

# Limited Care Offered to People with Epilepsy in Mwanza, Tanzania: Need for Intervention

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## Research article

**Keywords:** Epilepsy Management, Mwanza, Tanzania, Care Offered to People with Epilepsy

**Posted Date:** December 16th, 2019

**DOI:** <https://doi.org/10.21203/rs.2.18918/v1>

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**Version of Record:** A version of this preprint was published on April 29th, 2021. See the published version at <https://doi.org/10.11604/pamj.2021.38.407.28321>.

# Abstract

**Background** Epilepsy is one of the most common neurological disorder worldwide. It is associated with high socioeconomic burden. Epilepsy successful treatment depends on appropriate diagnosis, correct choice of anti-epileptic drugs (AEDs) and adherence to the prescribed AEDs. While up to 90% of PWE in developing countries don't get appropriate treatment, there is limited information about care offered to people with epilepsy (PWE) in Tanzania. Therefore, this study aimed to describe available care offered to PWE in Mwanza.

**Methods** This was a cross sectional descriptive study which enrolled health Care workers (HCWs) who regularly treated PWE in five selected hospitals of Mwanza region. It also enrolled PWE (or their caretakers) attending outpatient clinic in these hospitals. HCWs completed self-administered questionnaires while PWE or caretakers were interviewed using structured Swahili translated questionnaires. Coded data were analyzed using SPSS.

**Results** A total of 18 HCWs and 218 PWE (or their care takers) participated in this study. Among 18 HCWs who routinely diagnosed and treated PWE, nurses were majority and none was a neurologist. Only 2/18 (11.1%) HCWs reported to use investigations to confirm epilepsy diagnosis or explore its causes. 10/18 (55.6%) of HCWs reported that counseling was given to patients. However, counseling information was largely inadequate regarding the use of AEDs. The AEDs prescriptions were mainly dictated by drug availability and affordability to patients, rather than seizure types. 27/218 (12.4%) patients were given subtherapeutic and 109/218 (50.0%) sub-optimal doses, despite some had one or more seizures in the last 30 days. No follow-up investigation was done to any of the 218 participant patients. Ten (55.6%) HCWs did not stop AEDs medication to their patients while the rest stopped medication after varying periods of seizure free.

**Conclusion** Most PWE in Mwanza were diagnosed and treated by nurses. Patients were not thoroughly investigated, counseled and followed-up, and had limited choice and accessibility to AEDs. Some patients particularly in district hospitals were under-medicated despite of seizure recurrence. There was discrepancy between hospitals and practitioners regarding withdraw of AEDs. We recommend short-course training about epilepsy management to the HCWs who diagnose and treat PWE regularly.

## Background

Epilepsy is a very common chronic neurological disorder affecting more than 50 million people worldwide, with majority being from developing countries [1, 2]. Epilepsy is associated with high socioeconomic burden, which is due to increased health care cost as well as losses in employment, wages, and household work [3]. Successful treatments of epilepsy in majority of patients depend on appropriate diagnosis, correct choice of anti-epileptic drugs (AEDs) and patient adherence to prescribed AEDs.

In developing countries, reports showed that, up to 90% or more of people with epilepsy (PWE) were not getting appropriate treatment [4, 5]. However, a relatively recent report from Tanzania showed that only 40.5% of PWE do not get treatment [6]. Tanzania has limited medical human resource and Tanzanians have low income, the factors which can greatly compromise health care delivery. However, there is limited information about how PWE who attend health facilities are managed; in terms of facilities arrangement, who attend them, diagnostic methods and treatment offered to them and if followup is adequately done. Therefore, the aim of this study was to describe the available care offered to PWE in Mwanza region health facilities.

## Methods

### Study Design and Setting

We carried out a cross sectional descriptive study in five selected hospitals in Mwanza region from November 2016 to May 2017. Mwanza is the region with the highest population in the lake zone regions in Tanzania. It has an estimated population of 2.8 million. The hospitals involved were Bugando Medical Center (BMC), a consultant referral hospital and four district hospitals (Magu, Kwimba, Ukerewe and Sengerema). The four selected district hospitals are among seven district hospitals of Mwanza region. These hospitals were selected purposely because they are distant from BMC and therefore give general representation of the region.

### Study Participants

Participants in this study were health care workers who regularly diagnose and treat PWE in the five selected hospitals and PWE (or their caretakers) attending outpatient clinics at these hospitals.

### Sample Size Determination and Sampling Procedures

Due to small number of health care workers (HCWs) who regularly attend PWE, we aimed to enroll all HCWs who voluntarily agreed to participate in the study. The sample size for PWE was determined using Taro Yamane formula,  $n = N/1+N(e)^2$  [7], where  $n$  = sample size,  $N$  = number of people in the population and  $e$  = allowable error (%). Using an estimated total number of 400 PWE attending the selected hospitals in Mwanza region and assuming allowable error of 0.05% and 95% confidence level, the minimum sample size was determined to be 200.

Convenient sampling technique was used to enrol study participants.

### Data Collection

Data from HCWs were collected using self-administered pretested structured questionnaires. We interviewed PWE (or their caretakers) using pretested structured Swahili translated interview guide. In case a patient or caretaker was not competent in Swahili, a third person of choice by the patient (either a relative or HCW) was used as a translator. The questionnaires and interviews aimed to determine the

hospital arrangements for managing PWE, available facilities, who diagnosed and treated PWE, available/used AEDs, how AED treatments were initiated, instructions given to patients, basic investigations which were carried out, follow up of treatment and procedures on drugs discontinuation.

## Statistical Analysis

Data were coded and entered into SPSS version 20 where analysis for description was done. The results were summarized into frequency and percentages.

## Results

### *Charctersitsics of the Study Participants*

#### *Characteristics of Interviewed Health Care Workers*

A total of 18 (8 males, 10 females) out of 21 HCWs who routinely diagnosed and treated PWE in Mwanza region were enrolled in this study. Majority, 8 (44.4%) of them were nurses (table 1). Among eight nurses who managed PWE, 3 (37.5%) were trained in mental health and the the rest were general nurses. There were no epilepsy specialists (neurologists) in the region. There was only one specialist in other specialities (Psychiatrist) who regularly managed PWE (table 1).

**Table 1: Inteviwed Health Care Workers who diagnosed and treated PWE**

Cadre	Number	Percentage
Psychiatrist	1	5.6
General Medical Officers	5	27.8
Clinical Officers	4	22.2
Nurses	8	44.4
<b>Total</b>	18	100

#### *Characteristics of PWE Participants*

A total of 218 PWE with mean age of  $29.0 \pm 13.7$  years were enrolled in this study. Among them, 106 (486%) were males and 112 (51.4%) were females. Majority of them were recruited from BMC (table 2).

**Table 2: Distribution of PWE who participated in the Study by centre**

<b>Hospital</b>	<b>Number</b>	<b>Percentage</b>
Magu	40	18.3
Ukerewe	40	18.3
Sengerema	50	22.9
Kwimba	32	14.7
BMC	56	25.7
<b>Total</b>	<b>218</b>	<b>100.0</b>

### ***Hospital Units for Managing People with Epilepsy***

In all five hospitals studied, there were no special units for managing PWE. In 4/5 hospitals PWE were treated in psychiatric or mental health clinics while in the remaining one hospital, they were managed in general outpatient clinic. Electroencephalogram (EEG), computed tomograph (CT) scan and AED level monitoring facilities were available only in one centre (consultant referral hospital) out of the five. Magnetic resonance imaging (MRI) machine was not available in all five hospitals. Electrocardiogram (ECG) machines were available in the consultant referral hospital and one district hospital while echocardiogram was found only in the consultant referral hospital. Facilities for measuring hematological profile, serum electrolytes and liver functions were available in all five hospitals.

### ***Documentation of Epilepsy Cases***

In all five centres, epilepsy cases were documented without having their seizures classified.

### ***Investigations and Treatment of Epilepsy***

Only 2/18 (11.1%) HCWs, all from consultant hospital reported that, they sometimes used investigations to confirm epilepsy diagnosis or explore its causes. The rest of HCWs had never ordered investigation in the course of diagnosis of epilepsy. When 218 patients or their caretakers were asked about the investigations, which were done to them, only 11 (5.0%), 3 (1.4%), 1 (0.5%) had EEG, CT scan and MRI respectively done. These investigations were not necessarily being done in the five selected hospitals but could be in other diagnostic centres within the region or in other regions. None of the patient had cardiac investigations (ECG or Echocardiograph) done to exclude cardiac syncope or fainting from epileptic

seizures. No follow-up investigations (full blood count, liver enzymes, serum electrolytes or AEDs level measurements) were done in any of the 218 participant patients.

Most of HCWs, 10 /18 (55.6%) reported that counseling was given to newly diagnosed PWE. However, PWE or their caretakers revealed that counseling information regarding the use of AEDs was largely inadequate. One sixty (73.4%) of patients or caretakers reported that detailed discussion about what does epilepsy mean, how is it acquired and how can it be treated was given to them. One sixty seven (76.6%) PWE were told the importance of using AEDs and 75 (34.4%) were informed about the available AEDs to use and their costs. However, only 34 (15.6%) patients were told about the AEDs side effects. Majority of patients, 140 (64.2%) were told to avoid alcohol use but only 7 (3.2%) of them were told about the drugs to avoid while using AEDs.

Among 218 patients who were managed as PWE, three of them did not have symptoms or history suggestive of epilepsy. One of them had symptoms of psychiatric disorder with neither history of seizures nor loss of consciousness. Two had history of single episode of febrile convulsions during their first years of life but continued to receive phenobarbital (PB) for more than 10 years.

Phenytoin (PHT) and PB were mostly used AEDs by PWE in Mwanza region. In Magu district hospital, 38/40 patients used either PHT or PB or the two drugs together; one patient used carbamazepine (CBZ) and one used PHT and CBZ. In Kwimba district hospital, all patients used PB, with two each using either PHT or CBZ in addition to PB. In Sengerema district hospital, 41/50 patients used PHT and PB together, 6/50 used PB alone, 2/50 used PHT and CBZ and 1/50 was not using any drug. The AEDs used by 31/32 patients treated in Ukerewe district hospital were PHT, PB and CBZ either as monotherapy or in combination. One out of 32 patients used Keppra in combination with PB. Fifty six patients treated at BMC used PHT, PB, CBZ or valproic acid (VPA) either as monotherapy or combination of two drugs.

The AEDs prescriptions were mainly dictated by drug availability and affordability to patients, rather than seizure types and drug tolerability to patients (table 3). There was lack of consistence in type of drugs given to patients in the four district hospitals. The drug given was dictated by its availability in hospital during a hospital visit. Sometimes, there was switching between PHT and PB.

### **Table 3: Choice of AEDs for Prescription**

Reason for Prescription	Number of practitioners (n=18)	Percentage of practitioners
Affordability to patients	14	77.8
Availability of drug in the hospital or market	18	100.0
AED side effects	7	38.9
Seizure type	3	16.7
Other reasons	4	22.2

\* Respondents gave multiple reasons

Four patients (1.8%) were found to have used the drugs that are normally contraindicated to use with AEDs.

Twentyseven out of 218 (12.4%) and 109/218 (50.0%) patients were given subtherapeutic and sub-optimal therapeutic doses respectively (table 4). Among the patients who were given subtherapeutic and sub-optimal therapeutic doses, 15 (55.6%) and 57 (52.3%) respectively had one or more seizure in the past 30 days.

**Table 4. Dosages of AEDs used by PWE treated in Mwanza**

Type of AEDs used	Frequency (and percentage)					Total
	Magu	Kwimba	Sengerema	Ukerewe	BMC	
Subtherapeutic	6	1	1	16	3	27
Sub-optimal therapeutic	33	1	32	9	34	109
Optimal therapeutic		36	3	6	16	61
	<b>39</b>	<b>38</b>	<b>36</b>	<b>31</b>	<b>53</b>	<b>197</b>

\*In 21 patients, doses were not documented or patients were not on medication

Ten out of 18 (55.6%) prescribers did not stop AEDs medication to their patients despite of long period of seizure free and the rest, stopped medication after varying periods (1–5 years) of seizure free.

## Discussion

This is the first study in Tanzania and probably in Africa to describe the available health care, which is offered to PWE in terms of management setting, diagnosis, counseling, treatment and follow up.

Lack of epilepsy/neurology clinics in the region is more likely to be due to lack of epilepsy specialists in the region to run the clinics. This has led PWE to be managed in Psychiatric or mental health clinics.

All patients who are suspected to have epileptic seizures are recommended to be seen by a neurologist or other specialist for accurate diagnosis and optimal management [8, 9]. Unfortunately most PWE in Mwanza were diagnosed and treated by nurses. Other health workers who diagnosed and treated PWE were general doctors and clinical officers. This is contrary to earlier report, which showed that in more than 55% of low-income countries, epilepsy specialists (neurologists) were available to provide care to PWE [10]. Epilepsy specialists have a role of diagnosing and documenting the cases of epilepsy, performing investigations as well as treating and following up of epileptic patients. Epilepsy specialists also do provide education services and counseling to PWE and general public. This discrepancy is due to presence of only very few neurologists in the country with none in the lake zone regions including Mwanza.

Although failure of suspected new epilepsy case to be seen by a neurologist is not a new phenomenon [11], it is not proper for PWE to be diagnosed by nurses. The nurses are likely to lead to a number of misdiagnosis. They are also likely to be influenced by referral diagnosis, which in most cases is not correct [12]. This might lead to unnecessary or delayed use of AEDs. Significant number of patients could have been treated for pseudoseizures or syncope or arrhythmias. Although none can completely avoid misdiagnosis, neurologists can make most accurate epilepsy diagnosis compared to nurses, general doctors or other specialists. In some cases, neurologist opinion is most important in arriving into correct diagnosis of epilepsy. For instance, in United Kingdom it was found that neurologist final diagnosis of suspected new epilepsy significantly differed from that of specialist registrars [11]. While missing diagnosis of genuine epilepsy only delays initiation of AEDs, a false epilepsy diagnosis may have severe psychological and socioeconomic consequences for the patient and the family in general.

Inadequacy of HCWs trained in diagnosing and treating epilepsy noted in Mwanza region is comparable to observations made in other Sub-Saharan countries [13]. This is due to limited opportunity for speciality training in neurology [13]. It can also be aggravated by lack of interest for this speciality among doctors.

Failure in classifying epileptic seizures observed in this study might have led to PWE in the region to be treated with similar AEDs regardless of their seizure types. While a number of epileptic seizure types including partial and generalized tonic clonic seizures can be effectively managed using PB [14] or PHT or CBZ [15], the drugs of choice for managing absence seizures are ethosuxamide [16] and VPA [17]. Levetiracetam, lamotrigine and topiramate can be used as adjunctive therapy for the treatment of partial or generalized seizure. Unclassification of seizures and thus use of the same type of drugs across the patients could have been attributed by lack of adequate epilepsy knowledge among the practitioners or limited choice of available AEDs.

In Mwanza region, PWE do not have access to the EEG, CT scan and MRI investigations despite the reported availability of these facilities in more than 70% of African countries [10]. While physical examination is not important in arriving at diagnosis of epilepsy, in some cases thorough investigation matters in confirming epilepsy diagnosis and classifying epileptic seizures. Syncope and non-epileptic attacks of psychogenic origin are among the conditions that are commonly mistaken with epilepsy [18, 19]. ECG and echocardiogram are useful in excluding arrhythmias and syncope from epileptic seizures. EEG confirms epilepsy diagnosis and enables seizure classification. Accurate epilepsy diagnosis and seizure classification are necessary for appropriate AED selection. CT scan and MRI are useful and important in establishing the cause of epilepsy.

Although blood tests do not contribute to the diagnosis of epilepsy, they are important in the follow up of AEDs side effects. Assessment of liver functions for patients using AEDs is important because AEDs like PB, PHT and CBZ do induce liver enzymes while others such as VPA inhibit liver enzymes [20]. Likewise, assessment of serum electrolytes and full blood count in the course of epilepsy treatment is crucial because AEDs are known to alter serum electrolyte levels [21] and haematological profile [22, 23]. Altered serum electrolytes determine the degree of seizure control or resistance to AEDs therapy [21]. Haematological monitoring is particularly recommended among patients using older AEDs such as PHT, CBZ and VPA [24] since these drugs are more likely to alter haematological profile than the newer AEDs.

Plasma AEDs level monitoring remains a valuable tool in the clinical management of PWE [25], but none of the patients in the present study had his/her plasma AEDs level measured despite some of them having uncontrolled seizures. AED monitoring for selected patients are useful in minimizing AEDs side effects and maximizing seizure control [25]. Selective and appropriate use of AEDs monitoring can lead to better patient care and can significantly enhance the quality of life of patients with epilepsy [25]. The reasons for not practicing therapeutic AEDs monitoring, among others, could be lack of facilities for measuring AEDs or costs associated with it or lack of awareness of its importance among practitioners.

While counseling and followup are crucial for medication compliance, PWE in Mwanza were not adequately counselled and followed up. Choosing correct AED and compliance to prescribed AED are important in successful seizure control.

Continued supply of AEDs for years to people who didn't have any symptom or history suggestive of epilepsy is likely to be due to lack of appropriate specialist to review the patients. These patients were likely to be attended by nurses in each of their visits and they continued to be supplied with AEDs.

Despite of many side effects, PB and PHT were found to be the most commonly used AEDs. The two drugs are the cheapest amongst the AEDs and this could be one of the reasons for their likely use. For instance, the defined daily dose of other AEDs like CBZ and VPA are 11 times and 16 times that of PB respectively [10]. The two drugs are also in the Tanzanian list of essential drugs.

Limited choice and accessibility to AEDs were caused by affordability of patients to buy the drugs and drugs availability in the hospital or in the market. Inconsistent use of AEDs and switching from one AED

to another followed inconstant drug supply and patients' inability to afford the costs. In district hospitals AEDs were given free of charge and when the patient's drugs were not available in the hospital, they were given an alternative available AED. When both PHT and PB were not available, patients were required to buy the drugs from pharmacies. Unfortunately some patients could not afford to buy the drugs therefore failed to continue with medication until when the hospital is supplied with the drugs.

Under-medication despite of seizure recurrence observed in the present study is comparable with the finding of the study done in Northern Tanzania where 24.6% of PWE were receiving subtherapeutic doses of AEDs [6]. The use of sub-therapeutic doses among PWE is likely to be caused by prescribers who are not primarily trained to manage epilepsy. Most of prescribers identified in the present studies were nurses, clinical officers and general medical doctors instead of neurologists or other specialists.

Discrepancy between hospitals and practitioners regarding AED withdraw is in line with previous reports which showed lack of evidence to guide the timing of withdrawal of AEDs in seizure free adults [26, 27]. However, generally it is agreed that, it is best to stop AEDs medication because of their side effects. For children with partial seizures or abnormal EEG, it is recommended to withdraw AED medication after a period of at least two years or more of seizures free [26]. Discontinuation of AEDs for PWE after long period of seizure-free improves neuropsychological performance [28]. Discrepancy between hospitals and practitioners regarding AED withdraw in this region could be due to lack of common teaching practice regarding epilepsy management.

## Conclusions

The present study shows that care offered to PWE in Mwanza region is grossly inadequate compared to the needs. Most PWE in Mwanza were diagnosed and treated by nurses. PWE were not thoroughly investigated, counseled and followed-up, and had limited choice and accessibility to AEDs. Some patients particularly in district hospitals were under-medicated despite of seizure recurrence. There was discrepancy between hospitals and practitioners regarding AED withdraw.

In light of the findings of the present study, the following are recommended:

- Short-course training about epilepsy management to the practitioners who regularly diagnose and treat PWE.
- The government to ensure continuous AEDs supply.
- AED therapeutic drug monitoring for selected patients particularly the ones with uncontrolled seizures.

## Abbreviations

AED(s):antiepileptic drug(s), BMC–Bugando Medical Center, CBZ–carbamazepine, CT - computed tomograph, ECG–electrocardiogram, EEG–electroencephalogram, HCWs–health care workers, MRI -

magnetic resonance imaging, PB– phernobarbital, PHT– phenytoin, PWE– people with epilepsy, SPSS– Statistical Package for Social Sciences, VPA– valproic acid

## **Declarations**

### **Ethics approval and consent to participate**

Ethical clearance and approval was obtained from Joint Catholic University of Health and Allied Sciences and BMC Research and Ethical Committee under reference number CREC/120/2016. Permission to conduct the study was obtained from Mwanza Regional Commissioner’s office, Bugando Medical Center and respective District hospitals administrations. All study participants signed consents after adequately be informed about the objective of the study, the right not to participate in the study or withdrawal from the study at any time they want. All information obtained in the study was kept confidential.

### **Consent for publication**

Not Applicable

### **Availability of data and materials**

Data will be available upon request from the corresponding authors.

### **Competing interests**

The authors declare that they have no competing interest.

### **Funding**

This study was supported by the Fogarty International Center of the National Institutes of Health under Award Number D43TW010138.

### **Authors' contributions**

HD: conceptualization and investigation, study design, performed the analysis, wrote and approved the final manuscript. RN, SI and CM: Reviewed and edited research proposal, collected data, performed the analysis, wrote and approved the final manuscript. GK and MD: conceptualization, study design, overall supervision, performed the analysis, reviewed and approved the final manuscript.

### **Acknowledgements**

The authors would like to than the Mwanza Regional Administrative Secretary for providing support letter to conduct the present study as well as BMC Director General and the four District Excective Secretaries and Distric Medical Officers for their support. We also extend our sincere appreciation to all the study participants, data collectors and medical directors of the five hospitals. We would also like to thank Mr. Oscar Joachim who assisted in data entry.

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