

Analysis of Hospital Records on Treatment Outcome of Severe Acute Malnutrition: The Case of Gondar University Tertiary Hospital

Ashagrie Terefe Abeje¹, Temesgen Worku Gudayu², Yewunetu Dessalegn Malefia³ and Birhanu Boru Befftu³

¹Department of Pediatrics and Child Health, University of Gondar tertiary Hospital, Ethiopia

²Department of Midwifery, University of Gondar, College of Medicine and Health Sciences, Ethiopia

³Department of Nursing, University of Gondar, College of Medicine and Health Sciences, Ethiopia

*Corresponding author: Temesgen Worku Gudayu, Department of Midwifery, University of Gondar, College of Medicine and Health Sciences, Ethiopia, Tel: 251911755087; E-mail: teme.worku@gmail.com

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Abstract

Introduction: Globally severe acute malnutrition affects most children aged under five years old. Particularly those who are living in the developing world and in the extreme poverty regions were affected more.

Objective: To assess treatment outcome and associated factors of severe acute malnutrition among under five children in Gondar University tertiary Hospital.

Methods: A cross sectional analysis of two years record was done in Gondar University tertiary Hospital among under five years old children with severe acute malnutrition who were registered between September 2010 and August 2012. Data was collected from 298 patient charts and registration book by using data extraction format which was prepared based on the world health organization standardized manual. Data were entered in to EPI info version 3.5.3 and analyzed by using SPSS for window version 20.

Result: The finding of this study indicated that 68.5% of children were cured and discharged, 19.8% were defaulters and 11.7% were died. Severely wasted and severely stunted patients were 57.3% and 44.6% respectively. Children with acute gastroenteritis and HIV co morbidities were nearly three and ten times more likely to die respectively compared with their counter parts.

Conclusion and recommendation: All treatment outcomes are below the acceptable range of global SPHERE standards. The hospital should monitor and evaluate therapeutic feeding program to improve treatment outcome and give emphasis for cases with co morbidities especially acute gastroenteritis and HIV.

Keywords: Sever acute malnutrition; Treatment outcome; Gondar university referral Hospital

Abbreviations

SAM: Severe Acute Malnutrition; MUAC: Mid-Upper-Arm Circumference; NCHS: National Center for Health Statistics

Introduction

Severe acute malnutrition (SAM) is defined as very low weight-for-height (Z-score below -3SD) of the median World Health organization (WHO) child growth standards or a mid-upper arm circumference (MUAC) < 115mm or the presence of nutritional edema or weight-for-height ratio of below 70% [1,2]. Severely malnourished children are more vulnerable to disease and medical complications. In acute malnutrition, the amount of one or more macronutrients to the body tissue is found insufficient to sustain optimal function [3].

Though prevalence of moderate and severe stunting and underweight in developing countries including sub Saharan Africa declined from 47.2% to 29.9% and 30.1% to 19.4 % respectively over

the past 25 year (1985-2011), those countries as a whole have still less than 5% chance of meeting MDG 1 targets [4].

Malnutrition can affect all age groups, but it is more frequent among infants and young children [5]. Severe acute malnutrition is common in sub Saharan Africa, with approximately 3% of children under five year of age affected at any one time. It is also associated with several hundred thousand child deaths each year [6].

Nutrient deficiency may result from inadequate diet, poor absorption of ingested nutrients, or the presence of chronic inflammatory disease condition. The immediate causes of malnutrition and child death are mutually reinforcing conditions of inadequate dietary intake and infectious disease [3,7-9].

In Ethiopia malnutrition is common health problem. Nearly half (44%) under the age of five years old children were stunted, 10% wasted and 29% underweight. Stunting and wasting rates were even higher among rural children [7,10]. This study therefore is aimed to determine treatment outcome of SAM and identify its associated factors among under-five year children who were admitted and treated in Gondar University tertiary Hospital.

Methods

Cross-sectional analysis of Hospital records was done among SAM cases registered between September 2010 and August 2012 in Gondar University tertiary Hospital.

The Hospital is located about 730 km North West from the capital of Ethiopia, Addis Ababa. It serves as a referral center for North Gondar administrative district and the residents surrounding the zone. It has a bed capacity of 512. Of which 70 are used for children under the age of fifteen years. Pediatric ward has an isolate unit for therapeutic feeding of severe acute malnutrition.

The Hospital uses standardized management protocol of severe acute malnutrition that is an update of existing guideline [1]. According to this protocol, all SAM cases with co morbidities and poor appetite will be admitted in the Hospital for in patient management. Whereas those diagnosed for SAM without co morbidities and having good appetite will be linked to the outpatient management. After in patient management, those who satisfied a discharge criteria will be linked to community based feeding program for follow up.

Our sample comprised of 298 charts from 487 that were diagnosed as severe acute malnutrition during a period of two years from September 1, 2010 - August 31, 2012. A sample size was calculated using single population proportion formula considering 21.3% proportion of deaths of SAM cases from previous study [11] and 15% contingency for incomplete charts. Completely filled charts were randomly selected and included in the study.

In this study Sever Acute Malnutrition is defined as Wasting (Z-score below -3SD) or (Weight/Height < 70%) or presence of bilateral edema or Mid Upper Arm Circumference (MUAC) < 115mm for a child at admission.

Patients who were discharged after reaching the discharge criteria (weight for height/length \geq -1.5z score on more than one occasion or MUAC > 125mm and no edema for 14 days) considered as cured. Whereas those who disappeared from therapeutic feeding center for three consecutive days and more before reaching the discharge criteria were defined as defaulter. Those patients who died while in the therapeutic feeding program were defined as dead.

Data were collected by four BSC nurses. Training was given for data collectors before data collection period. Patient chart and registration book of severe acute malnutrition were used as data source and data were extracted by a checklist which has been adopted from world health organization standardized manual.

The checklist included demography (age, sex and family size), nutritional history (exclusive breast feeding and bottle feeding), anthropometry (weight and height/length), presence or absence of edema, immunization status, medical diagnosis at admission (co morbidities) and treatment outcome of severe acute malnutrition.

Data quality and completeness was checked by investigators during data collection period. Then the collected data were double entered in

to epi-info 3.5.3 to control errors and analyzed using SPSS for windows Version 20.0. First bivariate logistic regression analysis was done for each explanatory variables and then multivariate back ward stepwise logistic regression analysis was done in order to control confounding effect. The presence and strength of association of variables was assessed using odds ratio with 95% confidence interval and p-value 0.05.

Ethical clearance was obtained from Gondar University, College of Medicine and Health science, department of nursing ethical review committee. During data collection Hospital chief executive officer was communicated by formal letter and permission was obtained from the hospital administrators.

Results

Two hundred ninety eight charts with the diagnosis of severe acute malnutrition were analyzed. The age of the children ranged from 2 to 59 months with a median age of 17 months. About 37.2% were between 2-12 months of age and 60.1% were males.

Based on anthropometric measurement and National Center for Health Statistics (NCHS) classification, 57.3% were severely wasted and 44.6% were severely stunted cases (Figure 1).

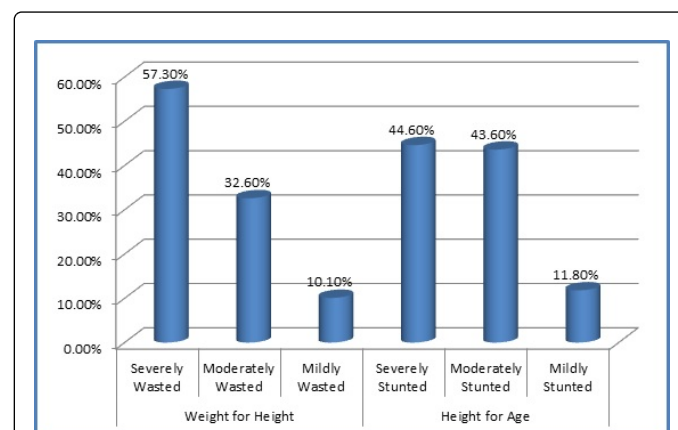


Figure 1: Anthropometric measurement and NCHS classification of SAM among under five children in Gondar University tertiary Hospital, September 1, 2010 to August 31, 2012.

Besides severe acute malnutrition, nearly 74.7% of cases also medically diagnosed for one or more co-morbidities. Tuberculosis, Acute gastroenteritis, pneumonia, developmental delay, rickets, anemia and HIV co-morbidities were 24.5%, 23.2%, 21.8%, 19.8%, 16.1%, 13.4% and 2% respectively.

In the study, 68.5% cases were cured and discharged with improvement, 19.8% were defaulters and 11.7% were died (Table 1).

Total length of Hospital stay (In week)	Treatment Outcome		
	Cured	Defaulter	Death
< 4 weeks	180 (67.2%)	57 (21.3%)	31 (11.6%)

4-6 weeks	18 (78.3%)	2 (8.7%)	3 (13%)
> 6weeks	6 (85.7%)	0	1 (14.3%)
Patient's age			
≤ 12 months	71 (64%)	24 (21.6%)	16 (14.4%)
13 - 24 months	78 (72.2%)	19 (17.6%)	11 (10.2%)
≥ 25 months	55 (69.6%)	16 (20.3%)	8 (10.1%)
Family size			
≤ 3	44 (74.6%)	12 (20.3%)	3 (5.1%)
>3	160 (66.9%)	47 (19.4%)	32 (13.4%)
Presence of bilateral edema			
Yes	94 (74 %)	20 (15.8%)	13 (10.2%)
No	110 (64.3%)	39 (22.8%)	22 (12.9%)
Clinically diagnosed SAM			
Severely wasted	110 (64.3%)	39 (22.8)	22 (12.9)
Moderately wasted + Bilateral edema	71 (73.2 %)	14 (14.4%)	12 (12.4%)
Mildly wasted + Bilateral edema	23 (76.7%)	6 (20.0%)	1 (3.3%)
Total	204 (68.5%)	59 (19.8%)	35 (11.7)

Table 1: Cross tabulated treatment outcome of SAM among under-five children in Gondar University tertiary Hospital from September 1, 2010-August 31, 2012 (n = 298).

Variables	Treatment outcome of SAM		COR 95% CI	AOR 95% CI
	Dead No (%)	Cured No (%)		
Family size				
< 3	3 (6.4)	44 (93.6)	1	1
≥ 3	32 (16.7)	160 (83.3)	2.93 (0.86, 10.03)	3.34 (0.92, 12.17)
Presence of bilateral or nutritional edema				
Yes	13 (12.1)	94 (87.9)	0.69 (0.33, 1.45)	NS
No	22 (16.7)	110 (83.3)	1	
Height for age				
Severely stunted	19 (17.1)	92 (82.9)	0.65 (0.23, 1.86)	NS
Moderately stunted	10 (9.7)	93 (90.3)	0.34 (0.11, 1.05)	NS
Mildly stunted	6 (24)	19 (76)	1	
Weight for height				
Severely wasted	22 (16.7)	110 (83.3)	4.60 (0.59, 35.87)	NS
Moderately wasted	12 (14.5)	71 (85.5)	3.89 (0.48, 31.54)	NS
Mildly wasted	1 (4.2)	23 (95.8)	1	

HIV co-morbidity				
Yes	3 (60)	2 (40)	9.47 (1.52, 58.89)*	9.61 (1.48, 62.32)*
No	32 (13.7)	202 (86.3)	1	1
Gastroenteritis				
Yes	15 (25.4)	44 (74.6)	2.73 (1.29, 5.76)*	2.78 (1.29, 6.00)*
No	20 (11.1)	160 (88.9)	1	1

*p-value < 0.05; COR = Crude Odds Ratio; AOR = Adjusted Odds Ratio; NS = Variables not associated by back ward step wise logistic regression analysis.

Table 2: Binary and Multivariate logistic regression analysis result for outcome of SAM in under-five children in Gondar University tertiary Hospital, from September 1, 2010 to August 31, 2012 (n = 239).

Results from multivariate analysis showed that children with severe acute malnutrition who had acute gastroenteritis and HIV co-morbidities were about three and ten times more likely to die (AOR = 2.79, 95% CI 1.31, 5.96), (AOR = 9.61 95% CI 1.48, 62.32) respectively as compared to their counterparts (Table 2). On the other hand, there was no statistically significant association when binary and multivariable logistic regression analysis was carried out by taking 'defaulter' as the outcome variable (data was not shown).

Discussion

Ethiopia is currently using a protocol for the management of severe acute malnutrition that is an update of existing guideline written by Professor Michael Golden and Dr. Yvonne Grellety [1]. As mentioned in this document the minimum acceptable reference value which have been developed by Sphere project [12] is: > 75% recovery, < 15% defaulter and < 10% death rates. In the current study recovery, defaulter and death rates were 68.5%, 19.8% and 11.7% respectively (Table 1) are below the acceptable range.

As identified in the current study, 68.5% of children were cured and successfully graduated from nutritional unit. Similar study done in Northern central Nigeria tertiary Hospital showed 62.6% of the children were discharged as cured [13]. The lower the country in development the lower the level of best quality of care could be possible explanation for such similarity.

The prevalence of death in this study was 11.7%. It is similar with studies done in Bangladesh tertiary Hospital [9] 10.8% and in North-central Nigeria 10.1% [13]. Though this outcome is below acceptable range, it is lower than another studies conducted in sub-Saharan Africa [11,14]. These higher proportions of death report could be due to the fact that the study settings were tertiary referral Hospitals where severely complicated malnutrition cases could be prevalent.

Marasmus or severe wasting was the most common type of severe acute malnutrition and identified in 57.3% followed by kwashiorkor 42.7%. Similar findings were also observed in studies from Addis Ababa, Nigeria Enugu and southern Ethiopia [11,14,15]. This similar pattern occurrence of severe acute malnutrition could be due to the resemblance in causes of malnutrition in most of sub-Saharan countries.

In this study SAM cases with acute gastroenteritis co morbidity were three times more likely to die than those without acute gastroenteritis. This is also showed in studies from Lusaka Zambia [16], Kenya [17] and Zewuditu Memorial Hospital, Ethiopia [11]. The possible reason

might be due to the fact that gastroenteritis is presented by vomiting and diarrhea; which results in dehydration and septicemia could further complicates sever acute malnutrition.

Human immunodeficiency virus (HIV) co morbidity among SAM cases resulted in statistically significant likelihood of death. Similar findings also reported from studies done in Nigeria, Zambia and Kenya [13,16,17]. In its nature, HIV decreases an immunity of individuals and then complicates SAM status and could lead to death.

Limitations

Incompleteness nature of secondary data and inappropriate keeping of old registration books and patient's chart made sample size smaller. Variables like family educational status, house hold income, socio-economic status, maternal nutritional status, previous SAM history of the children and babies feeding practice which might contribute on treatment outcomes were not addressed in this study.

Conclusion and Recommendation

All treatment outcomes in this study were below the acceptable range of global SPHERE standards. Acute gastroenteritis and HIV co morbidities were statistically significant factor for death outcome. The hospital should monitor and evaluate therapeutic feeding program in order to improve treatment outcome and give emphasis for cases with co morbidity. As this is a hospital-based secondary data analysis, further large scale prospective and community based studies are recommended to identify risk factors for severe acute malnutrition.

Competing Interests

The authors have declared that they have no competing of interests

Author's Contributions

TWG & ATA designed the study, participated in the data collection, performed analysis and interpretation of data and drafted the paper and revised the manuscript.

YDM & BBB designed, approved the proposal with some revisions, participated in data analysis, revised subsequent drafts of the paper and prepared the manuscript. All authors read and approved the final manuscript.

Author's Information

AT Pediatrics ward staff, University of Gondar Referral Hospital Matron, Gondar, Ethiopia

TW Lecturer at Department of Midwifery, College of Medicine and Health sciences, University of Gondar, Ethiopia

YD & BB Lecturers at Department of Nursing, College of Medicine and Health sciences, University of Gondar, Ethiopia

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