The treatment given at the nutrition ward consisted of therapeutic milk and RUTF. The parents had an important role and were responsible for the care of their child. The health care professionals worked preventively by strengthening parents’ knowledge of malnutrition. Parents were given advice and instructions regarding nutrition, the importance of basic hygiene and how to avoid transmission of infectious diseases. Preventive actions were also conducted as community outreach, which aimed to improve the health of the population in rural areas.

**Conclusion:** There are several causes of malnutrition and nutrition related disease it is a complex phenomenon with different affecting factors. The study reveals the importance of parents as caretakers. Lack of financial resources and education were major risk factors. Many parents could not afford to buy medications to their children and sought medical care too late. The importance of information and its contribution to improved living conditions was obvious. By reaching out to people with poor access to health care facilities, important actions should be performed in the struggle of preventing or management malnutrition and also lack of health policy to address such problem or malnutrition cases.

**Keywords:** Malnutrition, management, Children, South Sudan, Al-Sabah, Health, Disease.

**CHAPTER ONE**

1. **INTRODUCTION**

This chapter provides the background information about the research problem which motivated the researcher to carry out the study. It highlights the aim of the study and its significance and also explains the study justification and utility. This chapter announces the research design and methods and discusses the validity, reliability and ethical consideration related to the study.

**1.1 STUDY JUSTIFICATION AND UTILITY**

Malnutrition management, and nutrition related diseases continue to be the critical public health concern in South Sudan where an estimated 1,000,000 children under five are at risk of being malnourished.

Studies have shown that implementing WHO evidence-based guidelines for severe malnutrition can reduce mortality rates to less than 5%, also has the potential to save many lives currently being lost through malnutrition and contribute substantially to achieve the Millennium Development Goals of reducing the under-five mortality.

Also, implementation of these guidelines has been shown to be feasible and sustainable even in small county hospitals with limited resources.

With the ongoing conflict, malnutrition management of malnourished children is expected to decline due to displacement and food insecurity.

Assessing level of adherence to the guidelines would facilitate appropriate corrections and help develop strategies to improve the quality of care offered in malnutrition ward at Al-Sabah children hospital.

**1.2 RATIONAL OF STUDY**

As the main aim of the study was to determine the malnutrition management and disease control being used at Al Sabah Children Hospital, the study used a longitudinal survey method approach. The participants were allowed to explain and/or give reasons for some of the answers.

**1.3 STATEMENT OF THE PROBLEM**

Malnutrition still remains a cause of concern in developing countries. Although studies have shown that with the conflict going on in South Sudan the prevalence rate of malnutrition will increase due to food insecurity, financial problem, lack of education etc. due to the above causes, malnutrition management intervention programs should be taken seriously.

Despite awareness about the dire impact of malnutrition on health and the availability of health and nutritional interventions, malnutrition continues to be one of the leading causes of morbidity and mortality worldwide, particularly in developing countries (UNICEF, 2006). However, although there are all health and nutritional interventions in place, there is estimated evidence of high proportions of children under the age of five years still being admitted to hospital with severe acute malnutrition. This study will therefore determine the contributing factors to severe acute malnutrition amongst children under the age of five years at Al Sabah Children Hospital, South Sudan in order to improve health programmes and nutritional interventions.

**1.4 STUDY/RESEARCH QUESTION**

To what extent does the management of children with severe acute malnutrition at Al-Sabah children Hospital follow World Health guidelines?

What are the health policies being used or implemented at Al Sabah Children Hospital?

**1.5 OBJECTIVE**

**1.5.1 SPECIFIC OBJECTIVE**

To determine the proportion of Children appropriately managed for severe acute malnutrition according to WHO guidelines at Al-Sabah Children Hospital.

To determine the availability of essential supplies necessary for management of severe acute malnutrition at Al-Sabah Children Hospital.

To outline the health policy being used or implemented in managing malnutrition and disease control at Al Sabah Children Hospital

**1.6 SIGNIFICANCE OF THE STUDY**

The identification of the factors that may contribute to the poor management of malnutrition and the occurrence of the condition of underweight among under-five children at Al Sabah Children Hospital may help the Ministry of Health and NGOs in the formulation of appropriate policies and the creation of intervention strategies aimed at addressing those factors and in improving the nutritional status of the under-five population.

It helps or assist medical or health personnel in improving the malnutrition management, disease control and health policy at Al Sabah Children Hospital

It helps the researcher in understanding more about malnutrition and nutrition in general

As a researcher it helps him/her in award of Diploma/Bachelor degree during his/her studies.

## **1.7 DEFINITION OF TERMS**

**Malnutrition**

**Conceptual definition:** “Malnutrition” is a general term that indicates a lack of some or all nutritional elements necessary for human health (World Hunger Education Service website 2011).

**Operational definition:** In this study, malnutrition refers to the condition of moderate or severe underweight.

**Conceptual definition:** Level of education refers to the number of years completed by an individual to learn or train his or her mind and character (Longman Active Study Dictionary of English 1987:192).

**1.8 VALIDITY AND RELIABILITY**

To enhance the internal validity and reliability of this study, the following measures were taken:

* Similar conditions for data collection were ensured for each participant.
* The nature and purpose of the research were regularly communicated.
* Cases and controls were selected that were similar with regard to extraneous factors.
* Two weeks prior to the fieldwork, the study methodology was piloted at Al Sabah Children Hospital. Elements of the research proposal that were pre-tested included the study variables, the availability of the respondents, the acceptance of the study by the participants, the time factor, the adequacy of resources, the relevance of the questions, the sequence and comprehensibility of the questions, and the accuracy of the respondents’ interpretation of the questions. Pilot data have not been used in the main study.

**1.9 STRUCTURE OF THE DISSERTATION**

**Chapter 1 Orientation to the Study:** The first chapter provides the justification of study and utility about the research problem which motivated the researcher to conduct the study. It highlights the aim of the study and its significance, provides definitions of key terms used. This chapter also announces the research/study questions, rational of study, validity and reliability, structure of the dissertation and statement of problem. A short conclusion ends the chapter.

**Chapter 2: Literature review:** This chapter focuses on a review of specific literature studied on malnutrition.

**Chapter 3: Research methodology:** This chapter explains the research design that was used, the target population and the type of sampling followed. It also provides the data collection approach and method of data analysis used.

**Chapter 4: Presentation, analysis and description of the research findings:** This chapter provides an overview of the results of the study. The results are presented in descriptive and analytic statistics in frequencies, percentages, graphs, figures and tables.

**Chapter 5: Conclusions and recommendations:** The final chapter reports on the conclusions that were drawn in relation to the research problem, purpose and objective, and whether the objective of the study was achieved. It indicates the limitations of the research and presents recommendations for future action and research.

**1.10 CONCLUSION**

Malnutrition is a persistent problem in the Republic of South Sudan. Al Sabah Children Hospital, which is the focus of this study, it is the only Children Hospital in South Sudan that consistently reported high annual prevalence’s of underweight among under-five children who are admitted. This case-control study intends to grow the body of knowledge concerning the malnutrition management at the hospital. The following chapter presents a review of the literature that was studied regarding the research topic.

**CHAPTER TWO**

**LITREATURE REVIEW**

**2.0 INTRODUCTION**

This chapter provides a review of literature that was studied on the pathophysiology of malnutrition, classification of malnutrition, views of malnutrition in South Sudan, and an in-depth discussion of evidence of causes of malnutrition.

**2.1 BURDEN OF MALNUTRITION**

Every year 10.6 million children die worldwide due to preventable conditions such as pneumonia, diarrhea, malnutrition and measles. Of these deaths, malnutrition accounts for approximately 2.2 million deaths annually in children under the age of five. Globally, severe acute malnutrition is the most important risk factor for illness and death. It is the direct cause of about 300,000 death per year and indirectly responsible for about half of all deaths in young children.

In the developing countries, 50.6 million children under the age of 5 years are malnourished. In Sub –Saharan Africa, the number of malnourished people has increased from 90 million in 1970 to 225 million in 2008.

**2.2 MALNUTRITION IN SOUTH SUDAN**

One in seven South Sudanese children die before their fifth birthday, mainly from preventable diseases such as diarrhea and malaria. Malnutrition is another killer in South Sudan with malnutrition rate exceeding WHO emergency threshold of fifteen percent.

According to Sudan Household Survey 2010, thirty one percent of South Sudanese children less than five years are stunted, twenty three percent wasted and twenty eight percent underweight with wide variation across the state.

South Sudan ranks 15 the highest in the world in term of mortality rates for children aged less than five years.

The number of children affected by malnutrition and its long-term consequences place it among the greatest public health problems facing the world today.

**2.3 SEVERE ACUTE MALNUTRITION CAUSES, PATHOPHYSIOLOGY AND COMPLICATIONS**

**2.3.1 CAUSES OF MALNUTRITION**

Result from range of causes closely related to poverty, which include: maternal under-nutrition, low birth weight, deficiencies of specific nutrients (iodine, vitamin A, Iron, Zinc), diarrhea, inadequate infant and child feeding practice, low exclusive breastfeeding practices for six month, lack of access to vaccination, lack of safe drinking water and sanitation and limited household income.

**2.3.2 PATHOPYSIOLOGY**

Many of the manifestation of severe acute malnutrition represent adoptive response to inadequate energy and protein intake. When there is inadequate intake, activity and energy expenditure decreases. Despite this adoptive response, fat stores are mobilized to meet the ongoing energy requirement and once the fat stores are depleted, protein catabolism must provide the substrate for maintaining basal metabolism.

It is unknown why some malnourished children develop oedema and others do not. But there are some suggestions of factors related to this like variability among infants in nutrient requirement and body composition at time the deficit occurred. Also, it has been suggested that giving excess carbohydrate to a non-oedematous child reverses the adoptive response to low protein intake, resulting in mobilization of body protein stores. This process eventually leads to decrease in albumin synthesis resulting in hypalbuminaemia with oedema. Fatty liver also develops secondary to lipogenesis from excess carbohydrate intake and reduced Apo lipoprotein synthesis.

Finally, free radical damage has been proposed as an important factor in the development of oedema in severe acute malnutrition. This proposal is supported by low plasma concentration of methionine, which is a precursor of cysteine, which is needed for synthesis of the major antioxidant glutathione.

**2.3.3 COMPLICATIONS OF MALNURITION**

In addition to increasing mortality rate, effects of malnutrition include physical and developmental manifestations. Poor weight gain and slowing of linear growth occur, that may persist beyond adolescence and adulthood with implications to the work capacity of both men and women and to women’s reproductive performance, impairment of immunological function predisposing them to opportunistic infections.

It also has long term effect on cognitive and social development, physical work capacity, productivity and economic growth.

**2.3.3.1 MANAGEMENT OF COMPLICATIONS OF MALNUTRITION**

**Hypoglycaemia:**

* All severely malnourished are at risk of hypoglycaemia.
* Where blood glucose results can be obtained quickly (eg with Dextrostix), this should be measured quickly.
* Hypoglycaemia is present when blood glucose is <3 mmol/l (<54 mg/dl)
* Give 50mls of 10% glucose.
* Give 2 hourly feeds, day and night at least for the first day.
* If the child is unconscious. Treat with IV glucose.

**Hypothermia (<35C):**

* Is associated with increased mortality in severely malnourished children.
* Feeding the child, ensuring adequate clothing and appropriate antibiotics forms the management.

**Electrolyte imbalance:**

* Extra potassium should be added to the feeds during their preparation.
* All severely malnourished children have deficiencies of potassium and magnesium which may take 2 weeks or more to correct.

**Infection:**

* In severe malnutrition, the usual signs of infection such as fever are often absent, yet multiple infections are common.

Therefore, assume all malnourished children have an infection on their arrival at the hospital and treat with broad spectrum antibiotics straight away

**Micronutrient deficiencies:**

* All severely malnourished children have vitamin and mineral deficiencies. Although anaemia is not common, do not give iron initially but wait until the child has good appetite and starts gaining weight (usually in the 2nd week), because iron can make the infection worse.
* Give daily (for at least 2 weeks)
* Multivitamin supplement
* Folic acid (5mg on day 1, then 1mg/day)
* Zinc (2mg Zn/kg/day)
* Copper (0.3mg Cu/kg/day)
* Once gaining weight, ferrous sulphate (3mgFe/kg/day)

**Eye problems:**

If the child has eye signs of vitamin A deficiency (dry conjunctiva or cornea, corneal ulceration, keratomalacia):

* Give vitamin A orally on day 1,2 and 14 (aged <6 months, 50000 IU; aged 6-12 months, 100000 IU; older children, 200000 IU)
* If the eyes show signs of inflammation or ulceration
* Instill Chloramphenicol or tetracycline eye drops, 3 hourly for 7-10 days.
* Instill atropine eye drop.

Cover with saline-soaked eye pads.

**Feeding**

Initial feeding: Essential features are

* Frequent small feeds of low osmolality and low in lactose.
* Oral or nasogastric feeds.
* 100kcal/kg/day.
* Protein: 1-1.5 g/kg/day.
* Liquid: 130 ml/kg/day.
* If the child is breastfed, continue with this.

Monitor and record;

* Amount of feed offered and left overs
* Vomiting
* Stool frequency
* Daily body weight.

Catch up growth;

Give a milk-based formula, such as catch up F-100 which contains 100kcal/100ml and 2.9g of protein/100ml.

**2.4 MALNUTRITION CASE MANAGEMENT**

The World Health Organization (WHO) developed a manual that describes Case Management Practices for children with severe acute malnutrition entitled: “*Management of Severe Malnutrition: a manual for physicians and other senior health workers”*, to improve case management for the severely malnourished. The guidelines (the ten-step protocol) offer practical help to health workers and aim to improve the quality of hospital care for these children.

The WHO ten-step management guideline, includes a stabilization phase where life-threatening hypoglycaemia, hypothermia and sepsis are identified and treated, a cautious introduction of milk-based nutritional rehabilitation, micronutrient and vitamin supplementation, and empiric use of antimicrobial and anti-helminthic treatment.

To reduce malnutrition mortality among children in South Sudan, the Government of South Sudan (RoSS) adopted a manual; the Community-based Management of Severe Acute Malnutrition in children 6-59 months and includes community outreach, outpatient care and inpatient care.

The manual seeks to improve the management of SAM in children 6-59 months with medical complications such as severe oedema, poor appetite (failed the appetite test) or present with one or more IMCI danger signs (unable to drink or breastfeed, vomits everything, has had convulsion more than one or prolonged > 15 minutes), lethargic or unconscious should be treated in inpatient care and those without medical complication in outpatient care.

Despite the efforts of the government, donors, international and national non-governmental organization, South Sudan still faces numerous challenges. Decades of conflict have led to collapse of basic infrastructure across the country including health facilities, schools, roads, water and sanitation. The lack of infrastructure is associated with a range of acute crises resulting from renewed localized and international conflicts resulting in large population movement and displacement.

Only forty four percent of South Sudan’s population stays within a five-kilometer radius of a functional health facility. There is in addition lack of human resource and qualified health personnel, shortage of drugs and medical supplies, cultural and financial barriers, long distance to health facility with poor roads and transport, resulting in low use of health facility.

**2.5 SEVERE ACUTE MALNUTRITION CASE FATALITY**

Malnutrition is a cause of profound physiological and metabolic changes. A malnourished child responds poorly to treatment and is therefore, more likely to die when compared to the well-nourished. Even in a hospital set up, a severely malnourished child has a 30-50% chance of dying. The levels of reported mortalities could be higher, as in Africa, most parents still take home a severely ill or dying child. Malnutrition is linked to increased risk of deaths from diarrhea, pneumonia, malaria and measles. SAM contributes to more than sixty percent of hospital deaths from an infectious disease and poor hospital care of severely malnourished children is responsible for the high case fatality rate of 50% or more.

Global studies have shown that lack of knowledge and faulty practices in management of severe malnutrition were responsible for the high case fatalities. A Study in South Africa has shown that inadequate knowledge among the health care workers was responsible for between twenty-eight and fifty percent of the deaths and that inadequate supervision and lack of proper support were other factors that compromised quality of care in the two hospitals. Ashworth et al., (2003) noted that in many hospitals dangerous practices including: the use of intravenous (IV) fluids to correct dehydration, aggressive measures to promote weight gain, prescription of high protein diet for children with kwashiorkor, prescription of diuretics to get rid of oedema and iron to treat anaemia in the initial phase were the norm in treating malnutrition.

In Kenya, Nzioki et al., (2009) found adherence to the first 8 steps in management of children with severe malnutrition was inadequate in Kenya’s National Referral and Teaching Hospital. Only 30% and 47% of children who were severely malnourished were appropriately managed for hypoglycaemia and hypothermia respectively. The death rate was a high of thirty eight percent for children admitted for severe malnutrition despite the availability of major supplies.

According to Maitland et al., in their study at Kilifi District Hospital, Kenya, case fatality rate was high because of inappropriate management of sepsis, hypoglycaemia and hypothermia. At Mapulaneng Hospital in Ghana, the mortality was at 36% 14 while in Bangladesh, Bhan et al., (2003) found out that majority of the hospitals recorded mortality rates of 20 % or more.

In 2000, mortality rate for Colombia’s Antioquia was reported as 20% among severely malnourished children younger than 5 years old while the rate was nearly 3 times in Turbo, a town in Antigua.

Ashworth et al., (2003) reported that severe malnutrition is indeed a medical emergency and that urgent correction of hypoglycaemia, hypothermia and silent infections is required to minimize hospital deaths.

In hospitals where the WHO guidelines have been introduced and implemented, studies have shown a reduction in mortalities, although not to the WHO target levels of five percent or lower.

After analyzing data sets from 67 studies, Bhan et al., (2003) indicated that low mortality from severe acute malnutrition is indeed feasible and achievable. In fifteen percent of the studies, the mortality levels were reduced to less than ten percent when WHO protocol was implemented Studies at the International Centre for Diarrheal Disease Research, Bangladesh, showed that the use of WHO protocol had reduced deaths from 17% to 3.9% and from 40% to less than 15% in South Africa A study by English et al., (2006) noted that an improvement in triage, diagnosis and use of guidelines can reduce the high hospital deaths in developing countries.

Similarly, in South Africa, case fatality rates fell from 46% to 21% at Mary Theresa Hospital and from 25% to 18% at Sipetu Hospital. Other centres in South Africa recorded low mortality rates of 6%. In Kenya’s Kilifi District Hospital, the death rates were cut from 30% to 19% after implementation of WHO protocol.

A study done in South Africa by Ashworth on the effect of implementation of WHO guidelines on case fatality and its influence on the operational factors showed quality of care improved and case fatality rate fell after implementation of WHO guidelines. Another study done in Turbo, Colombia by Bernal to evaluate the implementation of WHO guidelines for the treatment of severe malnutrition, showed significant reduction in mortality.

There is therefore clear evidence that proper application of the protocol has reduced case fatality in different settings. Such reduction in mortality was attributable to the following modifications in case-management as outlined in the WHO’s ten step protocol: proper management of hypoglycaemia and hypothermia; routine prescription of broad-spectrum antibiotics on admission; transfusion of packed cells for severe anaemia; replacement of micronutrients; supplementation of vitamins and minerals; withholding iron supplements in the first week of treatment; avoiding intravenous rehydration whenever possible; cautious re-feeding; use of a low sodium diet; and close monitoring for vital signs for fluid overload.

The use of these evidence-based guidelines has the potential to reduce South Sudan’s high infant and under five mortality rates due to severe acute malnutrition. The implementation of the guidelines is a feasible and sustainable strategy for achieving the Millennium Development Goal 4 of reducing childhood mortality.

**2.5.1 General treatment**

General treatment of severe malnutrition involves two phases:

* An initial stabilization phases
* A longer rehabilitation phases

Initial stabilization phase addresses management of complications, micronutrient deficiency and initiation of the catch-up growth.

While a rehabilitation phase strengthens what has been achieved in the initial phase with the catch-up growth, electrolyte balance and sensory stimulation.

**2.6 QUALITY OF CARE**

**2.6.1 Assessment of quality of care**

Aspects of patient care or pillars of quality of care include, structure (facility level), process (health worker level) and outcomes (mortality, morbidity, and recovery, restoration cost, influenced by many factors outside health care). According to Donabedian, assessments of care involve assessment of outcome in terms of recovery, restoration and of survival, which has been frequently used as an indicator of the care given. There have been many advantages that are gained by using outcomes as the criteria of quality in medical care. Although outcomes may indicate good or bad care on the aggregate, they do not give an insight into the nature and location of the deficiencies or strengths to which an outcome may be attributed.

Another approach to assessment is to examine the process of care itself, rather than its outcomes. The assessment of quality must rest on a conceptual and operational definition of what the quality of medical care means. Many problems are present at the fundamental level. Judgments are based on considerations such as the appropriateness, completeness of information obtained through clinical history, physical examination and diagnostic tests. Justification of diagnostic and therapeutic procedures, including: surgery; evidence of preventive management in health, illness; coordination and continuity of care.

Another approach is the study of the setting in which the process of care takes place. It is concerned with the adequacy of the facility and equipment, the qualification of the medical staff and their organization. The presumption is made that given the proper setting and instruments, good medical care will succeed. This will be more relevant to the question at hand; whether medicine is properly practiced, in this case whether diarrhea management is per the diarrhea case management guidelines available. This approach to the assessment is to study not the process of care itself, but the settings in which it takes place and the instrumentalities of which can be accepted at face value.

A study was done in Bangladesh on the assessment of the quality of care, by Dewan and Muntasiru, which demonstrated that the overall quality of care provided in these hospitals is poor with no triage system, no laboratory support and essential equipment was deficient

Another study was done in Tanzania by Nicholes D Walter and Thomas lyimo, on first level health workers failing to follow guideline, revealed that the health workers surveyed rarely adhered to IMCI treatment and referral guidelines for children with severe illness. They administered therapy based on narrow diagnoses rather than IMCI classifications, disagreed with referral guidelines and often considered referral unnecessary.

The most comprehensive tool for evaluating quality of care is SPA (Service Provision Assessment). In addition to quality, it also measures the general functioning of a network of public and private facilities, and it provides an inventory of available equipment and supplies. The SPA provides a means of assessing strength and weaknesses in the service delivery environment, which may explain the impact of the services on the health behaviors in the catchment area, and may guide policy makers and program administrators in prioritizing resources for better health outcomes.

**2.7 ORGANIZATION OF HEALTH CARE IN SOUTH SUDAN**

The South Sudan health system is organized into counties within 10 States and a central Ministry of Health. The central level is responsible for policy development and guidance, the state level is responsible for providing policy guidance and oversight to its counties. The county level is responsible for overseeing service delivery.

Juba is the capital of South Sudan and lies in Central Equatorial State. There are currently six counties in the state. Available - information also indicates that there are a total of 284 health facilities (Hospitals, Primary Health Care Centres (PHCCs) and Primary Health Care Units (PHCUs) with over 2,968 health workers of all the different categories. There are several privately-owned health facilities in the city of Juba.

The population of South Sudan is around 8 million. Many areas have less than one health worker per 1000 people and only about 30 percent of the population have access to health facilities.

At the country level, there are currently 268 Outpatient Treatment Program (OTP) site providing treatment of children 6-59 months with uncomplicated severe acute malnutrition and 27 stabilization centres (SC) providing inpatient treatment of children 6-59 month suffering from severe acute malnutrition with complications.

Al-Sabah Children Hospital (ACH), established by the Kuwaiti government in 1983 is the only specialized children hospital in the country and referral hospital for malnourished children. It is managed by the state Ministry of Health.

Children suffering from SAM, malaria, pneumonia and diarrhea, make up the majority of the patients. With 100 beds now available, including a new ward, the hospital treats up to 150 outpatients daily.

About 40 percent of health workers have less than one-year training, a quarter have 1 to 2 years of training and another quarter have three to five years of training. Limited information exists on education level and training certification

**CHAPTER THREE**

**RESEARCH METHODOLOGY**

**3.0 INTRODUCTION**

This chapter explains the research design that was used, the target population and the type of sampling followed. It also provides the data collection approach and method of data analysis used.

**3.1 STUDY DESIGN**

A longitudinal survey that audits the implementation of WHO guidelines on management of severe acute malnutrition at Al-Sabah Children Hospital.

**3.2 STUDY AREA**

Al-Sabah Children Hospital (ACH), Juba-South Sudan. Juba the capital city of South Sudan, located in Jubek State or formally known as Central Equatorial State.

In recent years, the hospital has undergone extensive renovation, with funding from UNICEF, the African Union and other donors. Ministry of Health in collaboration with the UNICEF recently renovated and built a new ward for malnutrition, in total consisting of 22 beds. The hospital also gets support from UNICEF in terms of the feeds for the severely malnourished children specifically F75, F100 and ready to use therapeutic food.

According to the hospital records admission rate in malnutrition ward is about two per day. The staff working in the malnutrition wards consist of one medical officer, five nutritionists, six nurses and three cleaners (one per a shift).

Children were seen first by the clinical officers at OPD, screened for malnutrition (weight for height/length <-3SD or mid upper arm circumference <115mm or oedema of severe malnutrition).

The study covered outpatient department and malnutrition Wards.



**Figure 1**: Map of Juba Town (position of study site shown in red circle)

The red crosses indicate the hospitals in Juba, with Al -Sabah located opposite Hai Malakal, half a kilometer from Juba teaching hospital, and just opposite Al Saints` Cathedral.

**Figure 2:** Malnutrition ward from outside

The study was carried out in the malnutrition Centre at Al-Sabah Children Hospital which has two wards each having eleven beds with a total of twenty-two beds.

**3.3 STUDY POPULATION**

The study population comprised of children aged (6-59) months managed during the study period for severe acute malnutrition at Al-Sabah Children Hospital.

**3.4 STUDY PERIOD**

The study was conducted in one month’s period from 1st December 2019 to 15th January- 2020.

**3.5 INCLUSION CRITERIA**

* Children admitted to Al-Sabah Children Hospital with diagnosis of severe acute malnutrition aged 6-59 months.
* Informed consent from the parents/guardian

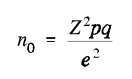
**3.6 EXCLUSION CRITERIA**

* Children with chronic medical conditions e.g. cardiac, renal diseases, cancer…. condition that predispose them to malnutrition
* Children who succumb within 24 hours of admission. It was assumed that they were not followed for a long time to assess quality of care.
* Children whom the PI was required to intervenes in their emergency management.

**3.7 SAMPLE DESIGN AND PROCEDURE**

**3.7.1 Sample Size Determination**

The sample size was calculated according to WHO formula for calculating one sample size using precision around a proportion



Z: critical value at 95% confidence interval = 1.96

P: Proportion of children' management expected to adhere to guidelines estimated to be 50%

E: degree of precision / sampling error = 0.1

The estimated sample size is was

**The minimum number of subjects was 96**

**Sampling criteria**: Consecutive enrolment of the patients who satisfy the study criteria and whom parents gave consent was done until the desired sample size was achieved.

**3.8 DATA COLLECTION**

Data were collected by a team led by the principal investigator and two research assistants who were working amongst the health workers (Medical officer, Nurses, Nutritionists and the support staff) at the Al-Sabah children Hospital. The research assistants were trained by the principal investigator (PI) for three days on how to use the study tools and standard operating procedures manual until they demonstrated competency in the completeness and accuracy of data entered. The PI and one research assistant visited Malnutrition ward daily between 8 am and recruited eligible patients. All medical records of patients with admission diagnosis of SAM were checked to ascertain if the patients met the inclusion criteria. We sampled consecutively all eligible patients until we reached our desired sample size. Informed consent was obtained from the parent/ guardian before a patient is recruited into the study.

The interviewer introduced herself/himself and explained to the potential study participants the purpose and methods of the study. Informed written consent was obtained using a predesigned consent which was sought from the Parents/ guardians (Appendix III).

All patient enrolled in the study had their weight and height measured and Z scores calculated as per WHO reference values, also the mid upper arm circumference was taken using the mid upper arm circumference tape (MUAC). The weight was taken with an electronic scale and height/length using audiometer in the ward. The Principal Investigator (PI) assessed the nutritional status of the patients admitted to the malnutrition wards with diagnosis of SAM on day 1 of admission and information was extracted from admission and treatment charts on how the patient was triaged in OPD, random blood sugar measurement, whether kept warm, any comorbid condition on admission (Appendix VI) and documented. Patients were followed until day seven of admission, death or discharge whichever occurred earlier. Relevant information regarding the WHO first 8 steps in the management of SAM was abstracted and entered into pro-forma sheet. Information collected was supplemented with information obtained through a structured interview with the care giver (appendix VII) and also direct observations on the ward during daily recruitment visits.

An inventory of commodities necessary in the management of severe of acute malnutrition, availability and reliability of supplies was done using a self-administered questionnaire with nurses and nutritionist (Appendix VIII).

**3.9 DATA MANAGEMENT AND ANALYISIS PROCEEDURE**

The collected data were entered into the computer using Microsoft Access and analyzed using IBM Statistics Confidentiality was observed, names did not appear on collected data. Data were checked for any wrong entry and double entry and corrected. Back up was created in an external hard disk in case of damage and/or loss of original data. Use of coded data were done to ensure maximum confidentiality. Descriptive data were presented as frequency tables, bar graphs, pie charts and cross tabulation. Categorical data were compared using Chi square, while student's t test and analysis of variance (ANOVA) were used for comparison of continuous data. An outcome was considered significant if p value was equal or less than 0.05. Simple summaries of inventory findings, views on availability of supplies, staff and care giver perceptions were prepared.

**3.10 ETHICAL CONSIDERATIONS**

Ethics are norms of conduct that distinguish between acceptable and unacceptable behavior (Resnik, 2011). Ethical approval to conduct the study was obtained from the University of Juba (Appendix ……). When the probable participant met the inclusion criteria of the study they were recruited for the study with their care-givers (respondents). The purpose of the study was explained to the care-givers and they were given an information sheet before they completed and signed an informed consent form (Appendix ….), which was written in English.

Care-givers had a choice to voluntarily participate in the study or not, they were free to withdraw from the study at any time without any intimidations or loss of benefits for which they would otherwise qualify. All information was explained to the care-givers before they signed the consent form. The information sheet (Appendix ……) which explained the purpose of the study was given to the care-givers, and it served as a clarification of what the study was all about and with information of whom to contact in any case of further clarification or if they had any questions concerning the study.

**3.10.1 CONFIDENTIALITY**

Confidentiality was maintained to both the child and the care-giver, and their anonymity was guaranteed as no name or identification of either the participants or respondents was collected during the interview. Confidentiality is a promise that you will not be identified or presented in identifiable form (Bell, 2005)

**3.10.2 ANONYMITY**

All the collected data were anonymous. Anonymity is a promise that even the researcher will not be able to tell which responses came from which respondent (Bell, 2005). Codes were used on forms and in data analysis. Codes are tags or labels for assigning units of meaning to information compiled during a study (Bell, 2005).

**CHAPTER FOUR**

**RESULTS**

**4.0 INTRODUCTION**

This chapter provides an overview of the results of the study. The results are presented in descriptive and analytic statistics in frequencies, percentages, graphs, figures and tables.

**4.1 RESULTS**

Study was conducted in the malnutrition wards of AL Sabah children's hospital from 1st December 2019 to 10th January 2020. A total of 108 Children with admission diagnosis of severe acute malnutrition were recruited. Eight were excluded because they met the exclusion criteria.

Out of 100 children with admission diagnosis of SAM 59 (59%) were boys and 41(41%) were girls with male to female ratio of 1.4:1.

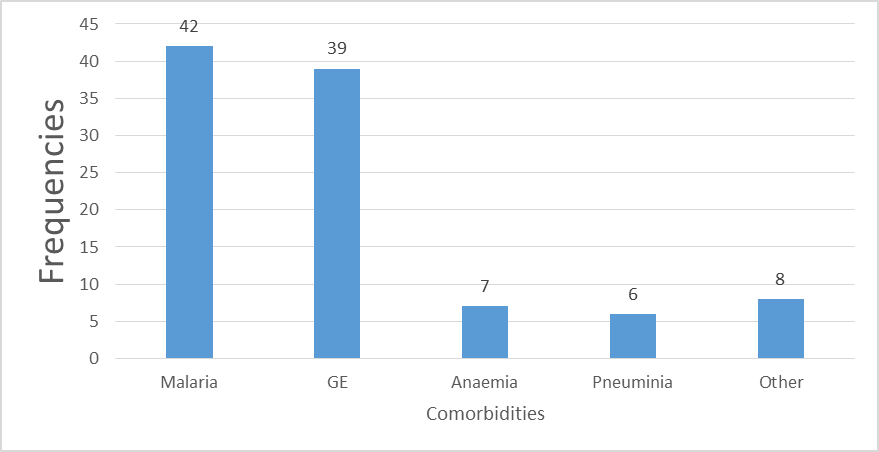
**Figure 2: Sex distribution**

#### Table 1: Demographic characteristics of admissions with acute malnutrition at ACH

|  |  |  |
| --- | --- | --- |
| Variable | Category | Frequency (%) |
| Age in months |  |  |
| Below 24 months, n (%) | 80(82) |
| Above 24 months, n (%) | 20(20) |
| Child’s gender | Male | 59(59) |
| Female | 41(41) |
| Total | 100(100) |
| Average age in months | All children (n = 108) | 16.6 (± 10.9) |
| Marasmus (n = 53) | 25 (± 13.7) |
| Kwashiorkor (n = 38) | 16 (± 10.6) |
| Marasmus- Kwashiorkor (n =  17) | 20(± 7) |

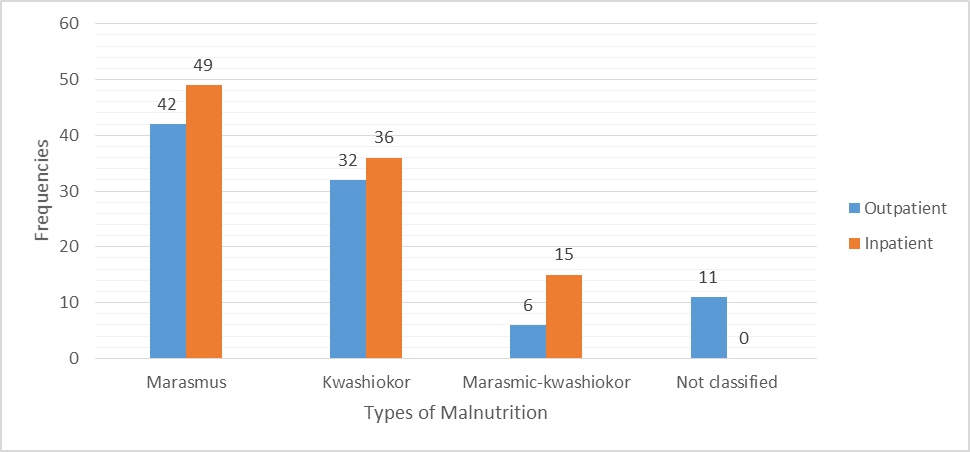
Among the malnourished children who had WHZ < 4, thirty-seven (63%) were males while 20(51 %) were females. The average age of children with WHZ -3SD-4SD was 18 months (with a standard deviation of 12.4 months) and were older when compared to an average age of 14.9 months (with a standard deviation of 8.8) for children with WHZ < 4SD (Table 2). There was no significant association of the WHZ scores with either patient age (p = 0.17) or gender (p = 0.92).

#### Figure 3: Comorbid conditions on admission



The most common co-morbid condition documented at admission by the admitting clinician were malaria and gastroenteritis. Many children have more than one co-morbid at presentation.

#### Figure 4: Classification by point of service (Outpatient and inpatient)



The inpatient classification was done by the primary investigator. The most frequent type of severe malnutrition was Marasmus 49 (50%), followed by Kwashiorkor 36(36%) and Marasmus Kwashiorkor 15 (15%).

#### Table 2: Definition of appropriately done steps

|  |  |
| --- | --- |
| **Steps** | **Appropriately done if** |
| Step 1: Treat and prevent hypoglycaemia | * Given dextrose 10%(5mls/kg) if RBS less than 3mmol/l or if not alert * Oral/NGT feeds as soon as possible< 30 min |
| Step 2: Treat and prevent hypothermia | Provide warmth if axillary temp. is less than 35 degrees Celsius |
| Step 3: Treat and prevent dehydration | * Assume dehydration in any malnourished child presenting with diarrhoea * Give ReSoMal 10mls/kg/hr-2hrs * If in shock, give 20mls/kg of 5% dexterous/HSD or Ringers/dexrous5% |
| Step 4: Correct electrolyte imbalance | Commercial F75 for electrolyte correction (contains extra potassium and magnesium). |
| Step 5: Treat infections routinely | All malnourished children receive correct dose of broad spectrum antibiotics (Penicillin 50,000 iu/kg 6hourly /    Ampicillin 50mg/kg 8 hourly and Gentamycin 7.5mg/kg OD |
| Step 6: Correct micronutrient deficiencies | Vit A given orally on admission (6-12 months:100 000 IU; older children 200 000 IU) on day one |
| Step 7: Feed cautiously | Correct amount of F75 is given. |
| Step 8: Catch up feeds | * The starter F 75 is replaced with an equal amount of catch up F100 for 2 days. * Then each successive feed is increased by 10 mls until some remains uneaten |

# Table 3: Triage at OPD

|  |  |  |  |
| --- | --- | --- | --- |
| Category |  | n | % |
| **Emergency** |  | 18 | 19.1% |
| **Priority** |  | 60 | 63.8% |
| **Non-urgent** |  | 1 | 1.1% |
| **No information** |  | 15 | 16.0% |

Appropriate triage is crucial in reducing time spent at the outpatient department before accessing care for the severely ill child.

In this study, any child who didn't wait to access care is considered appropriately triaged

At OPD 63.8% of children were triaged as priority cases and 19% as emergency cases as shown in the table above.

Overall 82.9% of children were appropriately triaged.

#### Step 1: Treatment or prevention of hypoglycaemia in the wards

TABLE 4: DIAGNOSIS AND TREATMENT OF HYPOGLYCEMIA IN THE WARD

|  |  |
| --- | --- |
|  | n % |
| Random blood sugar done Median [range] | 27 27% |
| 4 [2-32] |
| Treatment given (10%dextrose) n=4/4 | 4 100% |
| Oral/ NGT glucose or feeds given within 30 min of admission | 83 83% |

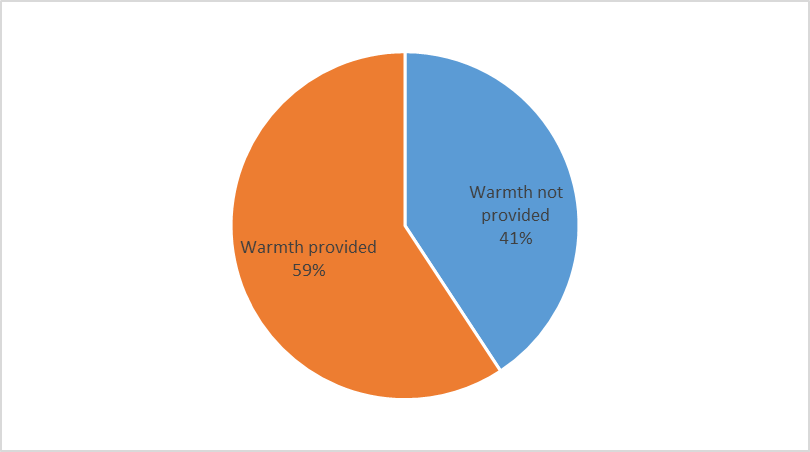
In the ward, twenty-seven children had a random blood sugar done. Four of the twenty-seven children had random blood sugars less than 3 mmol/l and all had 10% dexterous given correctly. Immediate feeding was routinely done with 83 children fed within 30 minutes of arrival in the ward.

Ten children who were in shock were not eligible to be fed within 30 minutes of admission.

Overall 83% of children were appropriately managed for step 1 according to WHO guidelines in the wards. (95% CI 75.6-90.3)

**Step 2: Treat / prevent hypothermia in the wards**

#### Figure 5: Treat / Prevent Hypothermia



Only 54% of children had their temperature taken, and 41% of those had temperature taken had fever and were not provided with warmth.

The proportion of patients appropriately kept warm were 59% (95% CI 71.02%-86.9%.

### STEP 3: TREAT AND PREVENT DEHYDRATION IN THE WARDS

# Table 5: Management of dehydration in the ward

|  |  |  |  |
| --- | --- | --- | --- |
| Management of shock in the ward n= 10 | | Management of dehydration n=67 | |
| IVFs given | 10  (100%) | IVFs given wrongly | 2(2.9%) |
| Correct choice of IVFs given\HSD in 5% dextrous | 10  (100%) | ReSoMal given n: 55/67 | 55 (82%) |
| Correct volume of IVFs given (20mls/kg in 2 hrs) | 10  (100%) | Correct volume of ReSoMal given n: 47/67 | 47 (70%) |
| Number correctly managed for shock | 10  (100%) | Number correctly managed for dehydration n: 47/67 | 47(70%) |

#### Flow chart: Treatment and prevention of dehydration in the ward



100

Patients



Diarrho

ea (67)

(67%)



No

diarrhoe (

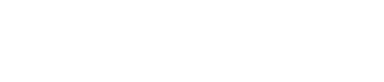
33)

(33%)



Shock (10)

(15%)



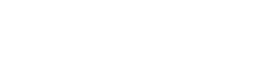
Correctly manage with

ReSoM

al

48

(84%)



Wrongly on IVF

2

)

(3

%



ock

No sh

(57)

(85%)

In the ward, diarrhoea was documented in 67 (67%) children, ten children were admitted in shock, and were all treated with correct fluid and given correct volume. Two children who were not in shock were inappropriately put on IVFs.

84% of children who were not in shock were appropriately managed with correct volume of ReSoMal. Seven children were not put on ReSoMal.

Overall 100% of children who were in shock were appropriately managed for shock and

70% were appropriately managed for dehydration in the malnutrition wards. (95% CI

76.8-91.1%)

#### Blood transfusion

Seventy eight percent of children had HB levels done, eight had HB of less than 4 and were transfused with correct volume of blood. (10mls/kg whole blood +Lasix 1mg/kg)

#### Step 4: Correct electrolyte imbalance

A total of 100 (100%) children were fed on ready to use formula F75 that contain extra potassium and magnesium.

**Step 5: Treat infections routinely**

# Table 6: Treat infections routinely

|  |  |  |
| --- | --- | --- |
|  | n | % |
| Antibiotic prescribed (Penicillin (or Ampicillin) and  Gentamycin) | 92 | 92% |
| Antibiotic dose corrects | 58 | 58% |

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

### STEP 6: CORRECT MICRONUTRIENT DEFICIENCIES

# Table 7: Correct micronutrient deficiencies

|  |  |  |
| --- | --- | --- |
|  | **n** | **%** |
| **Vitamin A given on admission** | 62 | 62% |
| **dose correct** | 58 | 58% |
| **Iron withheld in the initial phase** | 34 | 34% |

Out of 100 children 62 (62%) received high dose vitamin A on day one in the ward, and 58% of them had correct dose given, and 34 children had Iron withheld in the initial phase.

Overall 58% of children were appropriately managed for step 6. (95% CI 48.33-67.67)

### STEP 7: INITIATE FEEDING CAUTIOSUSLY

# Table 8: Initiate feeding cautiously

|  |  |
| --- | --- |
| Fed with F75 n=99/100 | 99 (99%) |
| Correct feed volume in the initial phase(n=97/99) | 97 (97.9%) |
| Fed in the first hour of arrival in the ward (n=99) | 88 (88.8) |
| Route of feeding specified (n=99) | 84 (84.8%) |
| Feed intake monitored | 94 (94.9%) |

A total of 99 (99%) were fed with F75in the initial phase. Children who were breastfeeding continued with breastfeeding. Route of feeding was oral in 71% of children and feeds were monitored in 94% of children.

In step 7, 97% of children were appropriately managed. (95% CI 95.0%-100.7%)

**Step 8: Rehabilitation / catch up feeds**

# Table 9: Rehabilitation/catch up feeds

|  |  |  |
| --- | --- | --- |
|  | n | % |
| Transition to F100 prescribed | 88 | 88% |
| Correct volume prescribed in the transition period | 86 | 86% |
| Volume of F100 increased after the transition period | 45 | 45% |

Of 91 patients who were alive on their day 7 of admission, 88 were prescribed F100 and 86 of them were prescribed and given the correct volume.

In step 8, 97% of children were appropriately managed according to WHO guidelines. (95% CI 93.66%-100.34%)

#### Table 10: Demographic characteristics of admissions with acute malnutrition at ACH

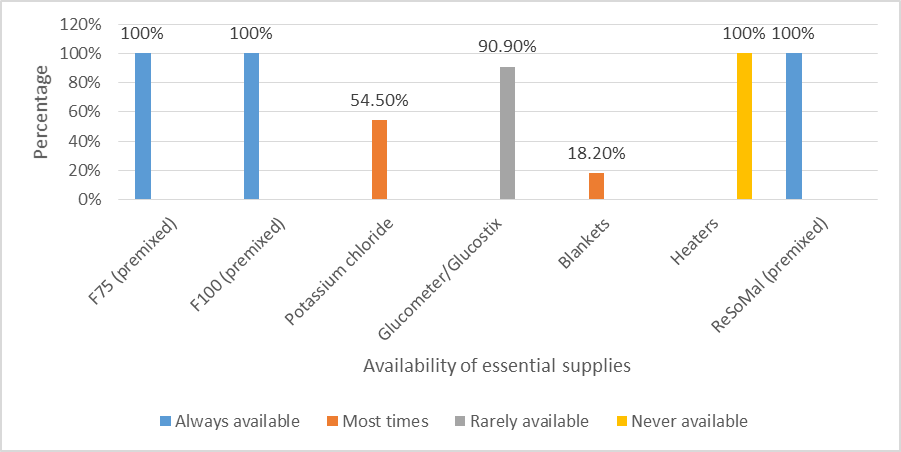
|  |  |
| --- | --- |
| Step 2: Treat and prevent hypothermia | 59% |
| Step 3: Treat and prevent dehydration | 70% |
| Step 4: Correct electrolyte imbalance | 100% |
| Step 5: Treat infections routinely | 58% |
| Step 6: Correct micronutrient deficiencies | 58% |
| Step 7: Feed cautiously | 97.9% |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

# Table 11: Outcome

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  | **n** | **%** |
| **Outcome** |  | Alive | 93 | 86% |
| Dead | 0 | 9% |
|  |  | Not aware | 15 | 5% |
| **Duration of hospital stay in days – Median [range]** |  |  | 13 [2-42] |  |

From the study population of 108 patients, 0 patients died giving case fatality of 0%. 15 patients absconded before day seven of their admission.

#### Figure 2: Availability of essential supplies



An inventory of essential supplies was done through observations in the ward and structured interviews with nurses and nutritionists. A total of 13 health workers were interviewed.

During the time of the study, F75, F100, XPEN, Gentamycin, ReSoMal were available all the time.

**CHAPTER FIVE**

**DISCUSSION, CONCLUSION** **AND** **RECOMMENDATIONS**

**5.0 INTRODUCTION**

This chapter seeks to interpret findings and explore the implications of these findings.

**5.1 DISCUSSION**

This study evaluated current practices of care of children with severe malnutrition at AL-Sabah Children's Hospital, in malnutrition wards and how it compares to WHO guidelines.

The majority of the children were younger than 2 years old. This age distribution among severely malnourished is similar to what other studies found in Colombia, Uganda, South Africa and Kenya. Marasmus was the commonest presentation and this contrasts with what Bernal et al, Colombia and Bachou et al, Uganda found in that Kwashiorkor was the commonest presentation in the two studies.

The most common clinical presentation in this study population at admission was malaria [42 %]. This was similar to observations made by the Gambian and Ethiopian studies which showed the malaria was the commonest presentation31, 32. Diarrhea was also common [39 %] which is similar to observation by Khanum and Bernal where thy found that most with severe malnutrition had diarrhea.

In this study 82.9% of patients were appropriately triaged at OPD. Similar studies in South Africa and Colombia found that emergency triaging at the emergency departments was poorly practiced resulting in long waiting times of up to 8 hours before accessing care33.

Prompt diagnosis, treatment and prevention of hypoglycaemia was inadequately done at OPD with 72% who were treated appropriately. Also 82% of children were fed within one hour of admission. This contrasts to what Ashworth in South Africa where they found some delay in giving first feed with children waiting for up to 11 hours before feeding. Night feeds were given in wards and it is probable that nurses and even the parents/guardians took feeds for malnourished children as “drugs” rather than routine feed. NGT feeding was prescribed for 6% of children similar to South Africa where NGT feeding for critically ill children was uncommon.

Children with severe malnutrition are susceptible to hypothermia. Prompt diagnosis and treatment of hypothermia was poor in this study. As in the South Africa study, temperatures were rarely checked on admission to ward and no routine measurements were carried out. From this study it was noted that temperature were not routinely taken for critically ill children and those with diarrhea were unlikely to be properly kept in warm rooms since malnutrition rooms did not have a heater during the entire duration study and the rooms. Children with diarrhea were nursed in “malnutrition rooms” but the rooms were not warm, although it is usually hot it sometimes gets cold especially during rainy season. However unlike in South Africa were electric heaters were largely available and mothers were admitted with their children though only 13.9% were trained on how to keep children warm.

Because of the difficulty in diagnosis of dehydration in malnutrition and estimation of its severity, rehydration fluids should only be given intravenously only if children are in shock. Severely malnourished children not in shock should be rehydrated orally using ReSoMal which has low sodium and high potassium. These guidelines were not adequately followed and a number of children not documented to be in shock were indiscriminately prescribed IV fluids both at OPD and ward. This could be due to lack of well-trained motivated clinicians. Choice of IVF for shock was unsatisfactory in OPD compared to the wards with 11.2% of children being resuscitated with normal saline. This observation could be explained by differences in knowledge and skills of health workers with wards being managed by more skilled personnel. Oral rehydration was poorly done in OPD compared to wards and there was high likelihood of standard ORS being used in OPD than wards, this could be explained by unavailability of standard ORS in malnutrition wards. Neither monitoring for signs of rehydration nor recording volumes of fluids given was properly done both at OPD and wards. This could be due to lack of knowledge about the dangers of over rehydration and also the limited number of nursing staff. Similar practices were observed by Puone et al in South Africa, where they found indiscriminate use of intravenous fluids and lack of monitoring was due to lack of knowledge about the dangers of intravenous therapy and over rehydration in severe malnutrition.

Infections are common in malnourished children but can be difficult to diagnose because common signs such as fever, inflammation and crepitation are often missing. Broad spectrum antibiotics are routinely administered to severely malnourished children because these children may not present with signs or symptoms of infection. In this study antibiotics were routinely prescribed but only 58% of the children appropriately received broad spectrum antibiotics with both gram positive and negative cover unlike KNH study by Nzioka where 91% of children were appropriately managed for infections. This could be due to the training of clinicians in emergency triage and treatment plus inpatient care at KNH.

The increasing severity of the biochemical imbalance in malnourished children is enhanced by the deficit of vitamins and minerals mainly zinc, folic acid and copper. Therefore, high doses of vitamin A, folic acid and mineral supplements, given at the start of therapy, are fundamental in improving outcome36. In this study only 58% of children received correct dose of vitamin A. A similar finding was documented in South Africa where most of the micronutrients were not routinely supplemented.

Children with severe malnutrition should be given small frequent feeds of a starter formula and continue breastfeeding where applicable. In this study 99% of children were fed with F75 and those who were on breast milk continued to do so. Ashworth in South Africa found that children were being fed on full strength milk and adults’ meals. Ready to use starter formula F75 was always available in the ward unlike in South Africa. Monitoring and computing daily feeds was done in 94% of children unlike Nzioka’s finding at KNH where monitoring of feeds were rarely done. Studies done in other places have shown that activities that require frequent physician and nursing staff besides presence are often poorly done. Availability of nutritionist in the malnutrition wards and their knowledge about the special needs of severely malnourished in terms of feeding could explain above findings.

The initial phase had a medium duration of 4 days. Bernal in Colombia found on average, appetite improved by the fifth day of hospitalization. At this time children attained the minimal necessary metabolic and physiological requirements and could transit to rehabilitation phase safely18. In our study, 88.8% of children alive at day six started the rehabilitation phase with 97.7% receiving the correct feed volume during the transition. However, feed volume was increased after transition for 52% of children only. From the observations during the study period, failure to increase feed volume was principally due to intolerance by the children but not failure by the doctors\ nutritionist in changing feeds prescriptions accordingly.

In our study most of the children were accompanied by care givers who were responsible for feeding their children, charting and supervisions were done by the nurses and the nutritionists. For the duration of the study, most of the caregivers developed the ability to feed their children competently. However, it was noted that a few were sharing their ward diet with the children especially when they go around in the hospital. Hence from this study there is a great potential for care givers to contribute to care of children in view of the shortage of nursing staff. However close monitoring and teachings would be required and this was missing in malnutrition wards.

Case fatality rate in this study was at 9%, WHO considers this as moderate case-fatality rate39. Bernal in Turbo Columbia found a mortality rate of 5.7%. A study in Bangladesh reported application of WHO protocol. Although it is difficult to compare case fatality across various studies due to population characteristics differences, studies have shown that implementation of WHO guidelines results in a decrease in hospital-based case fatality rate13, 18, and 14. Most of the fatalities were due to late to seek medical care and others ran away from the hospital before finishing treatment and by the time they were readmitted, the children were in critical condition. The high case fatality rate in this study could be a factor of poor clinical care also. Out of the 9 patients who died 2/9 (22%) were inappropriately managed for hypothermia. Management of dehydration, electrolyte and micronutrient imbalance and feeding were also inadequate among those who died. Other factors that could be contributing to mortality in this study may be the severity of illness probably due to delayed hospital presentation, with acute medical conditions mainly diarrhea and acute respiratory tract infections being the primary reason for hospital presentation, hence critically ill patients requiring intense medical and nursing care.

From this study, severe malnutrition was satisfactorily managed at AL Sabah Children's hospital with patients being managed appropriately in more than 50% of cases, and from the observation, the least percentages were noted in steps concerned with the clinician prescription. Also major shortfalls in care found in this study include delayed medical care seeking, treatment of hypoglycaemia and hypothermia, inadequate and basic nursing care like monitoring of fluids and vital signs. Supply of major commodities was good most of the time, being different from what Chopra found in South Africa. But the rooms are not well equipped with heaters to suit malnourished children.

Finally, clinical approach to improve management of malnutrition, disease control and health policy at AL Sabah should be accompanied by efforts to improve health system infrastructure and management. The rooms set aside for managing of children with severe malnutrition are well ventilated and almost the coolest rooms in the hospital, and the parents/guardians take the children outside the room just under the trees because its hot for them inside, exposing these children to hypothermia and drought also this makes it difficult to maintain proper hygiene and across infection is a major problem.

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

**5.1 STUDY LIMITATION**

The study was not designed to assess staff's knowledge of the WHO guidelines.

Study exclusion criteria biased the study towards survivors.

**5.2 CONCLUSION**

Quality of care for children admitted with severe malnutrition at Al-Sabah children's hospital was with more than 50% of children were appropriately managed in all the eight steps, some of the essential commodities necessary for management of severe acute malnutrition were also lacking,

**5.3 RECOMMENDATIONS**

There is need to assess knowledge of staff on WHO guidelines and carry out training according to the gaps identified infrastructural improvement for malnutrition rooms and improving staffing levels 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

**REFERENCE**

1. World Health Organization. Management of severe malnutrition: a manual for physicians and other health workers. WHO; Geneva: 1999.
2. Black RE, Morris SS, Bryce J. Where and why are 10 million children dying every year? Lancet. 2003; 361:2226–34. [[PubMed](https://www.ncbi.nlm.nih.gov/pubmed/12842379)]
3. Scholfield C, Ashworth A. Why have mortality rates for severe protein energy malnutrition remained high? Bull. WHO. 1996; 74:223–29. [[PMC free article](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2486901/)] [[PubMed](https://www.ncbi.nlm.nih.gov/pubmed/8706239)]
4. Rice AL, Sacco L, Hyder A, Black RE. Malnutrition as an underlying cause of childhood deaths associated with infectious diseases in developing countries. Bull WHO. 2000; 78:1207–21.[[PMC free article](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2560622/)] [[PubMed](https://www.ncbi.nlm.nih.gov/pubmed/11100616)]
5. Central Bureau of Statistics Kenya Demographic and Health Survey. 2003:155–167.
6. Berkley J, Mwangi I, Griffiths K, Ahmed I, Mithwani S, English M, et al. Assessment of severe malnutrition among hospitalized children in rural Kenya: Comparison of weight for height and mid upper arm circumference. JAMA. 2005; 294:591–7. [[PubMed](https://www.ncbi.nlm.nih.gov/pubmed/16077053)]
7. Allen SJ, Hammer C. Improving quality of care for severe malnutrition. Lancet. 2004; 363:2089–90. [[PubMed](https://www.ncbi.nlm.nih.gov/pubmed/15207969)]
8. Bryce J, Boschi-Pinto G, Shibuya K, Black RE. WHO estimates of the causes of death in children? Lancet. 2005; 365:1147–52. [[PubMed](https://www.ncbi.nlm.nih.gov/pubmed/15794969)]
9. Scholfield C, Ashworth A. Severe malnutrition in children: high case fatality rates can be reduced. Afr Health. 1997; 19:17–18. [[PubMed](https://www.ncbi.nlm.nih.gov/pubmed/12321237)]
10. WHO. Severe Acute Malnutrition. World Health Organization, www.who.int/nutrition/topics/malnutrition
11. Ashworth A, Khanum S, Jackson A, Schofield C. Guidelines for the inpatient treatment of severely malnourished. World Health Organization. 2003.
12. Muller O, Krawinkel M. Malnutrition and health in developing countries. CMAJ. 2003; 173(3):279-86
13. Save the Children. www.savethechildren.ca/page.aspx?pid:403
14. Scalingupnutrition.Org/Sun-Countries/south-Sudan
15. United Nations Children Fund (UNICEF). Level and Trends in child mortality report 2012.www.unicef.org/…/UNICEF\_2012\_child\_mortality\_for \_web\_0904.pdf
16. Based on WHO standards.www.who.int/child growth/standards
17. 14. Deen JL, Funk M, Guevara V, et al. Implementation of WHO guidelines on management of severe malnutrition in hospitals in Africa. Bull WHO 2003; 81:237-243.
18. Maitland, C; Mohammed, S; Peshu,N; et al., Children with Severe Malnutrition: Can Those at Highest Risk of Death Be Identified with the WHO Protocol? PLoS Med 3(12): e500.doi: 1371//journal.pmed.0030500; 2006
19. Bhan MK, Bhandari N, Bahl R. Management of severely malnourished child: perspective from developing countries. BMJ 2003; 326:146-151.
20. Bernal, Carlos; Velásquez C, Alcaraz G, Botero J. Treatment of Severe Malnutrition in Children: Experience in Implementing the World Health Organization Guidelines in Turbo, Colombia: Journal of Pediatric Gastroenterology & Nutrition: 2008; 46(3):322-328
21. Pocket Book of Hospital Care for Children: Guidelines for the Management of common Illnesses with Limited Resources; WHO
22. www.fantaproject.org/.../GOS-CMAM-manual-version%201.0%Nov
23. reliefweb.int/…/unicef%20south%20sudan%20site%20, South Sudan Humanitarian Situation Report
24. www.worldvision.org/south-sudan-conflict. FAQS: conflict in South Sudan and the risk to children.
25. www.cpc.unc.edu/.../service-d... University of North Carolina at Chapel Hill Service Delivery-Quality of Care / Service Provision Assessment…
26. Teller C, Alva S; Reducing Child Malnutrition in Sub- Saharan Africa: Surveys Find Mixed Progress: October, 2008
27. World Health Organization. Health research methodology: a guide to training on research methods. WHO, 2001, second edition page 76.
28. Bachou H, Yumwine J, Mwandime R, et al. Reduction of unnecessary transfusion and intravenous fluids in severely malnourished children is not enough to reduce mortality.Ann Trop pediatr 2008; 28:23-33
29. Hammer C, Kvatum K, Jeffries D; Detection of severe protein –Energy Malnutrition by Nurses in Gambia. Arch Dis child 2004; 89:181-184:10. 1136/dde. 2002.022715
30. Amsalu S, Asnakew G. The outcome of severe Malnutrition in Northwest Ethiopia: Retrospective Analysis of Admission. Ethop Med J. 2006 Apr; 44(2):151-7

**APPENCIES**

**APPENDIX I: PARENT/GUARDIAN CONSENT INFORMATION**

Study Identification Number:

Date:

**Study title**

Malnutrition Management, and Disease control at Al-Sabah Children Hospital – Juba

**Investigators Statement**

I am a Postgraduate student at the Africa Institute for Project Management Studies – Department of Health Science. I am conducting a study as part of the requirement for the Postgraduate Diploma of Public Health. I am requesting you to participate in this study by providing some information in a research study. The purpose of this consent form is to help you decide whether you can participate in this study or not. Please read through this form carefully. You are free to ask any questions about the study.

**Brief description of Study**

Children with severe malnutrition are seen at the OPD and admitted to the malnutrition ward. The study will look at the care they receive at OPD and malnutrition wards. The study aims to determine the proportion of children appropriately managed for severe malnutrition at the Al-Sabah children hospital. This assessment will be carried out by checking how the children are managed as per the WHO guidelines. The findings of the study will recommend on the areas of care that needs improvement and thus better the outcomes for such children. The information obtained will be used to improve the said care.

**Procedures**

The study will assess the nutritional status of the child. This includes measuring the height and weight, taking blood to check the blood sugar and urea and electrolytes. The files will be audited to look at the care provided.

**Risks**

There is no harm or risks that will be subjected to your child as a result of participating in this study. Any information obtained will be used to improve care

**Benefits/ Costs/ Compensation**

There will be no costs incurred by participating in this study. There will be no compensation as well. This study will not benefit your child immediately. The information obtained will be interpreted to you and will be used to improve the overall care provided in the hospital.

**Confidentiality**

This is to assure you that confidentiality will be maintained for any information regarding your child. The information obtained relating to your child will not be discussed or published.

**Rights/ Voluntariness**

Your participation in this study is purely voluntary. You may withdraw your participation or refuse to participate at any stage of the study. This will not affect or influence the care your child is receiving.

**Persons to contact**

If you have any questions about the study or your participation in the study you can contact the main investigator Telephone: +211923648095/+211916728186

Email: [francispgalerio@rocketmail.com](mailto:francispgalerio@rocketmail.com)

**APPENDIX II: PARENTS OR GUARDIAN CONSENT FORM**

The study has been explained to me. I have understood the purpose and also my rights as a subject in this study. I had an opportunity to ask questions and seek clarifications. I also understand that I can withdraw from the study at any time without impacting on the care my child will receive. If I have questions later about the research, I can contact one of the researcher/ supervisors listed above.

I voluntarily agree to participate.

Signed (Parent / Guardian) ---------------------------------------- Date -------------------

Signed (Investigator) ------------------------------------------------ Date--------------------

**APPENCIES**

**APPENDIX III: PARENT/GUARDIAN CONSENT INFORMATION**

Study Identification Number:

Date:

**Study title**

Malnutrition Management, and Disease control at Al-Sabah Children Hospital – Juba

**Investigators Statement**

I am a Postgraduate student at the Africa Institute for Project Management Studies – Department of Health Science. I am conducting a study as part of the requirement for the Postgraduate Diploma of Public Health. I am requesting you to participate in this study by providing some information in a research study. The purpose of this consent form is to help you decide whether you can participate in this study or not. Please read through this form carefully. You are free to ask any questions about the study.

**Brief description of Study**

Children with severe malnutrition are seen at the OPD and admitted to the malnutrition ward. The study will look at the care they receive at OPD and malnutrition wards. The study aims to determine the proportion of children appropriately managed for severe malnutrition at the Al-Sabah children hospital. This assessment will be carried out by checking how the children are managed as per the WHO guidelines. The findings of the study will recommend on the areas of care that needs improvement and thus better the outcomes for such children. The information obtained will be used to improve the said care.

**Procedures**

The study will assess the nutritional status of the child. This includes measuring the height and weight. Further, the daily records of the admitted patients will be audited to look at the malnutrition management and care provided.

In order to collect as much information as possible, questionnaires will be given to you to fill in as accurately as you can. We (the Supervisors and the Principal Investigator) do not anticipate that the questions will be difficult to answer. Your participation is voluntary and you may refuse to answer any question or you may withdraw from the study at any time without penalty.

**Risks**

There is no harm or risks that will be subjected to you by participating in this study.

**Benefits/Costs**

This study will not benefit you directly. You will not incur any costs by participating in this study. The information obtained will enable the hospital identify any weaknesses and thus strengthen or improve the care provided in the hospital and therefore the outcome of sick children.

**Confidentiality**

This is to assure you that confidentiality will be maintained. The information collected will be anonymous. There will be no record of names. No findings in this study will be linked to individual respondents. Your supervisors will not have access to the individual questionnaires as all data will be kept under lock and key.

**Rights/ Voluntariness**

Your participation in this study is purely voluntary. You may withdraw your participation or refuse to participate at any stage of the study. This will not affect or influence the care your child is receiving.

**APPENDIX IV: CONSENT FORM AND PARTICIPANT’S STATEMENT**

This research has been explained to me in details. I have understood the purpose and also my rights as a participant in this study. I had an opportunity to ask questions and seek clarifications where I needed. I also understand that I can withdraw from the study at any time without penalty. If I have questions later about the research, I can contact one of the researchers listed above.

I therefore voluntarily Agree to participate in the study

Do not agree to participate in this study.

Signed (Health Worker)…………………………… Date…………………………..

Signed (Investigator)……………………………… Date………….:………………

**APPENDIX V: AUDIT TOOL: APPROPRIATE MANAGEMENT OF SEVERE ACUTE MALNUTRITION AT ACH**

Questionnaire Serial Number----------------Name of Interviewer ---------------

Date (when the audit was carried out) ------------------------------------

DEPARTMENT (Tick as appropriate)

Malnutrition ward……………………………OPD……………………

**PART 1: Demographic characteristics of the patient**

1. Date of birth (dd/mm/yy) ------------

2. Age---------------------------months----------Years -------------

3. Sex M F (tick as appropriate)

PART 11: Anthropometric measurements

4. Weight------------------- (Kg) ---------------- (gm)

5. Height or Length (CM) ---------------------

6. Weight for Height (length) Z score

7. MUAC

8. Check for presence of (Tick as appropriate)

|  |  |  |
| --- | --- | --- |
|  | Present | Absent |
| Visible severe wasting(buttocks) |  |  |
| Oedema bilateral( Pitting) |  |  |

9. Classification of severe malnutrition (tick as appropriate)

Kwashiorkor-Marasmus

Marasmus-Kwashiorkor

Non severe malnutrition

**PART 2: Management Steps:**

Emergency management at OPD

10. How was the patient triaged at OPD?

Emergency Priority Non urgent No information

11. Step 1(tick or fill as appropriate) – Treatment or prevention of hypoglycaemia (if RBS < 3mmol/l)

(i) Was Random blood sugar done?

Yes

No

(ii) If Yes Result-------------

(iii)Was treatment given (5mls/kg of 10% dextrose)?

Yes

No

(iv) If not dextrose what else was given to treat hypoglycaemia on admission? ----------------------

(v) Was oral/ ngt glucose or feeds given?

Yes

No

How long after admission----------------

12. Step 2 (tick or fill as appropriate) Treat / prevent hypothermia (Axillary temp <35C)

1) Was temperature taken on admission?

Yes

No

Axillary Temp ------------Rectal Temp------

2) Was warm provided?

Yes

No

No information

3) If yes, how?

By warmed blankets --------------- heater--------------- any other--------------

4) Was instructions given to mother on the day of admission to keep child warm?

Yes

No

13. Step 3 Treat or prevent Dehydration (Tick or fill as appropriate)

(i) Was diarrhea present?

Yes

No

(ii) If yes, was dehydration present?

Yes

No

(iii)If yes, was hypovolemic shock present?

Yes

No

{Shock: reduced consciousness, cold hands absent, slow (<60bpm) or weak pulse}.

(iv) If yes, proceed to (V), if no skip to 10

(v) Was IVF prescribed?

Yes

No

Type of IVF given

(vii) Was IV Fluids Y N

(viii) Was choice of IV Fluids correct?

Yes

No

(ix) Was amount of IVF given in 1st hour correct (15mls/kg of HSD in 5% dextrose over I hour)?

Yes

No

(x) Was there monitoring and recording of IVF?

Yes

No

(xi) Was child reviewed after 1 hour of IVF?

Yes

No

14. Assessment on admission to the ward

(i) Was temperature recorded at admission?

Yes

No

(ii) Results ……………….

(iii) Was oedema documented on admission by ward clinician?

Yes

No

(iv) Eye changes

Yes

No

(v) Oral thrush

Yes

No

(vi) Was severe wasting documented by ward clinician?

Yes

No

(vii) What was the diagnosis by admitting clinician?

Marasmus

Kwashiorkor

Marasmus-kwashiorkor

Not classified

(viii) Any co-morbid conditions noted by admitting clinician?

(a) (C)

(b) (D)

**Ward management**

15. Step 1(tick or fill as appropriate) – Treatment or prevention of hypoglycaemia (if RBS < 3mmol/l)

(I) Was Random blood sugar done?

Yes

No

(II) If Yes Result-------------

(III) Was treatment given (5mls/kg of 10% dextrose?)

Yes

No

(IV) If not dextrose what else was given -------------------------?

(V) Was oral/ NGT glucose or feeds given within 30 mins of admission?

Yes

No

If no, how long after admission? ----------------

16. Step 2 (tick or fill as appropriate) Treat / prevent hypothermia (Axillary temp <35C)

a) Was temperature taken?

Yes

No

Axillary Temp ------------Rectal Temp------?

b) Was “keep warm” prescribed in the treatment sheet?

Yes

No

c) Was warm provided?

Yes

No

d) If yes, how?

By warmed blankets --------------- heater--------------- any other--------------

e) Was instructions given to mother to “keep child warm”?

Yes

No

If yes, by 1/adequate cover?

Yes

No

2/ Minimal washing

Yes

No

3/ any other means

Yes

No

17. Step 3 Treat or prevent Dehydration (Tick or fill as appropriate)

(I) was diarrhea present?

Yes

No

If No proceed to XIII

(II) If yes, was dehydration present?

Yes

No

If No proceed to XIII

(III) If yes, was hypovolemic shock present?

Yes

No

{Shock: reduced consciousness, cold hands absent, slow (<60bpm) or weak pulse}.

(IV) If yes, proceed to (V), if no skip to X

(V) Was IVF prescribed?

Yes

No

(VI) Was IVF given?

Yes

No

(VII) Was choice of IVF (HSD in 5% dextrose) correct?

Yes

No

(VIII) Was amount of IVF given in 1st hour correct (15mls/kg of HSD in 5% dextrose over I hour)?

Yes

No

(IX) Was there monitoring and recording of IVF?

Y N

(X) Was child reviewed after 1 hour of IVF? Y N

(XI) Was patient switched to/ prescribed ReSoMal (check T sheet?

Yes

No

(XII) was the volume of ReSoMal correct {10mls/kg/hour for up to 10 hours}?

Yes

No

(XIII) Was ReSoMal monitored?

Yes

No

(XIV) Was Hb done?

Yes

No

(XV) If yes, result ……………

(XVI) Was the patient transfused? Y N {if HB < 4g/dl, 10mls/kg whole blood + frusemide 1mg/kg in 3 hours}

18. Step 4: Correct electrolyte imbalance (Tick or fill as appropriate)

(i) Was electrolyte imbalance corrected?

Yes

No

(ii) With commercial F75?

Yes

No

(iii) If commercial F75 not available, Was mineral mix or extra potassium (4mmol/kg) mixed to feeds?

Yes

No

19. Step 5: Treat or prevent infections (tick or fill as appropriate)

(i) Was antibiotic (Penicillin (or Ampicillin) and Gentamycin prescribed?

Yes

No

(ii) Was the dose correct of X-pen (50,000 iu/kg 6 hourly) or ampicillin 50mg/kg 8 hourly), gentamycin (7.5mg/kg OD), (Check T sheet?

(iii)Others (Check T Sheet): Nystatin/ clotrmazole (if oral thrush present) ----- mebendazole (after 7 days) ---------- TEO (if pus or ulceration in the eye) ---

20. Step 6: Correct micro-nutrient deficiencies (tick or fill as appropriate)

(i) Was Vitamin A given on admission (check T sheet)?

Yes

No

ii) Was the dose correct (6-12months:100,000 IU; above 1 year: 200,000 IU) on day 1?

Yes

No

(iii)Was folic acid given/ prescribed on T sheet on admission (2.5mg on alternate days)?

Yes

No

(iv) Was multivitamin given/ prescribed in the T sheet?

Yes

No

(v) Was iron with held in the initial phase?

Yes

No

(vi) Was iron given in the catch-up phase if it was indicated?

Yes

No

When? ………….

21. Step 7 Initiate feeding/starter feeds (tick or fill as appropriate)

(i) Was starter feeds F75 prescribed?

Yes

No

(ii) Was starter feeds F75 given?

Yes

No

If no diarrhea

(iii)Was correct amount prescribed (if no oedema 130mls/kg/day or 100mls kg/day if oedema)?

Yes

No

(iv) Was correct amount of F75 given?

Yes

No

(v) Was frequency of feeds correctly prescribed?

Yes

No

(vi) What the frequency was of feeds

2hourly…..

3hourly…..

Not specified…..

(vii) Was the patient fed within one hour of admission?

Yes

No

(viii) If no, how long did the patient stay in the ward before the first feed was given?

……hours

(ix) What was the route of feeding?

Oral

NGT

Not specified

(x) Mean days on starter formula (F75)……………

(xi) Was the feed intake monitored daily?

Yes

No

22. Step 8 Rehabilitation / catch up feeds (tick or fill as appropriate)

(i) Was transition to F100 prescribed?

Yes

No

(ii) Was correct volume prescribed in the transition period?

Yes

No

(Check T sheet if same feed volume of amount of F75)

(iii)Was volume of F100 increased after the transition period?

Yes

No

23. Was pulse, respiratory rate, temperature monitored at least 6 hourly in first 2 days?

Yes

No

24. Outcome: Discharged ---------------

Alive

Dead

25. Duration of Hospital stay …………………. day