

# Outcome and Effectiveness of Inpatient Care of Malnourished under Five Children in District Hospitals of Mwanza Region, North Western Tanzania

Sospatro E. Ngallaba<sup>1\*</sup>, Daniel J. Makerere<sup>1</sup>, Anthony Kapesa<sup>1</sup>, Stella Mongela<sup>2</sup>, Basinda Namanya<sup>3</sup>

<sup>1</sup>School of Public Health, Catholic University of Health and Allied Sciences, Mwanza, Tanzania

<sup>2</sup>Department of Pediatrics, Catholic University of Health and Allied Sciences, Mwanza, Tanzania

<sup>3</sup>School of Public Health, Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania

Email: \*[sngallaba@gmail.com](mailto:sngallaba@gmail.com)

Received 20 January 2014; revised 28 April 2014; accepted 15 May 2014

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## Abstract

**Background:** Malnutrition is a disease affecting commonly children from 0 to 5 years of age. In Tanzania it is still a problem with a prevalence of 36% and 28% mortality. **Objective:** This study aimed to compare the outcome and effectiveness of therapeutic regimes used by different district hospitals in the management of malnutrition of under five years old children in Mwanza Region. **Methods:** Patient charts were reviewed collecting social demographic attributes, diagnosis, type of therapeutic regimen given and treatment outcome. **Results:** The prevalence of malnutrition was found to be 30% with case fatality rate (CFR) of 8.8%, for the health facilities using WHO regime while 29% CFR for those using traditional regimen. The use of recommend malnutrition screening tests was generally poor. **Conclusion:** Malnutrition is still a public health problem with high mortality rate in Tanzania which is mainly caused by failure to use the WHO regimen. There is a need to use the available screening methods and recommended regimens to avert this.

## Keywords

Outcome and Cost Effectiveness, Under Five, Malnutrition, WHO Therapeutic Regimen

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\*Corresponding author.

## 1. Introduction

Malnutrition (under nutrition) is still a major health problem in developing countries and particularly in Sub-Saharan Africa where some people are living below the poverty line. Worldwide more than 10 million children under five years of age die of malnutrition, of whom 1.5 million are severely malnourished, and in developing countries about 60% of children are stunted due to malnutrition [1]. This has been the global concern for decades now, with uneven decrease in incidence differing from one country to another but still with high mortality rate [2] [3].

Because of high mortality rate the WHO developed therapeutic guideline which is based on accumulative experience of over 30 years from nutrition units in Uganda, South Africa and Caribbean, by using the WHO guideline case fatality rate of primary malnutrition was reduced to less than 5% [4]. In Tanzania malnutrition has declined from 47% to 44% in the year 1991 to 1999, furthermore it has improved to 38% in 2004 [5]. Mortality in children below five years of age has been caused by many diseases but the leading underlying cause is malnutrition, which is approximately 58% globally with an estimation often children dying in every minute [6]. About 146 million children under five in the developing world are suffering from insufficient food intake, repeated infectious diseases, muscle wastage and vitamin deficiencies mostly in Asia and Africa. Three quarters of the 146 million undernourished children come from just 10 countries, India accounts for 57 million of the total [7] [8]. Sub-Saharan African countries have the highest case fatality rate due to malnutrition. Chronic diseases like tuberculosis and HIV/AIDS have made the situation of malnutrition severe while in a middle of inadequate inpatient care [4] [9].

The adoption of WHO therapeutic regime guideline in Sub-Saharan Africa has been shown to reduce the CFR of primary malnutrition to less than 5% if no other co-morbidities. Failure to achieve CFR below 5% can be attributed to many factors including inadequate trained health staff who can deliver the recommend treatment according to the WHO [10]. WHO therapeutic regime was used in Kilifi district hospital but they failed to achieve CFR below 5%, however it dropped from 30% to 19% [11]. Following many studies WHO in early 1990 circulated the therapeutic manuals, its primary aim was to provide a good quality care of which its expected results was to reduce the CFR and promote cure rate. In Malawi for instance after using the WHO therapeutic regime they managed to reduce CFR from 18% to 8% and 10% to 6%. As a result all the district hospitals in Malawi were urged to adopt the WHO therapeutic regime [12] [13]. In Tanzania particularly in Mwanza the cure rate of admitted malnourished cases in health facilities was not well known. This study therefore aims at finding out the outcome and effectiveness of treatment of malnutrition cases in Mwanza district hospitals and suggests the best ways toward improvement of fatality rates.

## 2. Methods

### 2.1. Study Design and Sampling Process

This was a cross sectional descriptive retrospective study which included all children less than five years of age admitted with malnutrition in children wards, the target population are the children under five years of age admitted with malnutrition. This study was conducted in district hospitals of Magu, Kwimba, Misungwi, Senge-remu, Geita and Ukerewe, this study also involved Sekouture regional hospital and Bugando referral and teaching hospital in Mwanza City. All Children admitted with malnutrition diagnosed based on clinical and anthropometric measurements from 2011 to 2013 were included in the study.

### 2.2. Data Collection Techniques and Tools

A review of patient charts was made among the admitted cases of malnutrition for 2011, 2012 and 2013. By using a check list data pertaining to date of admission, sex, age, number of days in the hospital, working diagnosis, type of treatment given and outcome of the treatment was collected. The counterchecking of the above data was done in the hospital admission and discharge registries to check if there was any discrepancy. Number of staff trained on effective management of malnutrition on every hospital was also obtained on every hospital visited.

### 2.3. Data Analysis

Frequency distribution of classified types of under nutrition with their associated case fatality rate per district was done. Number of trained staff on the WHO recommended malnutrition case management per district was

tabulated. Comparison in terms of CFR between the WHO regimen and the traditional was also done together with the distribution of treatment outcome per district.

## 2.4. Study Clearance and Ethical Considerations

The study ethical clearance was obtained from the Institutional Review Board (IRB) of the Catholic University of Health and allied Sciences. A written informed consent from each hospital was sought and confidential handling of clinical information was carefully observed.

## 3. Results

In Mwanza Region 1988 cases of malnutrition were admitted in 8 government hospitals in the past three years year, thus 55 cases of malnutrition on average were admitted monthly with 54% males and 46% females. Generally the distribution of malnutrition according to the type was found to be 18.9%, 52% and 29.1% of mild, moderate and severe malnutrition respectively.

Case fatality rate was higher in Ukerewe 32.2% (76/236), followed by Geita 31.5% (57/181) and Kwimba 30.9% (64/207) whereas Magu and Misungwi district hospitals had only 28.3% and 22% respectively. The two hospitals which are used as referral had low CFR, thus Bugando hospital had 4.9% and at Sekouture hospital 12%. Sengerema designated district hospital had also a very low CFR as compared to other district hospitals (see **Table 1**). Surveying the number of trained staff on WHO regime protocol, this study found no body was ever trained in Magu and Ukerewe district hospitals. Kwimba and Geita hospitals had only 16.6% (1/6) and 12.5% (1/8) staff trained respectively while Bugando consultant hospital, Sekouture regional hospital and Sengerema faith based district designated hospital had more than 37% of their staff trained on WHO regime protocol (see **Table 2**).

In general the CFR in Mwanza Region was 18% (367/1988) however where WHO regime protocol was used it was found to have lower CFR (8.8% (89/1011)). The traditional of regime had a higher CFR as compared to the WHO regimen (29% (285/977)). Generally the WHO regimen is three times more effective than traditional regimen (see **Table 3**) though there could be some other confounding factors. The mortality rate by type of malnutrition per district is as follows: mild form had mortality rate of 7.9 per 100, moderate form had mortality rate of 17.6 per 100 and severe form had mortality rate of 26.8 per 100. This shows that severe form of malnutrition had the highest rate of mortality in all hospitals (see **Table 4**).

## 4. Discussion

This is a hospital based study, so what is seen or observed at the health facilities in terms of malnutrition cases is just a piece of floating ice berg because studies have shown that very few cases of malnutrition are captured at

**Table 1.** Shows the distributions of morbidity, mortality and case fatality rate among under five years children with malnutrition in Mwanza Region for the year 2011-2013.

Districts	Mild n = 376	Moderate n = 1034	Severe n = 578	Total n = 1988	Deaths 374	CFR* 18.8	Regime mixed
Misungwi	37	132	25	194	43	22	Traditional
Kwimba	69	109	29	207	64	30.9	Traditional
Magu	40	102	17	159	45	28.3	Traditional
Sengerema	85	32	15	132	22	16.6	WHO
Geita	65	93	23	181	57	31.5	Traditional
Ukerewe	80	100	56	236	76	32.2	Traditional
Bugando	0	189	359	548	27	4.9	WHO
Sekouture	0	277	54	331	40	12	WHO
Total%	18.9%	52%	29.1%	100			

**Table 2.** Distribution of trained staff on WHO regime per district in Mwanza Region.

Districts	Trained	Not trained	Proportion of trained staff per hospital
All hospitals	N = 19	N = 48	28.3% (19/67)
Misungwi	2	5	28.5% (2/7)
Kwimba	1	5	16.6% (1/6)
Magu	0	8	0% (0/8)
Sengerema	3	5	37.5% (3/8)
Geita	1	7	12.5% (1/8)
Ukerewe	0	7	0% (0/7)
Bugando	8	5	61.5% (8/13)
Sekouture	4	6	40% (4/10)

**Table 3.** Effectiveness of WHO regime as compared to the traditional regime.

	Cases	Deaths	CFR
Regime	N = 1988	N = 374	19%
WHO	1011	89	8.80%
Traditional	977	285	29%

**Table 4.** Shows the distribution of morbidity and their respective outcome per districts.

Hospitals	Mild N = 376	Deaths N = 30	Moderate N = 1034	Deaths N = 182	Severe N = 578	Deaths N = 155
Misungwi	37	3	132	27	25	13
Kwimba	69	11	109	34	29	19
Magu	40	3	102	10	17	12
Sengerema	85	0	32	10	15	12
Geita	65	9	93	27	23	21
Ukerewe	80	6	100	33	56	37
Bugando	0	0	189	7	359	20
Sekouture	0	0	277	19	54	21

the health facilities because only 15% of the cases are diagnosed at the health facilities the rest are misdiagnosed as cases of measles, pneumonia, diarrhea and others. It is also known that malnutrition can cause a lot of health problems because malnutrition reduces the body immunity hence other problems can occur as complications example tuberculosis, viral infections and other infections. In order to capture such cases it is advisable to use recommended Malnutrition Screening Test (MST) or Short Nutrition Assessment Questionnaire (SNAQ), this screening test has sensitivity of 53% to 67% with specificity of 97% to 98% [13] [14].

The distribution of cases (hospital based study) was found to be as follows 57% of the cases are male while 43% are female children, such distribution could be due to the fact that male receive more attention or medical care as compared to female children, because according to the population structure in Tanzania the female are more than males, but this could also explain that female children spend more time with mothers who prepare daily meals for their family as a result they are the first one to receive whatever have been cooked or prepared

by their mothers [15]-[17].

The cases of malnutrition in district hospitals are still causing high mortality rate probably due to co-existence of other diseases like malaria, pneumonia, diarrhea etc., but also mismanagement of severe cases at the health facilities, since severe type of malnutrition has high CFR therefore they demand intensive patient care [18]-[21]. This study has shown that where they used WHO regime the CFR was low thus it is more effective than traditional regimes, probably because WHO regime looks at a wide spectrum including other diseases or infection beside malnutrition. These findings are in accordance with the findings in Rwanda where they managed to lower CFR from 20% to 9% when they used WHO regime [12] [13] [22]. Another reason which account for high CFR is failure to use WHO regime this could be due to shortage or lack of trained staff on intensive care of malnutrition [21] [23]. This has been shown by the study that health facilities with trained staff on WHO protocol and who are using the regime have shown low CFR, this shows that they had skills on intensive care of malnutrition. In some district hospitals they had few trained staff and hence they couldn't use the WHO regime. In Malawi they found that health facilities with well trained staff on WHO protocol the CFR was below 10% [13]. In order to reduce more the CFR WHO recommends that cases should get discharge through nutritional rehabilitation unit (NRU), though in Malawi it was found that the hospital stay was too long when they are discharged through NRU, the hospital stay recommended by WHO was four weeks [13] [24].

## 5. Limitations

The prevalence could be higher than what was found in the study because not all cases of malnutrition are reported at the hospital, furthermore many children report to the hospital because of other health problems, so malnutrition some time is captured by chance and some children go to seek treatment because of failure to thrive, general body weakness, recurrent fever, and the management focuses on those signs and symptoms.

## 6. Conclusion

Malnutrition is still a public health problem with high case mortality rate which is attributed by failure to use WHO protocol which can reduce CFR significantly. This has been practiced and found to be effective in Rwanda and Malawi and many other countries. Another factor is shortage of trained staff on WHO protocol in health facilities. Last but not least, it is the failure to use Malnutrition Screening Test (MST) or Screening Nutrition Assessment Questionnaire (SNAQ) which is important in early diagnosis of malnutrition, otherwise it is difficult to capture malnutrition in early stage.

## Acknowledgements

St. Augustine University Tanzania funded the whole study while the Catholic University of Health and Allied Sciences supported logistics especially transport which was used during the whole duration of the study. Also thanks to the Ethical Medical Research clearance Committee for approving and giving research clearance.

## Competing Interests

The authors declare that they have no competing interests.

## Authors Contributions

To conceive the study, SE is the principal author who developed the idea and analyzed the data, DJ and KA designed the study while MS and BN they had to oversee data collection and cleaning of data. All authors participated in writing of this manuscript. All authors read and approved the final manuscript for publication.

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