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Appropriateness and Immediate Outcome of Referrals in Pediatric Wards at Bugando Medical Centre, A Tertiary Hospital in North Western Tanzania

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Abstract

Background
Inappropriate pre-referral care and delays in primary health care facilities contribute to poor patients' outcomes in secondary and tertiary referral health care facilities. This study was set to determine the proportion, appropriateness and immediate outcome of referrals in paediatrics wards at Bugando Medical Centre (BMC).

Methods
A cross-sectional study included reffered children aged 1-59 months in BMC paediatrics wards. The minimum required sample size of 287 was determined by the Taro Yamane scientific formula, we excluded self-referral patients and those who misplaced their referral letters. Referral forms were reviewed, detailed history and thorough physical examination were done. Children were reviewed after 48 hours to determine the immediate outcome. Data were analysed using STATA version 15.1. By logistic regression we determined the association between appropriateness of referrals, clinical factors and outcomes and a p-value < 0.05 was considered to be statistically significant.

Results
Out of 602 admissions 55.1% (332/602) were referrals**,** and total of 300 children were analysed. Only (6) 2% had appropriately completed referral forms and (10) 3.3% were brought in by an ambulance. A total of 133 (44.3%) referrals were categorized as inappropriate. Deaths occurred in 34 (11.3%) [95% CI 8.2% – 15.5%]. Inappropriate referrals were not associated with increased mortality. Presence of lower chest in drawing (OR: 4.9; 95% CI: 1.7 – 13.8; p=0.003), lower limb swelling (OR: 3.6; 95% CI: 1.3 – 10.2; p=0.013), convulsion (OR: 8.1; 95% CI: 2.2 – 29.9; p=0.008), shock (OR: 9.7 95% CI: 1.8 – 52.6; p=0.008), age >2 years (OR: 5.2; 95% CI: 1.7 – 16.2; p=0.004), and inability breastfeed or drink (OR: 7.3; 95% CI: 2.2 – 23.7; p=0.001) were directly associated with mortality in the referred children.

Conclusion and recommendations
More than 50% of patients seen are referrals, and 34% of them end up in mortality but inappropriateness of referrals was not directly associated with mortality. The mortality in referred patients is linked to serious illness. Improving the capacity of management of paediatric emergencies in health facilities should go hand in hand with improvement of referral appropriateness in order to improve the overall outcome.

Keywords: *Acute Illness, Appropriateness of Referrals, Outcome, Primary Health Care, Pediatric Primary Care, Referrals.*

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Introduction

Referral is a process where a lower-level health facility with limited resources such as drugs, skilled personnel or medical equipment seeks assistance from a higher level or a better equipped health facility to take over the management of a patient (1, 2, 3). WHO, UNICEF through Integrated Management of Childhood Illness strategy (IMCI) have given special emphasis on referral systems in various settings especial in African countries (1). It has been documented that the first step in improving outcome for referral cases is good quality emergency care at all health care units (2). Therefore, timely management of acute illnesses will lead to reduced mortality and long term disabilities in referrals which were handled according to the proposed standards (2).

The most common problem reported in the care of referral patients in developing countries involves inadequate triage system and poor organization at the emergency department, lack of supplies and poor communication between the referring and the receiving facility which leads to delays in provision of appropriate and timely treatment and therefore causing harm to the patients (3).

Bugando medical center (BMC) is a tertiary hospital which serves nearly 1/3 of the Tanzanian population. BMC hospital records demonstrated a big number of improper referrals, inappropriately filled referral forms, delayed referrals and inappropriate pre referral care, hence we sought to conduct a study in order to document the appropriateness and immediate outcome of these referrals, with a hope that the collected data will help in proper resource allocation particularly in emergency services and pre referral care in lower health facilities.

Methods

This was a hospital based cross-sectional study with a follow up component that included all referred acutely ill children aged 1 to 59 months admitted in pediatric department of BMC between January and April 2018. The minimum required sample size of 287 was determined by the Taro Yamane scientific formula (1967) (4). We enrolled a total of 300 referred acutely ill children with emergency and /or priority signs and excluded self-referrals, and children who died at the emergency department before being admitted to the wards. Later on we excluded children who were referred but misplaced their referral letters because we could not access the information we needed to grade the appropriateness of the said referrals. All recruitments were done within six hours of admission upon receipt of written consent from parents/guardians/caregivers of the children. Figure 1 summarizes the screening for

eligibility criteria. Recruitment was conducted daily until the sample size was reached. Information regarding the reason for referral, time of referral, and pre referral management were extracted from the referral forms; standard referral form (5) was used to determine the appropriateness of the referral. Appropriateness was the summation of proper referral channel, indication of reasons for referral, proper pre referral care as documented in referral letter and timing of arrival (within 24 hours after being referred) (7).

Detailed history and thorough physical examination was done to determine the presence of priority signs and/or emergency signs of referred child. Immediate outcome was noted as being alive or dead after 48 hours of admission. Determinants of outcome included factors such as pre referral management, timing of the referral, and emergency and priority signs at the time of admission, and the admission diagnosis. The Research team reviewed the patients after 48 hours of admission for the outcome. Management of the patients was left to the attending doctor at the emergency department and the admitting paediatric teams during whole period of admission. The researcher did not interfere or delay management but discussed with the management team in case there were any discrepancies in diagnosis or management given to the study patient. We used STATA version 13 for data analysis, we presented the descriptive data in tables and graphs, logistic regression analysis was applied to find association between appropriateness of referrals, clinical factors and outcomes and a p-value less than 0.05 was considered to be statistically significant.

Results

Demographic and Clinical characteristics of study participants

A total of 602 children aged between one month and five years were admitted at pediatric wards and among these 332(55%) were referrals from other health facilities. Of these, 32 (9.6%) were excluded due to various reasons and 300 (49.8%) met the eligibility criteria for enrollment.

A total of 300 children were enrolled, the median age was 18 [IQR 8 – 36] months. Among these 153 (51.0%) followed appropriate referral system but only six (2.0%) had appropriately filled-in referral letters. The majority 200 (66.7%) resided within Mwanza region. Of note, significant number of the referred patients 290 (96.7%) did not use hospital ambulance, and most of them 192 (64%) reported after 24 hours of referral. Other Important baseline characteristics of patients are illustrated in Table 1.

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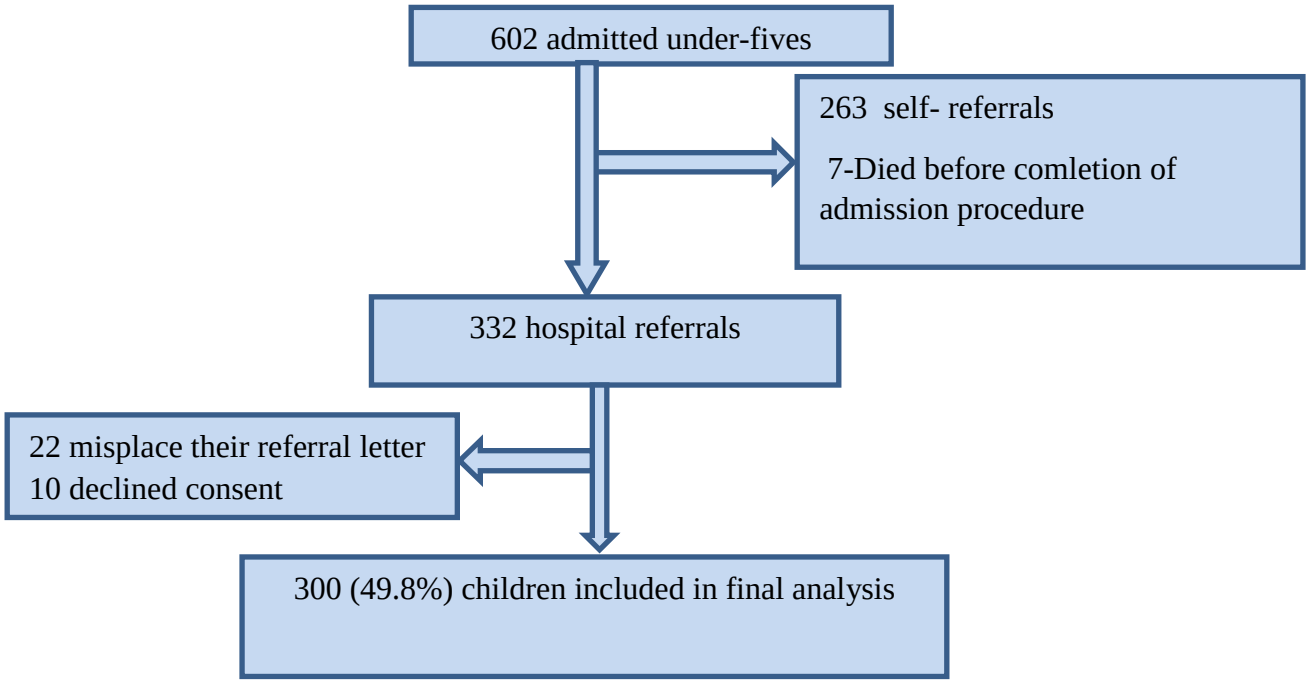

Figure 1. Study flow diagram

Table 1*:* Baseline characteristics of 300 referred children admitted at pediatric wards at Bugando Medical Centre

Characteristics (n=300)		Number (%)
Sex	Male Female	152(50.7) 148(49.3)
Source of referral	District Hospital Other (Health centers & dispensaries)	277(92.3) 23(7.6)
Means of transport	Ambulance/ facility Vehicle Other means of transport**	10(3.3) 290(96.7)
Referral channel	Appropriate Inappropriate	153(51.0) 147(49.0)
Pre-referral management	Appropriate Inappropriate***	148(49.3) 152(50.7)
Qualification of referring clinician	Indicated Not indicated	92(30.3) 208(69.7)
Standard referral forms	Appropriately filled Inappropriately filled	6(2.0) 294(98.0)

****Not documented if the child was given treatment*
*** Include buses, motorcycles, taxis and on foot*

The most common referral diagnosis in this study was severe acute malnutrition (SAM) in 90 (30%) patient's followed by, congenital heart disease 40 (13.3%). Other common diagnoses were as summarized in Table 2 below, of note 23 (7.7%) children were referred with no indicated diagnosis.

Table 2: Common referral diagnosis of 300 patients admitted at pediatric ward at BMC

Diagnosis	Number (%)
Severe acute malnutrition	90(30.0)
Heart problems (congenital and acquired)	43(14.3)
Invasive Bacteria infections (Pneumonia, meningitis and septicaemia)	30(11.3)
Sickle cell anaemia	24(8.0)
Other Anaemias	17(5.7)
Hydrocephalus	16(5.3)
Malignancy	13(4.3)
PAIDS	4(1.3)
Nephrotic syndrome	4(1.3)
Hepatitis	3(1.0)
Malaria	3(1.0)
Not indicated	23(7.7)
Others*	30(10.0)

**Others include stroke, epilepsy, adenoid hypertrophy, diabetic mellitus, syncope, rabies, cholelithiasis and osteomyelitis*

Appropriateness of 300 referred children admitted at paediatric ward at Bugando Medical Centre

Out of 300 referral forms, 294 (98%) were incompletely filled with a lot of missing data. Appropriateness included proper referral channel, reasons for referral, proper pre referral care as documented in referral letter and appropriate timing of referral (within 24 hours after being referred). Among 300 referred children only 50 (16.7%) were appropriately referred, 117(39.9%) were somehow appropriate and 113 (44.3%) were inappropriately referred. Figure 2 summarizes the appropriateness of referred children admitted at pediatric ward at Bugando Medical Centre.

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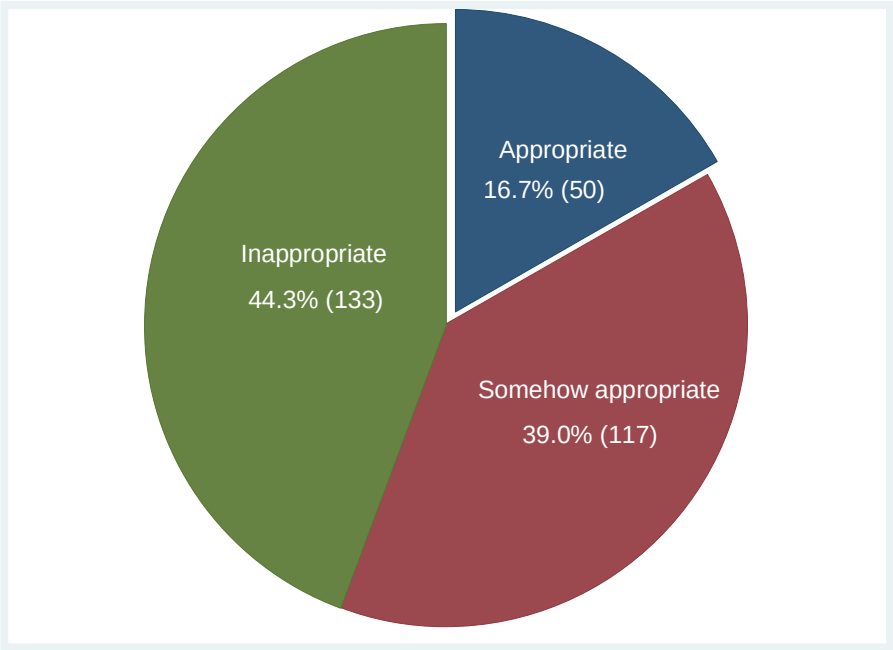

**Partially or somehow appropriate means the referral letter was missing one component of appropriateness; inappropriate means the referral letter missing> 2 components of appropriateness*

Figure 2. Appropriateness of 300 referred children admitted at pediatric ward at BMC

Immediate outcome of 300 referred children admitted at pediatric ward at Bugando Medical Centre

Among, 300 referred children from lower health facilities, 34 (11.3%) [95% CI 8.2% – 15.5%] died within 48 hours of admission.

Factors predicting mortality in 300 referred children admitted at paediatric ward after 48 hours

We performed univariate logistic regression analysis, which was followed by multivariate regression analysis on components of appropriateness of referral but none of them were statistically significant. Furthermore we analyzed the clinical characteristics of the patients where by lower limb swelling (OR: 3.6; 95% CI: 1.3 – 10.2; p-value =0.013), convulsion (OR: 8.1; 95% CI: 2.2 – 29.9; p-value =0.008), shock (OR: 9.7 95% CI: 1.8 – 52.6; p-value =0.008), age >2 years (OR: 5.2; 95% CI: 1.7 – 16.2; p-value =0.004), and inability breastfeed or drink (OR: 7.3; 95% CI: 2.2 – 23.7; p-value =0.001), were found to be significant predictors of mortality amongst children admitted as referral cases. Table 3

summarizes the clinical factors on admission that were associated with mortality of referred children admitted at pediatric wards (Table 3).

Table 3*:* Factors predicting mortality within 48 hours among 300 referral patients admitted at pediatric ward at Bugando Medical Centre

Characteristics	Outcome		Univariate		Multivariate	
	Death	Alive	OR [95% CI]	p-value	OR (95%CI)	p-value
Age						
≤ 2 years	18 (8.7)	190 (91.4)	1.0			
≥ 2 years	16 (17.4)	76 (82.6)	2.2 [1.1 – 4.6]	0.031	3.5 [1.4 – 9.0]	0.008
Difficulty in breathing						
No	13 (8.6)	138 (91.4)	1.0			
Yes	21 (14.1)	128 (85.9)	1.7 [0.8 – 3.6]	0.138	-	-
Lower chest in drawing						
No	19(8.1)	216(91.9)	1.0			
Yes	15(23.0)	50 (76.9)	3.4 [1.6 – 7.2]	0.001	4.5 [1.9 – 10.9]	0.001
No	22 (9.5)	210 (90.5)	1.0			
Yes	12 (17.7)	56(82.4)	2.0 [1.0 – 4.4]	0.066	4.3 [1.6 – 11.2]	0.003
Convulsion						
No	18 (6.8)	245 (93.2)	1.0			
Yes	16 (43.2)	21 (56.8)	10.4 [4.6 – 23.1]	<0.001	5.9 [1.8 – 19.2]	0.003
Shock						
No	26 (9.1)	260 (90.9)	1.0			
Yes	8 (57.1)	6 (42.9)	13.3 [4.3 – 41.4]	<0.001	9.9 [2.2 – 4.3]	0.003
Inability to breastfed						
No	22 (8.9)	225 (91.1)	1.0			
Yes	12 (22.6)	41 (77.4)	3.0 [1.4 – 41.4]	0.006	7.2 [2.4 – 21.7]	≤0.001
Inappropriate referral						
No	24(10)	216(90)	1.0			
Yes	10(20)	50(80)	(11.2 [8.2 – 15.5]	0.120	_	

Discussion

This study was conducted in a tertiary referral teaching hospital with the aim of finding out the appropriateness and immediate outcome of acutely ill children who were referred for further management. The proportion of referrals in this study was 49.8%, this was significantly high as compared to 1% reported at Kilombero Tanzania and Kilifi in Kenya (7, 8). This could be attributed to the reality that BMC is a zonal referral hospital serving a catchment area of around 13 million people whereby Kilombero is a District hospital, with a

catchment area of 188,000 people (7) similarly to Kilifi. Another contributory factor to the high proportion is the fact that BMC is the only Centre in Lake Zone providing comprehensive in- patient management for Severe Acute Malnutrition and Congenital Heart Disease (8,9), these conditions were among the commonest reasons for referral.

In this study only 50 (16.7%) patients were appropriately referred. In contrary to findings from developed countries (10) where low inappropriateness in referrals was observed. The difference is linked to well established health care system in the developed world and the use of electronic system in patient care, which facilitated completeness of referral notes. Appropriateness of referrals also included proper referral channel which showed if referral followed the right channel of referral from Dispensary, Health Centre, District Hospital, regional hospital to Consultant Referral Hospital (1,6,11). In this study it was found that 49% did not follow referral channel as per Tanzania pyramidal structure of health system (12). However even Front *et al* reported 0.6% of children having been referred directly from the Dispensaries to the District hospital (7). The little operational difference between dispensaries and health centres may as well contribute to the inappropriateness observed in these two studies (3). Higher inappropriateness were also reported from the study done at Muhimbili National Hospital in Tanzania in 2008, which reported 96.3% as direct referrals from dispensaries and health canters by then (13). Since we could not find recent studies which documented what is happening currently, we do assume that the situation might have been improved, and probably inappropriate referrals might be happening less frequently.

In this study we found 36.0% referred children took more than two days to reach referral hospital. This is obviously due to the limited use of ambulances or facility vehicle. We observed that only 10 (3.3%) reported to have used ambulances/ facility vehicles provided transport. Due to unavailability of ambulances, lack of fuel and other operational reasons most of the patients used other means of transport to the referral point mostly bus, motorcycle, taxi and others came by foot. This led to delay in reaching at the referral point hence delaying intervention (3,14). The proper referral includes patient being carried in a proper facility transport and being escorted by a skilled healthcare worker. (36-38,41,42). This translated into timely continuum of care and hence good outcome of the patient (3,11,15,16).

Appropriate pre referral care was provided to only 49.3% children. This could be explained by poor documentation in the referral letter as observed in this study. We also found that 20.3% of patients were referred by qualified health personnel while more than half of referral letters did not indicate the qualification of referring personnel. This may also contribute to the

inappropriateness of referral despite the availability of clear guideline regarding referral in Tanzania. This also indicates poor intra-facility communication whereby less qualified person may decide to refer a child who could have been managed in the same facility by a more qualified staff available. In this study some patients, up 9.7%, were referred without initial laboratory work which could increase length of hospital stay and unnecessarily high bed occupancy among the referrals and also can lead to overcrowding and delay in treatment of patients. Similar findings was reported by Mwabu et al in Kenya (3).

In this study mortality was found to be 11.8%. This is high compared to the study done at Chandigarh, a referral hospital in India, which documented a mortality of only 2%. Significantly higher mortality was observed in Egypt 33.1% and in Malawi 33.3% (17,18). This difference can be attributed to longer duration of their studies at the same time these studies followed up their participants until discharge, while our study did the follow up for the outcome in the first 48 hours post admission only. Higher mortality of 23.6 % and 16.6% were also noted in Kilombero, Tanzania and Northwestern Nigeria, respectively (7,19). These two studies reported that patients (20)study we also had some patients with poor pre-referral care, and those who took up to 48 hours to reach to our facility, however these two factors were not statistically associated with mortality, and thus we postulate that adherence to treatment guidelines (5,21)for management of critically ill children at the tertiary referral facility is the reason for the lower mortality in our study.

Similar studies demonstrated that inappropriateness of referral was strongly associated with poor outcome of patients at the receiving facility (1,19), our study couldn't demonstrate that and possibly this was so because our study was conducted in a tertiary referral hospital as compared to the comparable studies which were conducted in district hospitals (19). This further explained that the caliber of the patients seen were right for our hospital and probably they did not need to follow the referral channel as this could have caused further delayed management. However our study demonstrated that severity of the illness was the factor for mortality. This calls for the need of strengthening the management of critically ill referred children at the receiving facility. Prompt and thorough evaluation and management of children with shock, convulsions, lower limbs swelling and difficulties in breathing is emphasized here as similar conditions were seen as causes of deaths in the research setting previously (8,22), and even in other centres (19). Unfortunately the current study did not evaluate the care given to these patients and hence cannot strongly conclude on this.

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Conclusion

Half of the patients seen in this facility were referrals, and these referrals were accompanied by large inappropriateness but this was not directly associated with mortality in referred patients. Seriousness of the patient's illness is strongly associated with mortality. This calls for strengthening of management of patients with serious illness in both the referring and receiving centers. Further study to evaluate quality of care given to referral paediatric patients at a tertiary level is recommended.

Acknowledgement

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Ethics approval and consent to participate

This study received ethical approval from the joint CUHAS-Bugando Research and Ethics Committee, permit no 2CREC/234/2017. Written Parental/caregiver consent was sought prior to enrollment of children into the study. This study was given the permission to publish the findings by the Director of Research and Innovation of CUHAS.

Competing interests

Authors declare no competing interests.

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Author contributions

JS, TM and AH conceptualized and designed the study, carried out data collection, performed analysis, drafted the manuscript and approved the final manuscript. BK,NK, RR assisted with designing the study, performed the analysis, revised the manuscript and approved the final manuscript. RK, EK, RB,TC assisted with data collection, data entry, data analysis and approved the final manuscript.

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