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ADHERENCE TO ANTI-EPILEPTIC DRUGS AND SEIZURE CONTROL AMONG PATIENTS ATTENDING KAWE CLINICS IN NAIROBI COUNTY

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STUDENT'S DECLARATION

This dissertation is my original work. It has not been presented for the award of a degree in any other institution.

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DEDICATION

To Gabrielle Jianna, Ray Onyango Oluoch and the late Professor Ben Waweru.

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LIST OF ABBREVIATIONS

ADNFLE	Autosomal Dominant Nocturnal Frontal Lobe Epilepsy
AED	Anti-Epileptic Drugs
BECTS	Benign Epilepsy with Centrotemporal Spikes
BMQ	Brief Medication Questionnaire
CNS	Central Nervous System
DALY	Disability-Adjusted Life Years
FIRES	Febrile Illness Related Epilepsy Syndrome
HIC	High-Income Countries
ICD-10-CM	International Classification of Diseases-Tenth Edition Clinical Modification
IBE	International Bureau for Epilepsy
ILAE	International League against Epilepsy
KAWE	Kenya Association for the Welfare of People with Epilepsy
KNH	Kenyatta National Hospital
LIC	Low-Income Countries
LMIC	Low- And Middle-Income Countries
MARS	Medication Adherence Rating Scale
MAQ	Medication Adherence Questionnaire
MMAS-4	Morisky medication adherence scale-4
MMAS-8	Morisky medication adherence scale -8
NGO	Non-Governmental Organisation
PLWE	People Living With Epilepsy
SES	Socio-Economic Status
SUDEP	Sudden Unexpected Death in Epilepsy
WHO	World Health Organisation

DEFINITIONS OF KEY TERMS

Active Epilepsy:	This is two or more unprovoked epileptic seizures on different days in the prior year in people who have epilepsy.
Adherence:	Morisky Medication Adherence Score of 0.
Epilepsy:	Chronic disease of the brain that manifests with recurrent unprovoked seizures
Health:	State of complete physical, mental, and social wellbeing and not merely the absence of disease or infirmity.
Non-adherence:	Morisky Medication Adherence Score of 1 to 4.
Seizure:	The transient occurrence of signs and/or symptoms due to abnormal excessive or synchronous neuronal activity in the brain.
Treatment:	Any intervention intended to restore health.
Poorly Controlled Epilepsy:	Less than 50% reduction in baseline pre-treatment seizure frequency or intractable seizures during the past 6 months.
Partially Controlled Epilepsy:	More than 50% reduction in pre-treatment seizure frequency during the past 6 months.
Well Controlled Epilepsy:	The absence of seizures during the past 6 months while receiving the same antiepileptic drug.

ABSTRACT.

Background: Epilepsy is a chronic non-communicable disease affecting the brain. Adherence to drugs is a major issue in chronic diseases, with non-adherence being the largest predictor of poorly epilepsy control. There are limited studies looking at non-adherence and seizure control in primary level, health care facilities, hence this study.

Objectives: To determine the level of adherence to antiepileptic drugs and seizure control among patients attending KAWE clinics in Nairobi county.

Methods: A descriptive cross-sectional study on 382 epileptic patients was done between October and November 2021. Data collection was through a study proforma, and the morisky medication assessment scale-4, tool.
P values and 95% confidence levels were calculated where applicable.

Results: Majority of the patients were adherent at 67.5% (258) while 32.5% (124) were non-adherent.

In terms of seizure control, 23.0% (88), 39.5% (151), 37.4% (143) patients had well-controlled, partially controlled, and poorly controlled seizures respectively.

Non-adherence was found to be associated with forgetfulness, being separated and widowed, increased seizure frequency in the past 6 months, level of seizure control, use of polytherapy at the start of epilepsy treatment, longer duration of prescription refill time and the use of alternative methods of treatment.

There was a significant association between non-adherence with both partial and poor seizure control.

Conclusion: Adherence to AEDs among patients attending KAWE clinics was at 67.5% while non-adherence at 32.5%. Poor control of epilepsy is still a major problem with a prevalence of 37.4%, and it is significantly associated with non-adherence to AED

1.0 CHAPTER ONE: INTRODUCTION.

1.1 INTRODUCTION.

The brain can be affected by many diseases, epilepsy being one of them. Epilepsy is regarded as a chronic non-communicable disease that affects the brain, manifesting with recurring seizures that affect people of all sexes, ages, and socio-economic statuses.

Its definition is based on meeting any one of these set criteria:

a) At least two unprovoked (or reflex) seizures occurring more than 24 hours apart.

b) Diagnosis of an epilepsy syndrome.

c) One unprovoked (or reflex) seizure and a probability of further seizures similar to the general recurrence risk (at least 60%), after two unprovoked seizures, occurring over the next 10 years(1).

Some examples of the known epilepsy syndromes include autosomal dominant nocturnal frontal lobe epilepsy (ADNFLE), benign epilepsy with centrotemporal spikes (BECTS), early myoclonic encephalopathy, jeavons syndrome, febrile illness related epilepsy syndrome (FIRES), frontal lobe epilepsy, childhood absence epilepsy, west syndrome, ohtahora syndrome, lenox gaustaut syndrome, reflex epilepsy, juvenile myoclonic, absence epilepsy, and panayiotopoulos syndrome.

Data from a meta-analytic study by Ngugi et al. estimate that around 70 million people of the world's population have epilepsy(2), this being a sharp increase from the world health organization (WHO) 2004 projection of fifty million people. The prevalence of active epilepsy lies between 4 and 10 per 1000, while in Kenya, it stands at 4.5 per 1000(3).

Epilepsy accounts for a compelling proportion of the global disease burden, at 0.56% of disability adjusted life years (DALYs)(4).

Epilepsy can be put under control. As high as 70 percent of people living with epilepsy(PLWE) can be free from seizures with appropriate treatment(5). WHO, via the mental health gap (mhGap), rolled out protocols that were to be used in managing mental, substance use and neurological disorders(6). Most anti-epileptic drugs (AEDs) are typically low-cost, yet despite this 75% of PLWE in low-income countries (LIC) receive no treatment at all.

PLWE have also been noted to be non-adherent to their medications as it occurs in other chronic illnesses. The prevalence of non-adherence to AEDs was noted to be between 20-80%, according to WHO, 2003 by Sabaté et al.(7). In Kenya, the prevalence of non-adherence to

AEDs was at 54% and 65.1% in studies that were undertaken by Mbuba et al.(8) and Ibinda et al.(9), respectively. Davis et al. established that non-adherence to AEDs leads to increased healthcare costs(10). Non-adherence also increases mortality, morbidity and causes less seizure control, as determined by Faught et al. in the RANSOM study(11). Not much is known about non-adherence or seizure control in primary care, especially in the African population.

2.0 CHAPTER TWO: LITERATURE REVIEW.

2.1 BACKGROUND.

2.1.1 THE DEFINITION OF SEIZURES AND EPILEPSY.

Seizures are the paroxysmal disturbances in the cerebral function, which is secondary to the abnormal excessive or synchronous discharges of the brain's cortical neurons(12,13). The manifestations and frequency of seizures can vary both in an individual, and from person to person, and can range from interruption of attention to obvious severe convulsions. Approximately 10 percent of individuals worldwide will have one seizure in their lifetime.

Epilepsy is a condition whereby an individual is predisposed to repetitive unprovoked seizures. According to the ILAE official report (2014), epilepsy was defined practically as any one of these:

a) At least two unprovoked/reflex seizures occurring more than 24 hours apart,
b) Diagnosis of an epilepsy syndrome,
c) One unprovoked/reflex seizure and a probability of further seizures similar to the general recurrence risk (at least 60%) after two unprovoked seizures occurring over the next 10 years(1).

2.1.2 PATHOPHYSIOLOGY.

Seizures occur because of the disruption in the normal balance between the excitatory and the inhibitory signalling drive, situated at the neurons' synaptic levels within the central Nervous System (CNS), through a process termed epileptogenesis(14). Epileptic seizures originate from the forebrain, of which the main components are the cerebral cortex and the thalamus. Focal seizures are confined to a single cerebral hemisphere and generally to one focal point within the cerebral hemisphere. On the contrary, generalized seizures affect the cerebral hemispheres bilaterally, with the resultant impairment in the level of consciousness.

2.1.3 CLASSIFICATION OF EPILEPSY.

The ILAE in 2017, commissioned a new classification of epilepsy. The new classification involves three tiers/levels, starting from seizure type, then the epilepsy type, and finally the epilepsy syndrome. It also incorporates etiological causes and comorbidities along each stage, as these carry management implications and enables early identification and diagnosis of epilepsy. The seizure type tier/level distinguishes between the seizure onset as being focal (arising from one hemisphere), generalized (originating simultaneously from the hemispheres bilaterally), or those of unknown onset. Focal seizures are then categorized based on awareness,

i.e., whether consciousness was maintained or lost. They are then divided into motor or non-motor depending on the physical manifestation of the seizure(15).

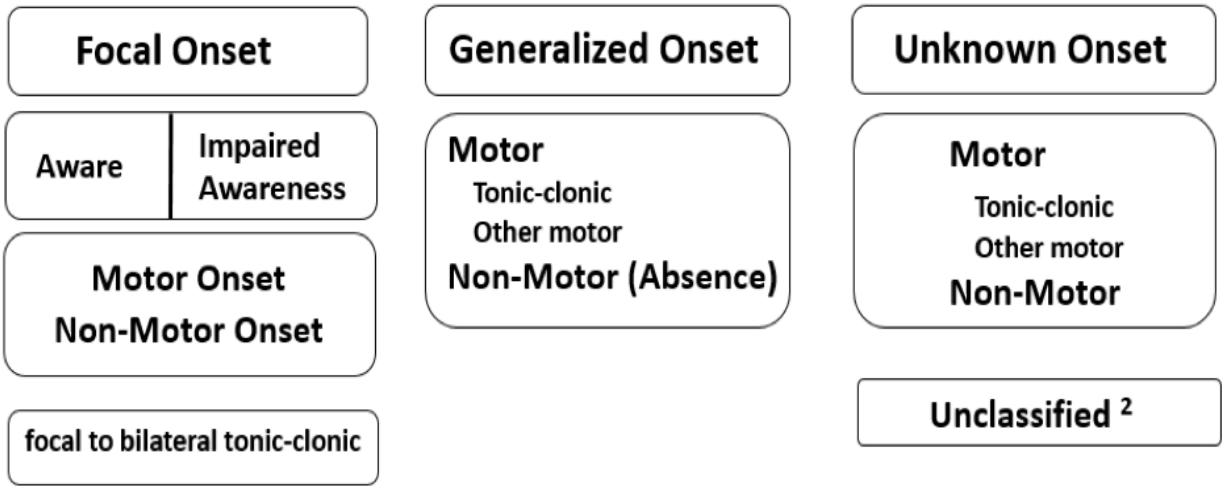

Figure 1: The ILAE 2017, Classification of Seizure Types.

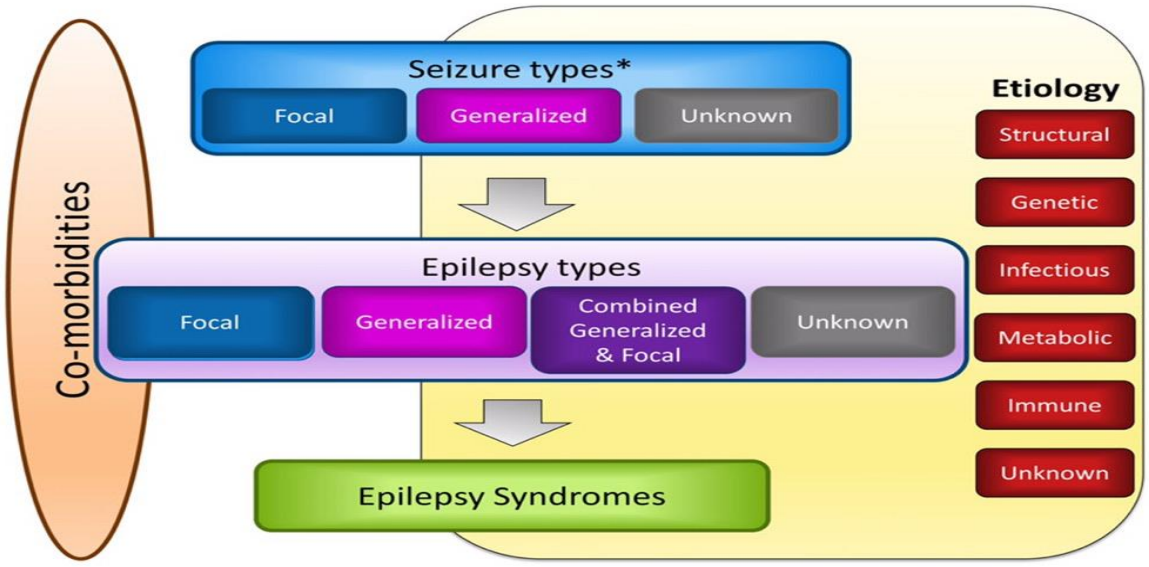

Figure 2: The ILAE 2017 Classification of Epilepsy.

2.1.4 TREATMENT OF EPILEPSY.

Epilepsy being a chronic illness, requires long term management. Different approaches can be employed towards the treatment of epilepsy and these include the use of antiepileptic drugs (AEDs), surgery, e.g., temporal lobe resection for cases of refractory epilepsy, or those that are caused by a structural lesion in the brain that can be removed by surgery, ketogenic diet, mostly used in children works by changing how the brain gets energy to function because of the reduced carbs consumed, vagus nerve stimulation for the treatment of refractory epilepsy and

for the treatment of PWE who are not candidates for surgical treatment, lifestyle changes like avoiding alcohol and bright light for those with photosensitive epilepsy, and having adequate sleep, psychosocial and psychoeducational therapy, cognitive behavioural therapy, and relaxation therapy(16). Of note most of these are not accessible to patients living in LMICs.

2.1.4.1 PHARMACOLOGY OF SOME AEDS.

The main targets for current available AEDs appear to act primarily through voltage-gated ion channels implicated in generating the action potentials and in neurotransmitter release, and through ligand-gated pathways responsible for modulating synaptic excitation and inhibition(13). Other mechanisms of action include neurotransmitter modification, such as peptides and hormones, enhancing the GABA signalling within the synaptic cleft, and alteration of the function of synapses, with the prospect of vesicle release(17).

The different classes of AEDS include sodium channel blockers like carbamazepine, phenytoin, lamotrigine and zonisamide, calcium current inhibitors like ethosuximide and valproic acid, gamma-aminobutyric acid (GABA) targets like benzodiazepines, barbiturates, valproic acid, gabapentin, and tiagabine, glutamate blockers like felbamate, topiramate, carbonic anhydrase inhibitors, hormones and drugs with unknown mechanisms of action(18).

Commonly used drugs in our setup include carbamazepine, phenytoin, phenobarbitone, and valproic acid and this is mainly because of their favourable cost profile among our population.

Various international guidelines recommend that AED treatment strategy should be individualised according to the seizure type, epilepsy syndrome, co-medication and comorbidity, and the patients, lifestyle. They also take note that both newer and older drugs are general equally effective.

The Kenya national guidelines recommended that in the management of epilepsy, the physician should start with one drug, at the lowest recommended dose compatible with the medical preparation, then gradually titrate the dose, until complete seizure control or the maximum pharmacologically tolerated dose has been reached. If no seizure control is attained, then a second drug can be added, while considering gradually decreasing or maintaining the initial drug depending on clinical response(19). This is to minimise on side effects of the drug, and the drug-to-drug interactions, that can come about with polytherapy.

2.2 ADHERENCE TO ANTIEPILEPTIC DRUGS (AEDS).

2.2.1 DEFINITION OF ADHERENCE AND NON-ADHERENCE.

Adherence in medicine is a wholistic term. It is the degree to which a persons' behaviour i.e. following a diet, taking medicine, and or executing lifestyle changes, conforms to the agreed instructions from a health care provider(7).

Medication adherence is, therefore, the extent to which a patient uses their medication regimen based on a health care provider's prescription(20).

Non-adherence can thus be referred to as the extent to which a patients' medication-taking behaviour fails to coincide with the medical guidelines provided by a health care provider. This can be in form of not taking the correct dosage (too much or too little), failure to observe dosing schedules, not taking medication for the duration prescribed, or using other non-recommended non-prescribed medications(21).

Non-adherent behaviour can either be unintentional or intentional(22). Unintentional behaviour occurs if the patient desires to be adherent but is unable to because of the lack of resources and capacity. This can be in the form of forgetfulness, not understanding the instructions given, inability to afford the drugs, difficulty in administration, and scheduling of the medicines. On the other hand, intentional non-adherence occurs if the patient opts to forego his/her medications as previously agreed or use it in ways other than that recommended by the prescriber.

2.2.2 BURDEN OF NON-ADHERENCE TO AEDS.

Non-adherence to AEDs in adults suffering from epilepsy has been linked with breakthrough seizures(23), poor clinical outcomes(24), higher health care costs, increased rate of hospitalization, and increased morbidity and mortality, RANSOM Study(11).

Non-adherence to AEDs has been estimated to vary between 20-80%, according to WHO(7). Recent studies still show that much has not changed in terms of non-adherence to AEDs. A study published in 2017 by O'Rourke et al., determined the level of non-adherence to be between 29-66%(25).

Non-adherence to medication was also found to be the main contributor to poorly controlled epilepsy, as demonstrated by Davis et al.(10).

Studies done to elucidate the prevalence of non-adherence to AEDs include Mativo et al. in 2004, KNH, at the adult neurology outpatient clinic and Amolo et al. in 2011 at the KNH Paediatric neurology clinic Kenya at 40% and 3% respectively(26,27), Sanya et al. in 2013 at the neurology clinic at the University of Ilorin Teaching Hospital Nigeria at 21% (28), the

RANSOM study in the USA which was a retrospective cohort study, using state Medicaid claims data from Florida, Iowa, and New Jersey during the period from January 1997 to June 2006, by Faught et al. at 26% (11), Elsayed et al. whose study population was 96 adult patients diagnosed with epilepsy and attending three major tertiary hospitals in Khartoum Sudan at 35% (29), Davis et al. in North Carolina, in which retrospective claims from the PharMetrics database were analysed at 39% (10), in the rural town of Kilifi, Kenya in 2012, a study by Mbuba et al. that recruited 232176 people, estimated non adherence at 54%(8), Ibinda et al. in a population-based study in five African countries at 65.1%(9) and Kaddumukasa et al., who did a cross sectional study on 256 epileptic patients between August and December 2009 in Mulago Hospital Uganda at 46% (23).

Table 1: Table Showing the Prevalence of Non- Adherence to AEDs across Various Countries.

Area	**Year**	**Non- adherence**	**Type of method used to determine non-adherence**	**Author**
Worldwide	2003	20-80%	Meta-analysis	Sabaté et al.
Kenya (KNH adult Outpatient clinic)	2004	40%	Optimal drug level measurement in blood	Mativo Peter et al.
USA	2008	39%	MPR- Medication Possession Ratio	Davis et al.
USA- New Jersey, Iowa, Florida	2008	26%	MPR- Medication Possession Ratio	Faught et al. for the RANSOM study
Kenya (KNH Paediatric neurology clinic)	2011	3%	Self-Reported- Two Yes or No answer questions	Amolo Judith et al.
Kenya (Kilifi)	2012	54%	Self-Reported – (MMAS-4)	Mbuba et al.
Uganda	2013	46%	Self-Reported- Two Yes or No answer questions	Kaddumukasa et al.
Nigeria	2015	21%	Not clearly demonstrated	Sanya et al.
Worldwide	2017	29-66%	Systematic review of published articles	O'Rourke et al.
Africa-Kilifi (Kenya), Agincourt (South Africa), Ifakara (Tanzania) Iganga-Maguye (Uganda), Kitampo (Ghana)	2017	a) 65.1% **(50.2%, 46.5%, 46.6%, 78.8%, 87.6% respectively)** b) 79.1% **(81.9%, 73.9%, 72.7%, 90.3%, 87.6% respectively)**	a) Self-Reported- (MMAS-4) b) Optimal drug level measurement in blood	Ibinda et al.
Sudan	2019	35%	Self-Reported (MMAS-4)	El Sayed et al.

2.2.3 FACTORS ASSOCIATED WITH NON-ADHERENCE TO AEDS.

This is mainly five-tiered(7), and includes socio-economic, patient, treatment, health-system, and condition-related factors. Socio-economic-related factors include and are not limited to the long distance from treatment centres, poverty, illiteracy, the huge cost of medication, and unwillingness to pay for medication. Health-care-related factors include the irregular supply of drugs, lack of education about AEDs, healthcare provider-patient relationships, and poorly developed health systems. Condition-related factors include the duration of treatment, previous treatment failures, forgetfulness, memory deficits, and high-frequency seizures. Patient-related factors include refusal to take medication, denial, and disbelief of diagnosis, stigma, stressful life events, and uncertainty about the need for drugs. Treatment-related factors include misunderstanding instructions on taking medication, adverse drug events, polytherapy, and complex drug regimens.

Mbuba et al. in Kilifi found out that the long duration of medication use was the most important factor affecting adherence. Other factors noted as drivers of non-adherence were the amount of AEDs prescribed, the ability to have a good relationship with the health care provider, seizure frequency, and being injured during a seizure episode(8).

2.2.4 MEASURING ADHERENCE AND NON-ADHERENCE.

2.2.4.1 QUANIFICATION OF ADHERENCE AND NON-ADHERENCE.

Different methods have been utilized to quantify the extent of adherence and non-adherence to medication, however, no one ‘gold standard' method exists. Farmer et al(30), however, recommend that a combination of the measurement methods, be used, as the most effective way of analysing medication adherence or non-adherence.

A range of approaches can be used to quantify adherence. These methods include:

a) Indirect measures like patient self-report; family and caregiver report; medical records; prescription refill rate; use of pill count; assessment of patients' clinical response.

   Self-report questionnaires are a convenient and efficient method to measure adherence among patients. They have the merit of easy applicability in clinical practice and low cost. However, their main disadvantage is that they have to be validated, the responder is subjected to recall bias which might reduce accuracy and validity, and the overestimation of the level of adherence in order not to disappoint doctors. Pill count and pharmacy refill and drug pick up rate have the merit of being easy to compute and inexpensive, however it does not measure the actual administration patterns of the medication and that adjustments of medication doses by the physician are not always

reflected by these rates. The patients' clinical response can be used as a surrogate marker of adherence, however each patient's individual clinical response to a medication is usually affected by a complex combination of variables, rendering a precise derivation of medication adherence difficult.

b) Direct measures like the use of assays measuring drugs and their metabolites in biological fluids like urine, serum, and saliva; use of drug markers for the intended medication; directly observing the patient while taking their medication(20).

   Measuring drug levels or their metabolites in serum has been considered a more accurate method of determining non-adherence. The main limitations are that it is expensive, it cannot quantify the way the patient has been taking the medication or detect fluctuations in compliance between clinic visits. It is affected by the drug pharmacokinetics e.g., half-life and drug trough levels, and the variations in an individual's metabolism and volume of distribution will affect the drug level independent of medication regimen adherence, making assessment of the degree of compliance difficult. Direct observation of the patient is also fairly accurate but can be cumbersome for both the patient and the person doing the direct observation.

2.2.4.2 MEASURING SELF-REPORTED ADHERENCE AND NON-ADHERENCE

Self-report measures the patients' recall of how drugs have been taken. They help in distinguishing between intentional and unintentional non-adherence(31). Validated self-report measures can predict outcomes and remain the most pragmatic approach that can be used in clinical practice and research. Examples include the 4 item Morisky medication adherence scale (MMAS-4); the 8 item Morisky medication adherence scale (MMAS-8), which has a 93% sensitivity and 53% specificity and is recommended to serve as a screening tool for validated conditions in the clinical setting; the Medication Adherence Questionnaire (MAQ), which was derived from the MMAS-4, but has poorer psychometric properties; the Brief Medication Questionnaire (BMQ), which is sensitive and brief and has the ability to discover different types of non-adherence, but can be difficult to score and patients are required to list their medication regimen; the Medication Adherence Rating Scale (MARS) used in psychiatric patients and has a weak to moderate validity with limited generalizability. Most of these tools were developed for specific medical conditions but along the way have been adopted and validated for the use in other diseases as well, and been translated in different languages so as to be used in different populations(24,32,33).

The Morisky medication adherence scale-4 (MMAS-4) developed by Morisky et al. in 1986(34), is a self-reported, generic, medication-taking behaviour tool, that measures both intentional and unintentional adherence behaviours. It has four items that have a "Yes" = 1 and "No" =0, answer format. The researcher then sums up the scores that range from 0 to 4. Patients are classified as adherent (as it was in this study) if they score 0 and non-adherent if they score between 1-4. The level of adherence can then be reclassified as highly adherent if the patients score 0, medium adherent if they score between 1-2, and low adherent if they score 3-4 as was the case in this study.

The Morisky scale holds merits over other patient self-report tools. Some of the advantages it offers include the widespread adoption in various illnesses, population groups (especially those with low literacy), and nations, a higher level of similarity with electronic monitoring gadgets or pharmacy fill data, and fewer items to be answered, hence, a lower burden of response thus reducing responder fatigue during answering of the questions and is the most widely used scale in research. The scale has moderate to high reliability and criterion validity(35). The MMAS-4 was adopted for this study to aid in comparison with other local studies done.

Table 2: Morisky medication adherence scale 4.

QUESTION	YES	NO
Do you ever forget to take your medication?	0	1
Are you careless at times in taking your medication?	0	1
When you feel better do you sometimes stop taking your medicine?	0	1
Sometimes if you feel worse when taking your medicine, do you stop taking it?	0	1

2.3 SEIZURE CONTROL.

2.3.1 IMPACT OF SEIZURE CONTROL.

Epilepsy can be controlled. As high as 70 percent of people living with epilepsy(PLWE) can be free from seizures with appropriate treatment, with most patients achieving this on monotherapy(5). So important is seizure con0trol, that the ICD-10-CM (International Classification of Diseases, Tenth Revision, Clinical Modification) classifies poorly controlled epilepsy as being equivalent to intractable, pharmaco-resistant (pharmacologically resistant), treatment-resistant, or refractory (medically) epilepsy, under the code G40(36).

Controlled epilepsy makes the quality of life better and makes patients motivated to seek medical care regularly. Poorly controlled epilepsy, has been linked with increased mortality

rates, as demonstrated by Zielhiski et al. who found out that people with epilepsy were 1.8 times at risk of death, than the general population(37), with the overall risk being 1.6-11.4 times than the general population(38). A much more recent study shows that patients who continue to suffer from seizures appear to have almost 40 times higher risk of mortality than those in remission(39). Some of the causes of mortality in epileptic patients include accidents, sudden death in epilepsy (SUDEP), suicide, vascular diseases, and pneumonia.

Several factors affect seizure control, and they include drug adherence, cultural factors, psychosocial factors, biological factors, and socio/economic factors(26). Poorly controlled epilepsy is also linked to high unemployment rates, cognitive impairment, excessive body injuries, comorbidities, social stigma, reduced marriage rates, reduced employment levels, and poor education(38,40,41). It has also been noted that when seizures are controlled for an extended period, the mortality rates approach those of the general population(42) hence underscoring the need for good seizure control. However, a recent study showed that a sizeable minority of SUDEP occurred in patients thought to have well controlled epilepsy(43).

Treatment failure may result from inappropriate drug selection, inappropriate dosing, either as over or under dosing, poor adherence to the therapeutic regimen(44). Of note, certain AEDs work better with certain seizure types. Therefore, therapy should start with the AED most appropriate for a given seizure type. Unfortunately, not every patient with epilepsy achieves the desired therapeutic goals and outcomes. Approximately 1/3 of patients remain uncontrolled with optimal therapy.

Some patients may also continue to have seizures even though they are adherent and have tried multiple drug combinations. These are termed drug-resistant epilepsy i.e., the failure to achieve sustained seizure freedom, despite the adequate trials of two tolerated, appropriately chosen and used AED medication, (whether as monotherapies or in combination)(45). These patients may therefore be candidates for vagal nerve stimulation or seizure surgery.

2.3.2 PREVALENCE OF SEIZURE CONTROL.

Some of the studies done to determine seizure control in epilepsy include Mativo et al.(26) in 2004 who got poorly controlled epilepsy at 39.1%, Amolo Judith in 2011 who got that in children, 63.2% had well-controlled, 22.1% partially controlled while 14.7% had poorly controlled epilepsy(27), Jang et al, 72% poorly controlled and 38% well controlled in Guinea, and Niriayo et al., 53.2% poorly controlled and 46.6% well controlled in Ethiopia(46).

Table 3: The Level of Seizure Control across Various Countries

Area	Year	Level of seizure control	Type of study	Author
Kenya (KNH-Adult neurology clinic)	2004	40%-Poorly controlled 60%-Well controlled	A cross-sectional comparative study	Mativo et al.
UK-South Hampton	2006	57%- Poorly controlled 43%-Well controlled	A hospital-based cross-sectional study	Jones et al.
Kenya- (KNH Paediatric neurology clinic)	2009	14.7%- Poorly controlled 22.1%-Partially controlled. 63.2%- Well controlled	A hospital-based descriptive cross-sectional study	Amolo et al.
Saudi Arabia	2017	48.6%-Poorly controlled 51.3%-Well controlled	A hospital-based prospective cross-sectional study	Azra et al.
Kenya (KNH Adult neurology clinic)	2017	56% Poorly controlled 44%-Well controlled	A questionnaire-based hospital-based descriptive cross-sectional study	Ahmed et al.
Guinea	2018	72%-Poorly controlled 38%-Well controlled	A hospital-based descriptive cross-sectional study	Jang et al
Ethiopia	2018	53.2%-Poorly controlled 46.6%-Well controlled	A hospital-based descriptive cross-sectional study	Niriayo et al

2.3.3 DEFINING SEIZURE CONTROL.

Seizure freedom has been defined as the freedom from all seizure types, for 12 months or three times the preintervention interseizure interval, whichever comes last(45). For this study, the time set for grading seizure control was six months, prior to the time of administering the questionnaire to the patients. This was to aid in the comparison with other local studies that used the same framework(26,27,47), and also because the inclusion criteria included those on medication for at least 6 months.

Seizure control was graded as, poorly controlled epilepsy, partially controlled epilepsy, or well controlled epilepsy. Poorly controlled epilepsy refers to less than 50 percent reduction in the baseline pre-treatment seizure frequency or the presence of intractable seizures during the past 6 months. Partially controlled epilepsy is more than 50 percent reduction in the pre-treatment seizure frequency during the past 6 months while well/good controlled epilepsy is the absence of seizures during the past 6 months while receiving antiepileptic drug(27).

Seizure freedom was deemed as the absence of seizures since the start of AEDs, while intractable or resistant epilepsy was defined as the continuation of seizures despite being on two maximally tolerated doses of AEDs with confirmed adherence to AEDs. Pre-treatment/

baseline seizure frequency was the average number of experienced seizure episodes per month at the time of the initial visit to the clinic, spanning the 3 months before the visit (35).

2.4 STUDY JUSTIFICATION

Non-adherence to AEDs has been linked to poor epilepsy outcomes, yet epilepsy as a disease can be controlled. It is possible that by tackling the causes of non-adherence, the associated morbidity and mortality in PLWE could be significantly reduced. Data derived from this research can be used by relevant stakeholders and in the long term, impact positively on the lives of the epilepsy patients and caregivers-this can make and help patients live seizure-free, fulfilling lives.

Finally, most of the previous studies done that investigate non-adherence to AEDs and seizure control have been done in secondary or tertiary level health care facilities, both locally and internationally. This study was designed to detect non-adherence and its determinants in an urban primary level, health care facility hence the use of KAWE clinics as the designated study sites. Primary care has been noted to be pivotal in the overall health care system delivery chain, because it offers enhanced access to healthcare services, a decline in the rate of hospitalizations and emergency department visits, and also provides patients with better health-related outcomes(48,49). Because of these factors disease control and drug adherence can be better achieved in patients seeking care in primary care facilities than in secondary or tertiary level health care facilities. Primary health care providers can be nurses, clinical officers, physician assistants, or even doctors(50).

2.5 RESEARCH QUESTION

What is the level of adherence to antiepileptic drugs and seizure control among patients attending KAWE clinics in Nairobi County?

BROAD OBJECTIVE

To determine the level of adherence to antiepileptic drugs and seizure control among patients attending KAWE clinics in Nairobi County.

PRIMARY OBJECTIVES

1. To determine the patterns of adherence to antiepileptic drugs among patients attending KAWE clinics in Nairobi County.
2. To determine the level of seizure control among patients attending KAWE clinics in Nairobi County.

SECONDARY OBJECTIVES

1. To determine the factors associated with non-adherence to antiepileptic drugs.
2. To determine the association of non-adherence to antiepileptic drugs and seizure control.

3.0 CHAPTER THREE: STUDY DESIGN AND METHODOLOGY

3.1 STUDY DESIGN

This was a descriptive cross-sectional study.

3.2 STUDY SITE

The study was conducted at KAWE (Kenya association for the welfare of epilepsy) clinics based in Huruma Lions health centre, Riruta health centre, and Karen health centre. KAWE is a not-for-profit organization (NGO) established in 1982 that caters to needy epileptic patients. It has 3 run clinics in Nairobi County and 28 affiliate clinics all over Kenya. It aims to address the challenges that PLWE experience through a community participatory approach. The KAWE clinics are run by well-trained clinical officers, nurses, and volunteers. Their catchment population is usually the informal settlement areas. The clinics operate on Wednesdays, Thursdays, and Fridays from 9 am to 3 pm. The Huruma Lions health centre clinic handles an average of 70 patients in a day with the rest an average of 50 patients each.

3.3 STUDY POPULATION

Study population was patients aged 14 years and above, who had a clinical diagnosis of epilepsy and were on treatment for the last 6 months. This was to capture non-adherence and seizure control in the adolescent and adult population hence the ages of 14 years and above. Patients must also have provided written informed consent for the study for those above 18 years of age, while an informed assent was obtained for those who were below the age of 18 years.

3.3.1 CASE DEFINITION

A case was defined as a patient who had had two or more unprovoked epileptic seizures on different days in the prior year.

3.3.2 INCLUSION CRITERIA

- Patient on treatment with antiepileptic medications for the last 6 months.
- Patients aged 14 years and above.
- Patients attending KAWE Clinics in Nairobi County.
- Those with informed signed consent. N.B., For patients below 18 years, informed assent was obtained from the patient, and an informed consent obtained from the parent or guardian.

3.3.3 EXCLUSION CRITERIA

Patients who had mental restriction (major cognitive impairment) and or other severe psychiatric conditions, who were not able to give informed consent and accurate information.

3.4 SAMPLE SIZE DETERMINATION

Fischer's formula was utilized to attain the minimum needed sample size, to estimate the level of adherence to AEDs and seizure control in patients who have active epilepsy:

$$n = \frac{Z^2 \, x \, P(1-P)}{d^2}$$

In which:

n = Desired sample size

Z = The statistic value from standard normal distribution resembling the desired level of confidence (1.96 for 95% Confidence Interval (CI))

P = Prevalence of non-adherence worldwide ranges from 20-80%. P was considered as a prevalence of 54% from a study done by Mbuba et al.(8) in Kilifi.

d = Desired precision (0.05)

$n = \frac{1.96^2 \, x \, 0.54(1-0.54)}{0.05^2}$ = 382

3.5 SAMPLING AND RECRUITMENT

A consecutive sampling technique was used to recruit study participants, from the study sites until the desired sample size was attained (The patients were approached in order of their arrival time to the clinics and allowed to take part in the study). The principal investigator and the research assistants went to the KAWE clinics on the different clinic days and went through the patient's booking register and identified those, aged 14 years and above, who had a diagnosis of active epilepsy and had been on treatment for more than 6 months.

The recruitment days were on Wednesdays at the Karen clinic, Thursdays at Kawangware clinic, and Fridays at the Huruma clinic, from 9 am to 3 pm.

The recruitment process involved screening for eligibility and consenting procedures. The eligible participants were consented by explaining the study procedures, the discomforts, benefits, and confidentiality. Patients who gave informed consent/assent and met the inclusion criteria were recruited.

3.6 DATA COLLECTION PROCEDURES

The study population was recruited over a period of two months. All patients with clinically diagnosed active epilepsy and on treatment for the last 6 months were allowed to take to part in the research. The participants who met the inclusion criteria were taken through the terms and procedures of the study and a written informed consent/assent obtained.

A screening study proforma filled in by the participant was used to collect details on the age, date of birth, gender, and willingness to take part in the study.

The participants were then given the questionnaire that was self-administered and the Morisky Medication Adherence Scale-4 (MMAS-4) for information on treatment adherence. All these forms were available to be completed either in English or Kiswahili. Unique patient identifier numbers were assigned to all participants during interviews and the numbers kept in a logbook with their full names written down. The participants' names were not indicated on the questionnaire to ensure the confidentiality of the informant.

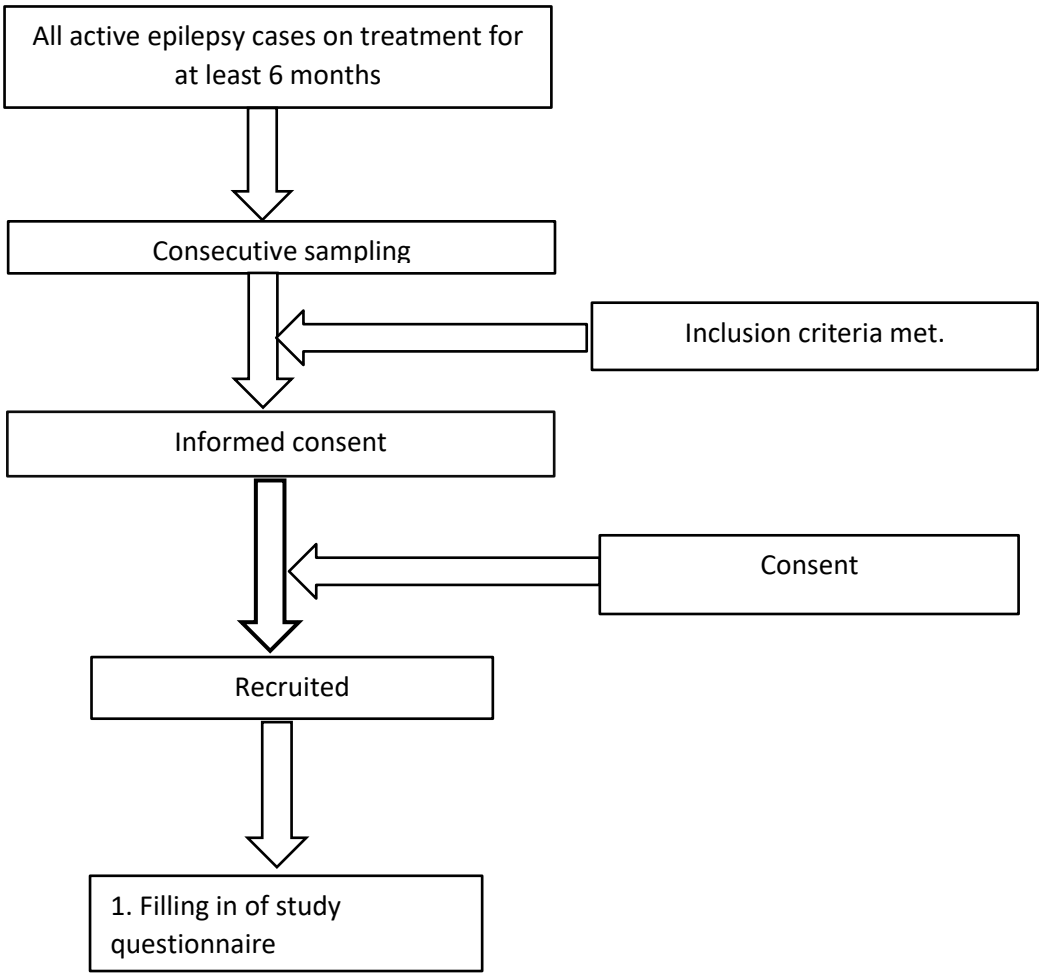

Figure 3: Flow Chart Demonstrating the Recruitment of Patients into the Study

3.7 STUDY INSTRUMENTS

a) A study proforma to collect socio-demographic, seizure frequency and severity, and factors associated with medication adherence.

b) The morisky medication adherence scale-4(MMAS-4).

3.8 QUALITY ASSURANCE

The MMAS-4 has moderate to high reliability and criterion validity. It holds merits over other patient self-report tools such as the widespread adoption in various illnesses, population

groups, and nations, a higher level of similarity with electronic monitoring gadgets or pharmacy fill data, and fewer items to be answered, hence, a lower burden of response, thus reducing responder fatigue during answering of the questions.

The study assistants were adequately trained by the PI on the process of data collection before the start of the data collection process, thus the study assistants were well knowledgeable with the research tools and all clarifications were made beforehand. This reduced errors during the process of data collection. Data verification was done by the PI, at the end of every data collection day.

3.9 ETHICAL CONSIDERATIONS

Approval and permission was attained from The Kenyatta National Hospital/University of Nairobi Ethics & Research Review Committee (KNH/UoN-ERC) and the KAWE organization before the start of data collection.

The goal of the research was explained to all participants, and a written informed consent obtained from those above 18 years of age, while an informed assent was obtained for those who are aged below 18 years after explaining to them fully the intended purpose of the study while in the presence of their parents or guardians.

Patients' confidentiality was honoured by assigning codes to the questionnaires and through use of computerized data. The data collection forms were kept in a lockable cabinet, only accessible to the principal investigator. Also, all soft data were stored securely by the principal investigator in a password-protected computer.

Privacy was upheld during the data collection process to ensure that the participants felt comfortable while answering the questions that might have been personal. The PI/ research assistant used an isolated cubicle in the clinics when assisting participants to fill in the questionnaire and were empathetic. Participants answered questions at will without being coerced and were granted the freedom to pull out, at any point from the research, without being discriminated against. The collected data was not used for other purposes, other than for achieving the study objectives.

The MMAS-4 scores were communicated to the patient as well as their primary physician with the sole aim to enforce adherent practices and measures in patients found to be non-adherent.

The Ministry of health (MOH) COVID-19 infection control protocols, which included washing and sanitization of hands, wearing face masks, social distancing, were observed and adhered to at all stages of recruitment and data collection.

3.10 DATA ANALYSIS AND MANAGEMENT

Data cleaning was conducted after data entry. Analysis of data were then performed using the SPSS Chicago Illinois version 23.0.

The study population was defined using clinical and socio-demographic characteristics.

Age was summarized into mean with standard deviation and compared between groups using independent t test.

Categorical variables e.g., sex, age group, marital status, educational level, were presented as counts.

Medians and interquartile ranges were used to summarize non-normally distributed data such as duration of seizures and comparison between adherent versus non-adherent groups tested using Mann Whitney U test.

Patterns of adherence to antiepileptic drugs were analysed and presented as a percentage of patients who are adherent versus those who are non-adherent to AEDs.

Factors associated with non-adherence to AEDs were determined by associating socio-demographic and clinical characteristics with the level of AED adherence.

All categorical data were associated with adherence status using chi square test and Fisher's exact test was used when numbers were small.

Odds ratios were calculated and presented as estimates of the level of risk of non-adherence associated with independent variables as well as the risk of uncontrolled seizures associated with non-adherence. Multiple logistic regression was done to determine predictors of non-adherence, while controlling for confounding factors.

Statistical significance was tested at a 5% level (p-value of less or equal to 0.05 was interpreted as significant).

4.0 CHAPTER FOUR: RESULTS

Between October 2021 and November 2021, a descriptive cross-sectional study, on patients aged 14 years and above, with a diagnosis of active epilepsy and on treatment for at least 6 months, and on follow up at KAWE clinics in Nairobi County, was undertaken.

A total of 397 patients were screened. Of these: 6 were underage, 4 had mental restriction, 3 declined to consent, 2 did not complete the administered questionnaires, and were therefore excluded from the study. A total of 382 patients were enrolled into the study and analysed.

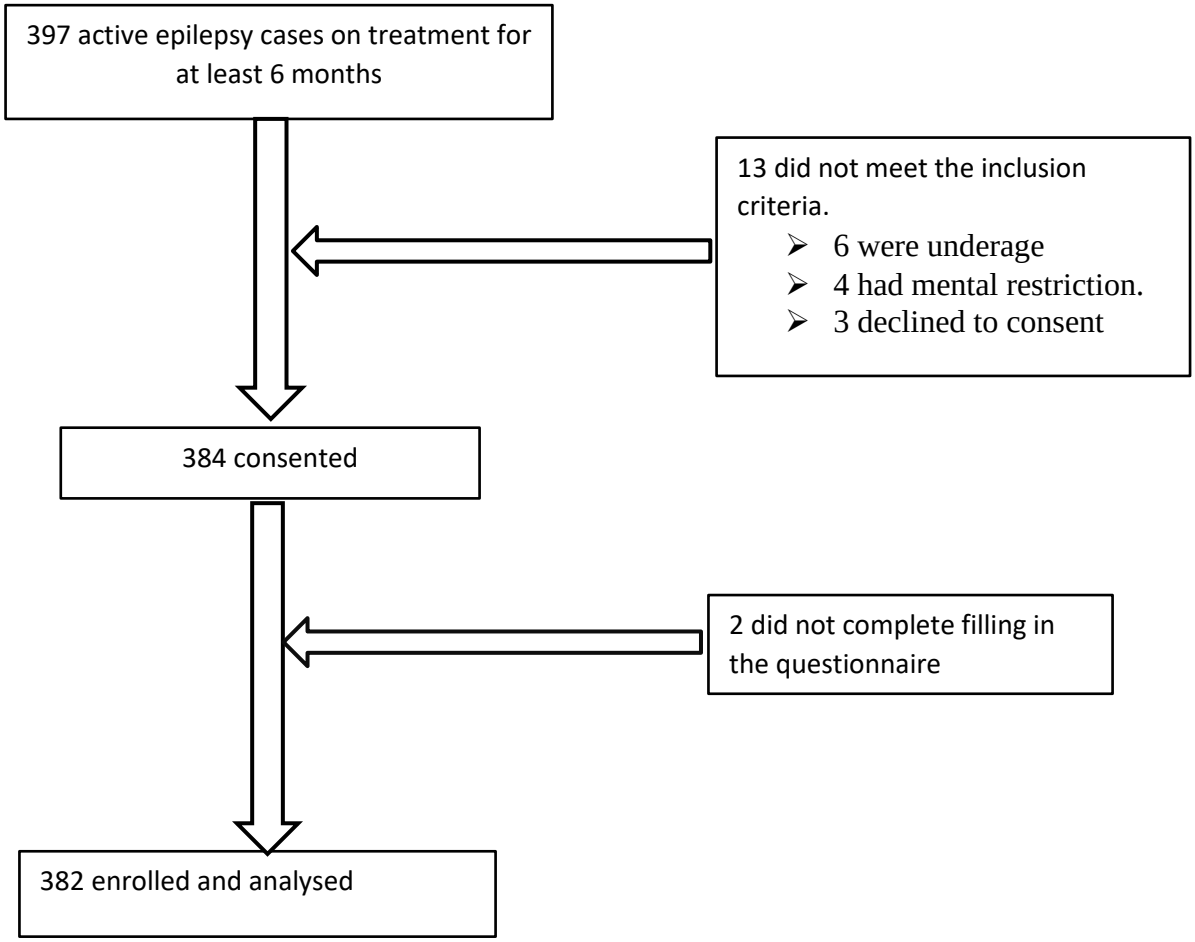

Figure 4. Flow diagram of recruitment of epileptic patients into the study

4.1 THE CHARACTERISTICS OF THE PATIENTS ATTENDING KAWE CLINICS

4.1.1 Sociodemographic characteristics

Majority of the epileptic patients were between the ages of 20-29 years (177), with the mean age of 30.9 years (SD, 11.5). There were slightly more male patients 51.8% (198). Most of the patients were single 54.2% (207), had a source of income 65.4% (246), had some form of education 91.8% (351), were single 54.2% (207) and had no family history of epilepsy 86.4% (330).

Table 4: Sociodemographic characteristics of patients attending KAWE clinics in Nairobi county.

Variable	Frequency n=382 (%)
Age in years	
14-19	35 (9.2)
20-29	177 (46.3)
30-39	88 (23.0)
40-49	54 (14.1)
50-59	18 (4.7)
60+	10 (2.6)
Age in years	
Mean (SD)	30.9 (11.5)
Median (IQR)	28.0 (22.0-37.0)
Min –max	14.0-74.0
Gender	
Male	198 (51.8)
Female	184 (48.2)
Marital status	
Single	207 (54.2)
Married	136 (35.6)
Separated	20 (5.2)
Widowed	12 (3.1)
Divorced	7 (1.8)
Education level	
None	30 (7.9)
Nursery	1 (0.3)
Primary finished	29 (7.6)
Primary not finished	63 (16.5)
Secondary finished	113 (29.6)
Secondary not finished	62 (16.2)
College	69 (18.0)
University	15 (3.9)
Occupation	
Trader/Businessman	130 (34.0)
Student	91 (23.8)
Casual laborer	59 (15.4)

Unemployed	45 (11.8)
Farmer	34 (7.9)
Professional	22 (5.8)
Other	1 (0.3)
Other family members with history of epilepsy	
None	330 (86.4)
First degree relative	27 (7.1)
Second degree relative	16 (4.2)
Third degree relative	9 (2.4)

4.1.2 Clinical characteristics of patients

Majority of the patients had no concurrent co-morbidity. Hypertension was the commonest co-morbidity. The other co-morbidities are shown in table 5.

Table 5: Clinical characteristics of patients attending KAWE clinics.

Variable	**Frequency n=382 (%)**
Any chronic illnesses(s) on treatment	
Yes	32 (8.4)
No	350 (91.6)
Chronic illnesses(s) (n=32)	
Hypertension	7 (21.9)
Asthma	5 (15.6)
Bipolar mood disorder	5 (15.6)
Hypertension + diabetes	4 (12.5)
HIV	4 (12.5)
Diabetes	3 (9.4)
Peptic ulcer disease	3 (9.4)
Dementia + tuberculosis	1 (3.1)

4.1.3 Antiepileptic drug use

Monotherapy was used more than polytherapy, both as initial and as current treatment. A small proportion of the patients (2.1%) were not on any AED at the time of the study.

Table 6: Number of initial versus current AEDs prescribed to patients attending KAWE clinics in Nairobi county

Variable	**Number of AEDs type(s) given at the start of treatment Frequency n=382 (%)**	**Number of AEDs currently being used**
None	0 (0)	8 (2.10)
1 drug	194 (50.8)	210 (55)
2 drugs	138 (36.1)	131 (34.3)
3 drugs	46 (12.0)	31 (8.1%)
4 drugs	4 (1.0)	2 (0.5)

In terms of monotherapy use, in the current AED therapy administration, majority of the patients were on Carbamazepine 19.6% (75). Only 0.5% (2) were on clonazepam (Figure 5)

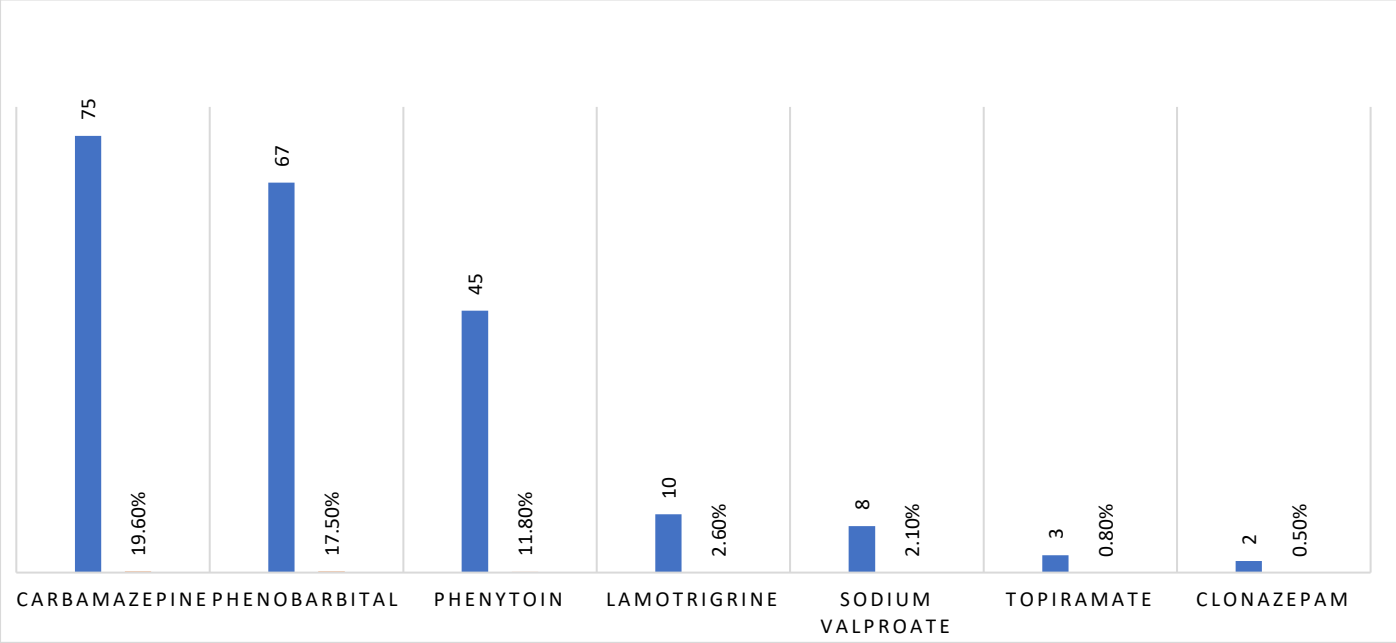

Figure 5: Distribution of AEDs used as monotherapy among patients attending KAWE clinics.

Majority of the patients (81.4%) were still on the initial drugs that they had been started on, while 18.6% (71) had had, their drugs totally changed to other new drugs.

Poor seizure control was the main cause for changing AEDs among the patients at 53.5% (38). Other causes for change in AEDs are shown in the figure 6 below.

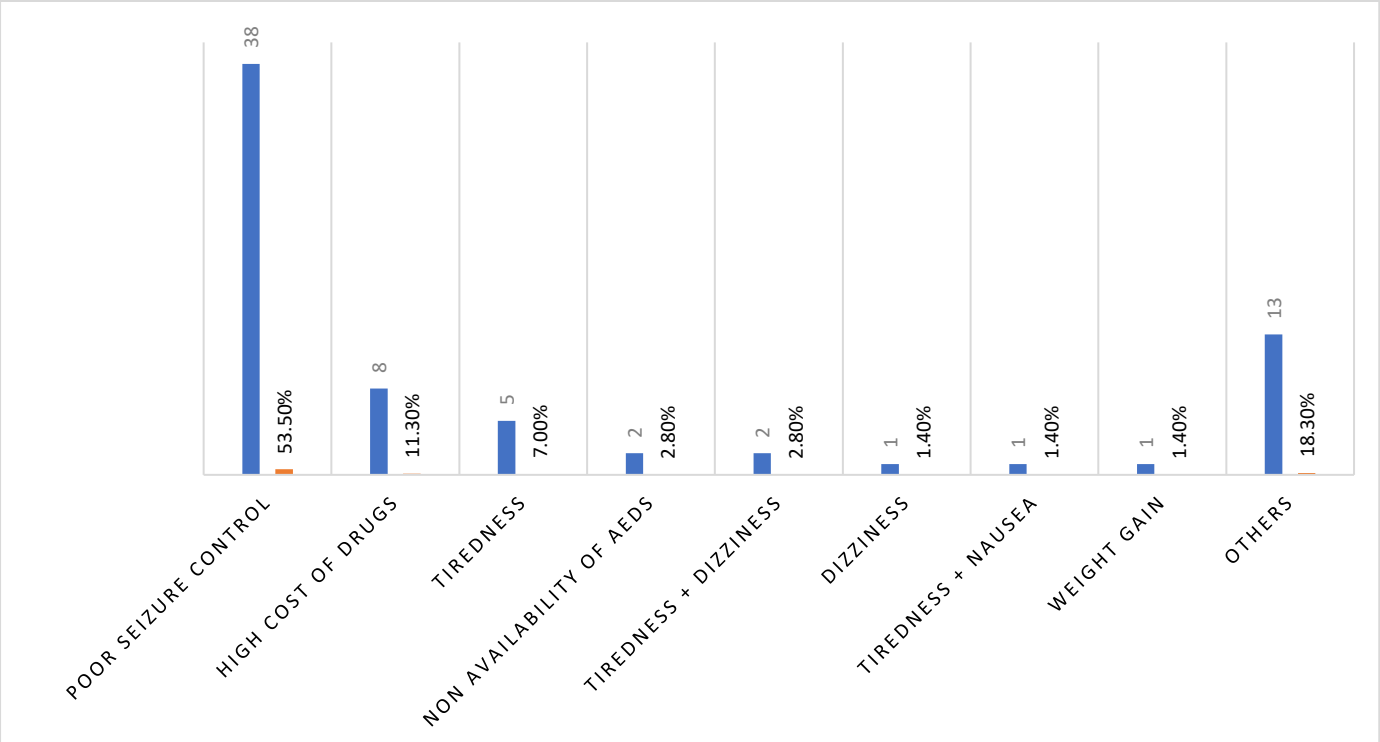

Figure 6: Reasons for changing AEDs among patients among patients attending KAWE clinics.

4.1.4 Drug prescription refill

More than half (63.4%) of patients had a refill of their prescriptions before their current stock was over. A small proportion (0.5%) took a duration of up to one month after their current AED stock was over to refill their prescription.

Table 7: Duration taken before drug prescription refill among patients attending KAWE clinics.

Variable	Frequency n=382 (%)
Duration taken for AED prescription refill	
Before they are over	242 (63.4)
The day they are over	88 (23.0)
Up to one week after they are over	50 (13.1)
Up to one month after they are over	2 (0.5)

4.1.4 Alternative therapy in the treatment of epilepsy

A small proportion (22.3%) of the study population had ever used some form of alternative therapy, concurrently with AEDs during the treatment for epilepsy, while 40% of those patients, were still using the alternative therapies at the time of the study. The alternative therapy method commonly used was religious/faith-based interventions (Table 9).

Table 8: Alternative therapy uses among patients attending KAWE clinics.

Variable	Frequency (%)
Ever used alternative/other treatment methods for epilepsy	
Yes	85 (22.3)
No	297 (77.7)
Alternative methods (n=85)	
Religious/Faith-based Intervention	32 (37.6)
Herbs	25 (29.4)
Traditional healers	22 (25.9)
Herbs and religious/faith-based intervention	4 (4.7)
Herbs and traditional healers	1 (1.2)
Acupuncture	1 (1.2)
Still using the alternative treatment methods (n=85)	
Yes	34 (40.0)
No	51 (60.0)
Alternative methods in use (n=34)	
Religious/faith-based intervention	27 (79.4)
Herbs	2 (5.9)
Herbs + religious/faith-based intervention	2 (5.9)
Traditional healers	2 (5.9)
Religious/faith-based intervention + traditional healers	1 (2.9)

4.2 THE PATTERNS OF ADHERENCE AND NON-ADHERENCE TO ANTI-EPILEPTIC DRUGS

Majority of the patients (67.5%) were fully adherent. On further subclassification, 67.5% were highly adherent, 24.0% were medium adherent and 7.6% were low adherent.

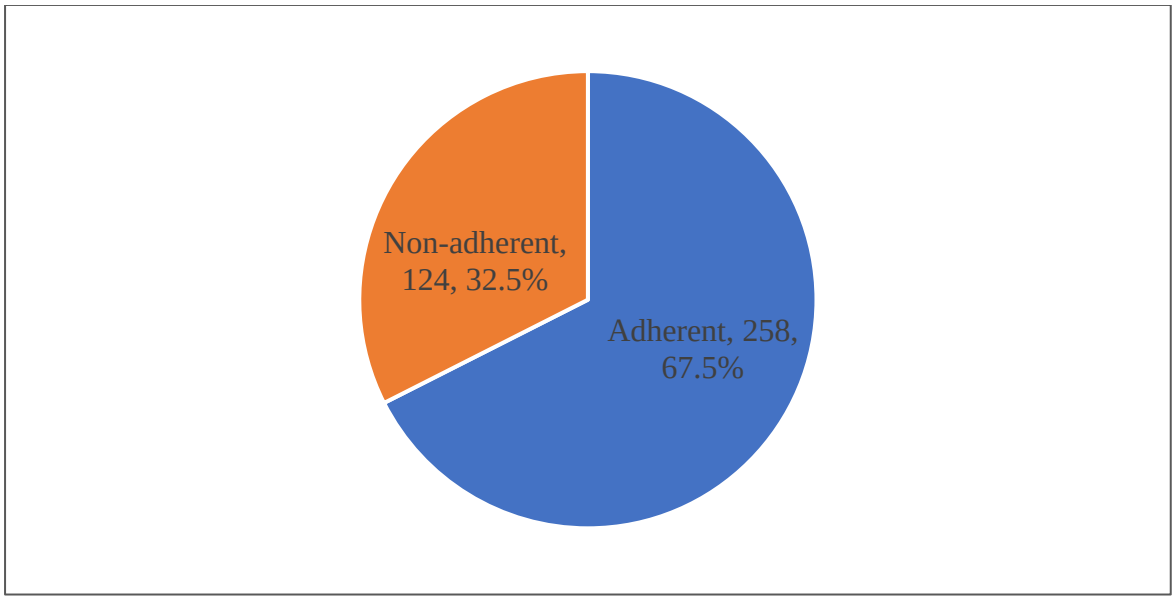

Figure 7: Level of Adherence among patients attending KAWE clinics.

Table 9: Re-classification of adherence levels in patients attending KAWE clinics.

Variable	Frequency n=382 (%)
Level of adherence to medication	
Highly adherent (Score 0)	258 (67.5)
Medium adherent (Score 1-2)	95 (24.9)
Low adherent (Score 3-4)	29 (7.6)

4.3. THE LEVEL OF SEIZURE CONTROL

Of the recruited patients, 37.4% had poorly controlled epilepsy, 39.5% were partially controlled while 23.0% had well-controlled epilepsy.

Table 10: Level of seizure control among patients attending KAWE clinics.

Variable	Frequency n=382 (%)
Seizure control	
Well	88 (23.0)
Partial	151 (39.5)
Poor	143 (37.4)

The table below shows the difference in seizure frequencies and the trend in seizure control between the two time periods.

Table 11: Difference in seizure frequencies from baseline to the last 6 months on treatment and trend in seizure control among patients attending KAWE clinics.

Variable	Pre-treatment/ baseline seizures	Number of patients who had seizures in the last 6 months while on medication	Trend in seizure control
Seizure frequency			
None (0)	4 (1.0)	88 (23.0)	2100%↑
1-3	121 (31.7)	178 (46.6)	47% ↑
4-6	111 (29.1)	62 (16.2)	44% ↓
>6	146 (38.2)	54 (14.1)	63% ↓

4.4 FACTORS ASSOCIATED WITH NON-ADHERENCE TO AEDS.

4.4.1 Factors associated with non-adherence to AEDs (Univariate analysis).

Forgetting to take medication was the most common reason for non-adherence to AEDs at 26.2% (100), among the MMAS-4 (Morisky medication adherence scale-4) scoring variables. The distribution amongst the other variables is shown in table 12.

Table 12: MMAS scoring

Variable	Frequency n-382 (%)
Do you ever forget to take your medications?	
Yes	100 (26.2)
No	282 (73.8)
Are you careless at times in taking your medication?	
Yes	80 (20.9)
No	302 (79.1)
When you feel better do you sometimes stop taking your medicine?	
Yes	45 (11.8)
No	337 (88.2)
Sometimes if you feel worse when taking your medicine, do you stop it?	
Yes	24 (6.3)
No	358 (93.7)

Other reasons for adherence and non-adherence were assessed by asking the patients some commonly surveyed reasons usually asked for. during studies done on adherence on AEDs.

The main reason for adherence to AEDs, among all the patients was the understanding of instructions from the doctor (97.6%). Keeping medication in sight (88.0%) and others (1%) were the least cited reason for adherence to AEDs (Table 13).

Among the non-adherent patients, forgetfulness was the main reason for non-adherence (79%), followed by cost of medication at (73.4%). Having infrequent seizures (16.1%) was the least cited reason for non-adherence (Table 14).

Table 13: Factors promoting regular use of AEDs among patients attending KAWE clinics.

Variable	**Frequency (%)**
Understanding instructions from the doctor	373 (97.6)
Understanding the need for medication	372 (97.4)
Understanding the effectiveness of medication	367 (96.1)
Understanding the need for long term treatment	363 (95.0)
Making medication a habit	363 (95.0)
Availability of family support system	359 (94.0)
Accessibility/ availability of medication	355 (92.9)
Good patient doctor relationship	347 (90.8)
Keeping medication in sight	336 (88.0)
Others	4 (1.0)

Table 14: Barriers to regular use of AEDs among patients attending KAWE clinics.

Variable	**Frequency (%)**
Forgetting	98 (79.0)
Cost of medication	91 (73.4)
Lack of access to medication	74 (59.7)
Travelling	73 (58.9)
Fear of getting addicted to medication	64 (51.6)
Drug side effects	62 (50.0)
Lack of family support system	57 (46.0)
Continuity of seizures despite treatment	53 (42.7)
Lack of understanding the effectiveness of medication	44 (35.5)
Lack of understanding the need for long term treatment	31 (25.0)
Lack of understanding instructions from the doctor	24 (19.4)

Lack of understanding the need for medication	24 (19.4)
Dissatisfaction with treatment	23 (18.5)
Infrequent seizures	20 (16.1)

4.4.2 Factors associated with non-adherence (Bivariate analysis).

4.4.2.1 Association between medication non-adherence and sociodemographic characteristics of patients attending KAWE clinics.

Non-adherence was significantly associated with being separated (p=0.018) and widowed (P=0.038).

The patients who had a higher level of education, i.e., secondary and college/university education, were more adherent at OR= 0.4[95%, CI 0.2-0.8], p=0.013, and OR= 0.3[95%, CI 0.1-0.8], p=0.012, respectively.

The likelihood of being non adherent was 2 times higher in patients who had a concurrent co-morbidity OR 2.0[95% CI 0.9-4.0], but not significant p>0.05. The other sociodemographic characteristics which were studied did not show statistically significant associations with non-adherence.

Table 15: Relationship between non-adherence and sociodemographic characteristics of patients attending KAWE clinics.

Variable	Non-adherent n=124 (%)	Adherent n=258 (%)	OR (95% CI)	P value
Age in years				
Mean (SD)	31.8 (11.7)	30.5 (11.4)	-	0.318
Gender				
Male	60 (48.4)	138 (53.5)	0.8 (0.5-1.3)	0.350
Female	64 (51.6)	120 (46.5)	1.0	
Religion				
Protestant	56 (45.2)	130 (50.4)	0.9 (0.6-1.4)	0.619
Islam	9 (7.3)	13 (5.0)	1.4 (0.6-3.6)	0.447
Tradition	7 (5.6)	10 (3.9)	1.4 (0.5-4.0)	0.483
None	2 (1.6)	5 (1.9)	0.8 (0.2-4.4)	0.822
Other	2 (1.6)	1 (0.4)	4.1 (0.4-46.6)	0.252
Catholic	48 (38.7)	99 (38.4)	1.0	
Education level				
Primary	33 (26.6)	60 (23.3)	0.5 (0.2-1.1)	0.086
Secondary	52 (41.9)	123 (47.7)	0.4 (0.2-0.8)	**0.013**
College /University	23 (18.5)	61 (23.6)	0.3 (0.1-0.8)	**0.012**
None	16 (12.9)	14 (5.4)	1.0	
Occupation				
Unemployed	43 (34.7)	93 (36.0)	0.9 (0.6-1.5)	0.794
Employed	81 (65.3)	165 (64.0)	1.0	

Marital status				
Married	44 (35.5)	92 (35.7)	1.2 (0.8-1.9)	0.447
Separated	11 (8.9)	9 (3.5)	3.1 (1.2-7.8)	**0.018**
Divorced	3 (2.4)	4 (1.6)	1.9 (0.4-8.7)	0.417
Widowed	7 (5.6)	5 (1.9)	3.5 (1.1-11.5)	**0.038**
Single	59 (47.6)	148 (57.4)	1.0	
Number of siblings				
Median (IQR)	5.0 (3.0-6.0)	4.0 (3.0-6.0)	-	0.266
Other chronic illnesses on medication				
Yes	15 (12.1)	17 (6.6)	2.0 (0.9-4.0)	0.078
No	109 (87.9)	241 (93.4)	1.0	

4.4.2.2 Association between medication non-adherence and the MMAS-4 variables and the barriers to regular use of AEDs.

All the variables within the MMAS-4 were found to significantly associated with nonadherence. Similarly, all the explored barriers to regular use of AEDs were significantly associated with non-adherence.

Table 16: Association between medication non-adherence and the MMAS-4 variables.

Variable	Non-adherent n=124 (%)	Adherent n=258 (%)	P value
Do you ever forget to take your medications?			
Yes	100 (80.6)	0	**<0.001**
No	24 (19.4)	258 (100.0)	
Do you ever have problems remembering to take your medication?			
Yes	80 (64.5)	0	**<0.001**
No	44 (35.5)	258 (100.0)	
When you feel better do you sometimes stop taking your medicine?			
Yes	45 (36.3)	0	**<0.001**
No	79 (63.7)	258 (100.0)	
Sometimes if you feel worse when taking your medicine, do you stop taking it?			
Yes	24 (19.4)	0	**<0.001**
No	100 (80.6)	258 (100.0)	

Table 17: Association between medications and the barriers to the regular use of AEDs.

Variable	Non-adherent	P value
Forgetfulness	98 (79.0)	**<0.001**
Cost of medication	91 (73.4)	**<0.001**
Misunderstanding instructions by the doctor	24 (19.4)	**<0.001**
Misunderstanding of the need for long-term treatment	31 (25.0)	**<0.001**
Lack of understanding of the need for medication	24 (19.4)	**<0.001**
Lack of understanding of the effectiveness of medication	44 (35.5)	**<0.001**
Continuity of seizures despite treatment	53 (42.7)	**<0.001**
Infrequent seizures	20 (16.1)	**<0.001**
Drug side effects	62 (50.0)	**<0.001**
Lack of family support system	57 (46.0)	**<0.001**
Lack of access to medication	74 (59.7)	**<0.001**
Fear of getting addicted to medication	64 (51.6)	**<0.001**
Dissatisfaction with treatment	23 (18.5)	**<0.001**
Traveling	73 (58.9)	**<0.001**

4.4.2.3 Association between medication non-adherence and seizure type among patients attending KAWE clinics.

Not knowing the seizure type was significantly associated with non-adherence at P=0.030.

Table 18: Relationship between non-adherence and seizure type among patients attending KAWE clinics.

Variable	Non-adherent n=124 (%)	Adherent n=258 (%)	OR (95% CI)	P value
Type of seizures				
Not sure	39 (31.5)	61 (23.6)	1.9 (1.1-3.3)	**0.030**
Generalized	53 (42.7)	103 (39.9)	1.5 (0.9-2.5)	0.120
Partial (Focal)	32 (25.8)	94 (36.4)	1.0	

4.4.2.4 Association between medication non-adherence and seizure frequency among patients attending KAWE clinics.

Having increasing numbers of seizures over the last 6 months was significantly associated with being non-adherent to AEDs. Epileptic patients who had 1-3 seizures, 4-6 seizures and >6 seizures were 2.4, 2.5 and 3.6 times, more likely to be non-adherent, respectively.

Table 19: Association between medication non-adherence and seizure frequency among patients attending KAWE clinics.

Variable	Non-adherent n=124 (%)	Adherent n=258 (%)	OR (95% CI)	P value
Seizure frequency in the last 6 months while on AEDS				
1-3	62 (50.0)	116 (45.0)	2.4 (1.3-4.5)	**0.006**
4-6	22 (17.7)	40 (15.5)	2.5 (1.2-5.2)	**0.018**
>6	24 (19.4)	30 (11.6)	3.6 (1.7-7.7)	**0.001**
None	16 (12.9)	72 (27.9)	1.0	

4.4.2.5 Non-adherence and AEDS.

It was noted that the likelihood of being non-adherent increased with longer duration of treatment, however this was not statistically significant, P=>0.05.

Non-adherence was significantly associated with the use of polytherapy among PLWE at the start of treatment. Patients on dual therapy were 1.7 times more likely to be non-adherent to AEDs, while those on triple therapy were 4.3 times more likely to be non-adherent, OR 1.7[95% CI 1.0-2.7], P 0.034, and OR 4.3[95% CI 2.2-8.5], P<0.001, respectively.

A significantly lower proportion, 72.6% (90) of non-adherent patients were using the same AED given at the start of therapy, compared to 85.3% (220) of the adherent group, OR 0.5[95% CI 0.3-0.8], P <0.003.

Table 20: Association between medication non-adherence and AEDs use among patients attending KAWE clinics.

Variable	Non-adherent n=124 (%)	Adherent n=258 (%)	OR (95% CI)	P value
Duration of taking AEDs to control seizures				
<1 year	1 (0.8)	11 (4.3)	1.0	
1-3 years	41 (33.1)	103 (39.9)	4.4 (0.5-35.0)	0.164
4-5 years	26 (21.0)	38 (14.7)	7.5 (0.9-61.9)	0.060
>5 years	56 (45.2)	106 (41.1)	5.8 (0.7-46.2)	0.096
Number of AEDs type(s) given at the start of treatment				
1 drug	48 (38.7)	146 (56.6)	1.0	
2 drugs	49 (39.5)	89 (34.5)	1.7 (1.0-2.7)	**0.034**
3 drugs	27 (21.8)	19 (7.4)	4.3 (2.2-8.5)	**<0.001**
4 drugs	0	4 (1.6)	-	0.999
Patients still using the same AEDs given at the start of their treatment				
Yes	90 (72.6)	220 (85.3)	0.5 (0.3-0.8)	**0.003**
No	34 (27.4)	38 (14.7)	1.0	

Number of AEDs currently taking?				
None	4 (3.2)	4 (1.6)	1.0	
1 drug	58 (46.8)	152 (58.9)	0.4 (0.1-1.6)	0.183
2 drugs	42 (33.9)	89 (34.5)	0.5 (0.1-2.0)	0.305
3 drugs	20 (16.1)	11 (4.3)	1.8 (0.4-8.7)	0.455
4 drugs	0	2 (0.8)	-	0.999

4.4.2.6 Non-adherence and prescription refill, alternative therapy use and seizure control.

Patients who delayed in refilling their prescriptions were more non-adherent than those who refilled their medication before their current stock ran out. Non-adherence was significantly associated with refilling of the AED prescription at the duration of up to a week after they were over, (OR 5.9[95% CI 3.1-11.3] P< 0.001).

More non-adherent patients had ever used alternative methods of treatments. Those who had used an alternative method of treatment were 2 times more likely to be non-adherent, (OR 2.0 [95% CI 1.2-3.3], P= 0.006).

More non adherent patients had uncontrolled seizures compared to the adherent patients. Having partial seizure control (p=0.001) and poor seizure control (p=0.010) were significantly associated with non-adherence.

Table 21: Association between medication non-adherence and prescription refill, alternative therapy uses, and seizure control among patients attending KAWE clinics.

Variable	Non-adherent n=124	Adherent n=258	OR (95% CI)	P-Value
Duration taken for refill of AEDs				
Before they are over	60 (48.4)	182 (70.5)	1.0	
The day they are over	30 (24.2)	58 (22.5)	1.6 (0.9-2.7)	0.095
Up to one week after they are over	33 (26.6)	17 (6.6)	5.9 (3.1-11.3)	**<0.001**
Up to one month after they are over	1 (0.8)	1 (0.4)	3.0 (0.2-49.2)	0.435
Used alternative therapy for epilepsy				
Yes	38 (30.6)	47 (18.2)	2.0 (1.2-3.3)	**0.006**
No	86 (69.4)	211 (81.8)	1.0	
Seizure control				
Partial	59 (47.6)	92 (35.7)	2.9 (1.5-5.4)	**0.001**
Poor	49 (39.5)	94 (36.4)	2.3 (1.2-4.5)	**0.010**
Well	16 (12.9)	72 (27.9)	1.0	

4.5 MULTIVARIATE ANALYSIS USING MULTIPLE LOGISTIC REGRESSION MODEL.

All the significant factors were entered into the logistic regression model. Table 23 shows that poor seizure control (aOR 2.0 (95% CI 1.1-3.6), P= 0.021) and being three drugs at the start of

treatment (aOR 2.9 (95% CI 1.3-6.2), P= 0.007). were the factors that were independently associated with non-adherence.

Table 22: Factors independently associated with non-adherence among patients attending KAWE clinics.

Variable	Adjusted OR (95% CI)	P value
Seizure control		
Partial	0.8 (0.4-1.6)	0.483
Poor	**2.0 (1.1-3.6)**	**0.021**
Well	1.0	
Number of AEDs type(s) given at the start of treatment		
1 drug	1.0	
2 drugs	1.3 (0.7-2.2)	0.407
3 drugs	**2.9 (1.3-6.2)**	**0.007**
4 drugs	-	0.999
Still using the AEDs given at the start of your treatment		
Yes	**0.4 (0.2-0.8)**	**0.009**
No	1.0	

5.0 CHAPTER FIVE: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 DISCUSSION

The study set out to find the level of adherence to antiepileptic drugs and seizure control among patients attending KAWE clinics in Nairobi County and to determine the factors associated with non-adherence and the association between non-adherence and seizure control.

In this study**,** 258 (67.5%) of the participants were found to be adherent, while 124 (32.5%) epileptic patients were non-adherent to their AEDs.

This level of non-adherence is almost similar to what was found from a local study done by Elsayed et al.(29), whose study population was 96 adult patients diagnosed with epilepsy and were attending three major tertiary hospitals in Khartoum, Sudan. He used a similar method of measuring adherence and determined non-adherence at 35%. Our levels were lower than Mbuba et al.(8) who carried out a demographic study in Kilifi. They also used the MMAS-4 and estimated that the level of non-adherence at 54%. We thought that the reason for this level of adherence was because the study population was rural community-based, with a lower education profile than our patients. However, the level of non-adherence in this study was lower than in the study conducted by Mativo et al.(26), who conducted his study at KNH adult neurology clinic in 2004. Mativo et al. used therapeutic drug levels to measure non-adherence and estimated the level of non-adherence to be 40%. This discrepancy could be because of the use of serum drug levels, which is sometimes thought to be more accurate than the self-reported methods. Our level of non-adherence was however higher than in Amolo et al(27) who did her study in the pediatric neurology clinic at KNH in 2011 and found the level of non-adherence to be 3%. She used a self-reported questionnaire that had a yes or no answer. The findings could be due to the influence of caregiver input. There is usually direct supervision during the administration of medication by the parent or guardians (caregivers), hence ensuring adherence to drugs. We concluded that the level of non-adherence in our study was relatively low, because of the setup of the study area, being a primary health care facility. Because of this, the physicians and patients are bound to have a more interpersonal relationship(49), hence adherence can be explored deeply during every clinic visit. However, our result are in keeping with findings from WHO that reported that the rate of non-adherence in the use of AEDs, is between 20% to as high as 80%(7).

We found out that 88 (23.0%) had well-controlled epilepsy, 151 (39.5%) were partially controlled while 143 (37.4%) of the recruited patients had poorly controlled epilepsy. A

duration of 6 months on treatment was considered before calculating seizure control. Schmidt D in 2007(51), concluded that response at 6 months of treatment was an excellent predictor of response at 12 months. He found out that those patients who were seizure-free at 6 months had a 90% chance of being seizure-free at 12 months, whereas those not seizure-free at 6 months had only a 45% chance of being seizure free at 12 months.

Our study had similar levels of poorly controlled epilepsy as Mativo et al(26). The study findings estimated that 40% of the patients had poorly controlled epilepsy. Our study however had much lower levels than Ahmed et al(47) who did her study in KNH in the adult neurology clinic and demonstrated that the prevalence of poorly controlled epilepsy was 56% among patients with poor knowledge attitudes and practices. Our study had a much higher level of poorly controlled epileptic patients as compared with Amolo et al(27) who found the prevalence at 14.7%. This can be explained by the fact that they had very low levels of non-adherence in their study, hence most of the patients had therapeutic doses of AEDs in their body system with the resultant better control of their disease, and because the study was caried out in a tertiary level facility, where patients were exposed to more advanced health care than in the primary level facility where our study was carried out. This study also showed an overall positive trend in seizure control. This translates to the overall improved quality of life among the patients living with epilepsy attending KAWE clinics.

The main reason for unintentional non-adherence was forgetfulness and was significantly associated with non-adherence. This finding is similar to findings from cross-sectional studies done in United States by the Paschal et al(52) and in Brazil by Ferrari et al(53), who did a prospective cross-sectional study and evaluated 385 epilepsy outpatients in a tertiary referral centre and reported that patients' forgetfulness was the primary contributor of non-adherence at 68% and 47.5% respectively. This is thought to be so, because epilepsy is a progressive disease that causes neuronal loss and brain atrophy hence affecting cognition and memory(40).

Concerning sociodemographic factors, patients who were either separated and widowed were three times more likely, OR 3.1(95% CI 1.2-7.8), P=0.018 and OR 3.5 (95% CI 1.1-11.5), P= 0.038, respectively, to be non-adherent to AEDs. This finding was similar to results from a cross-sectional study done by Hasiso et al.(54) from Yirgalem general hospital in Ethiopia who used the MMAS-8 to determine nonadherence among 210 epileptic patients This is because of reduced financial and moral support, to help in ensuring adherence among these patients. The use of polytherapy at the start of therapy was an independent predictor of non-adherence to medication. Johnbull et al, demonstrated that adherence is more difficult when taking multiple drugs with different dosing requirements, because of side effects and the complexity of

administration(55). The use of alternative therapy was associated with non-adherence**.** Patients on alternative therapy were two times more likely to be non-adherent than those who did not use alternative therapies at OR 2.0 (95% CI 1.2-3.3), P=0.006. The use of alternative treatment methods usually leads to complex polypharmacy(56), leading to multiple side effects and because patients might use most of their resources in seeking these therapies(57), leaving them with limited finances to seek for medical therapy, thus non-adherence. This study was similar to Farrukh et al.(58), in Malaysia. They carried out a cross sectional study on 100 epileptic patients and demonstrated that non-adherence was significantly associated ($p<0.01$) with the use of alternative therapy, although the use of alternative therapy in their study was higher at 58%. Non-adherence was associated with delaying prescription refill after the current drug stock ran out. This causes undersupply in the patient's medication and therefore patients have no possibility of being adherent.

We found out that having partial and poor seizure control was significantly associated with being non-adherent at p values of 0.001 and 0.010 respectively. Our results are similar to Hovinga et al (59), wo did an online survey among 408 adults patients with epilepsy and a separate cross-sectional survey of 175 physicians who treat patients with epilepsy in the United States. They demonstrated that non-adherent patients were significantly ($p < 0.05$) more likely than adherent patients to report that they had experienced a loss of seizure control and had symptoms that were ''poorly" or ''not at all controlled". This is because non-adherence causes patients to have sub-therapeutic doses of the AEDs in their system, and ultimately, poorly controlled seizures.

5.2 STUDY LIMITATIONS

One of the limitations of the study is the use of self-reporting to analyze adherence levels. This can be subjected to recall bias, the possibility of misinterpretation of questions, and answering the MMAS-4 wrongfully to appear fully adherent. We tried to minimize such biases by cross-checking information from the patients' medical records.

We did not use direct methods such as pill count and measurement of serum drug levels or their metabolite concentration in serum, which may have been more accurate in measuring adherence. The use of serum drug levels is however invasive and very expensive. In addition to that, factors such as drug interaction, physiological and metabolite variations can also affect the measurement.

5.3 CONCLUSION

Adherence to AEDs among patients attending KAWE clinics was at 67.5% while non-adherence at 32.5%. Poor control of epilepsy is still a major problem with a prevalence of 37.4%, and it is significantly associated with non-adherence to AEDs.

5.4 RECOMMENDATIONS

Routine assessment of non-adherence should be an integral part in the management of epilepsy. Monotherapy should be favoured over polytherapy by healthcare providers, especially at the start of epilepsy treatment to reduce the rates of non-adherence to AEDs. Future research could also employ combinations of methods i.e., the indirect and direct methods to adequately measure the levels of adherence and non-adherence.

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APPENDICES

Appendix I: Dummy Tables

Table 1: Socio-demographic characteristics of patients

VARIABLE	CATEGORIES	COUNT	PROPORTION (%)
AGE (Yrs.)	14-19 20-29 30-39 40-49 50-59 ≥ 60		
Gender	Male Female		
Marital Status	Never married/Single Married Separated/ Divorced. Widowed		
Employment Status	Employed Unemployed		
Level Of Education	None Primary Secondary Tertiary		
Religion	Catholic Protestant Muslim Hindu Others		
No. of Siblings In The Family	**Median (IQR)**		
Position of Sibling With Epilepsy In The Family	First born. Middle Last born		
Average Monthly Income	**Median (IQR)**		

Table 2: Clinical Characteristic of the Patients

VARIABLE	CATEGORY	COUNT	PROPORTION (%)
Duration of Epilepsy	< 1 Year >1 Year		
Type Of Epilepsy	Focal Generalized		
Seizure Frequency In The Last 3 Months Before Starting AEDS			
Seizure Frequency With AEDS	1-3 per year Seizures almost every 2-3 months ≥ 1 per month Seizure free for ≤2 years Seizure free for > 2 years Seizure free for more than 6 months Not applicable		
Type of AED Therapy	Monotherapy Polytherapy		
Type of AED Used	Old New Combination		
Number of AEDS Used	One Two > Two		
Duration Of Treatment	6 months – 1 year 2 years – 5 years >6 Years		
Adverse Drug Reaction	YES NO		
Cormobid Illness	YES NO		
Number Of Drugs For Comobid Illness			
Ever Substance Use	YES NO		
Current Substance Use	YES NO		

Table 3: Level of Adherence

LEVEL OF ADHERENCE	COUNT	PROPORTION (%)
ADHERENT (0)		
NON-ADHERENT (1,2,3,4)		

LEVEL OF ADHERENCE	COUNT	PROPORTION (%)
HIGLY ADHERENT (0)		
MEDIUM ADHERENT (1-2)		
LOW ADHERENT (3-4)		

TABLE 4: FACTORS ASSOCIATED WITH NON-ADHERENCE.

VARIABLE		**Adherent**	**Non-adherent**	**Crude estimate (e^{β} coefficient)**	**OR (95% CI)**	**P-value**
AGE (yrs.)	18-39 40-59 ≥ 60					
GENDER	Male Female					
MARITAL STATUS	Never married/ Single Married Separated/ Divorced. Widowed					
EMPLOYMENT STATUS	Employed Unemployed					
LEVEL OF EDUCATION	None Primary Secondary Tertiary					
DURATION OF EPILEPSY	< 1 Year >1 Year					
TYPE OF EPILEPSY	Focal Generalized					
SEIZURE FREQUENCY	1-3 per year ≥ 1 per month Seizure free for ≤2 years Seizure free for > 2 years Not applicable					
DISTANCE FROM THE HOSPITAL						
TIME SPENT ON CONSULTATION WITH THE DOCTORS						
AVAILABILITY OF DRUGS						
TYPE OF AED USED	Old New Combination					
TYPE OF AED THERAPY USED	Monotherapy Polytherapy					
ADVERSE DRUG REACTION	Yes No					
FORGETFULNESS						
USE OF ALTERNATIVE METHOD OF TREATMENT						
UNDERSTANDING INSTRUCTIONS FROM THE DOCTOR						

Table 5: Level of Seizure Control

LEVEL OF SEIZURE CONTROL	**COUNT**	**PROPORTION (%)**
GOOD CONTROL		
PARTIAL CONTROL		
POOR CONTROL		

Table 6: Relationship between adherence level to AEDs and seizure control

Response variable (Good control, partial control, poor control)

Characteristic	**Adjusted estimate (e^{β} coefficient)**	**Good control**	**Partial control**	**Poor control**	**95% Confidence Interval**	**P-value**
Adherence level						
Highly adherent						
Medium						
Low						

Appendix II: Screening Proforma

Study No.: …….

Age: …….

Date of Birth: ……

Gender: Female ☐ Male ☐

Are you willing to take part in the study of the magnitude of the treatment gap of epilepsy in two resource-poor communities in Nairobi County? (Viwandani and Korogocho slums) ?

YES ☐

NO ☐

Appendix III: Participant Information And Consent Form Adherence To Anti-Epileptic Drugs And Seizure Control Among Patients Attending KAWE Clinics In Nairobi County.

Principal Investigator:

Dr. Eve Koile - UoN

Co-Investigators:

Prof. K.M Bhatt - UoN

Dr. Thomas Kwasa – UoN

Dr Osman Miyanji- KAWE

Introduction:

I am Dr. Eve Koile, a qualified doctor, registered by the Kenya Medical Practitioners and Dentists Board, currently pursuing a Master's degree in Internal Medicine at the University of Nairobi.

I would like to inform you about and recruit you into the research being run by me and the above-listed co-investigators.

The purpose of this consent form is to give you the information required to assist you in deciding whether you would take part in the research.

Do not be shy to ask any questions pertinent to the research, what happens if you take part in the research, the possible risks and merits, your rights as a volunteer, and anything else about the research or this document, that might not be clear. When we have answered all your queries to your satisfaction, you may decide to take part in the research or not.

This process is termed informed consent. Once you understand and agree to be in this research, I will request you to sign your name against this form.

You should be fully aware of the general principles that apply to all participants in medical research:

i) Your decision to take part is entirely voluntary.

ii) You may pull out from the research at any time without necessarily giving a reason for your pulling out.

iii) Refusal to take part in the research will not affect the medical care you are entitled to in this health facility or other facilities. We will give you a copy of this form for your records.

May I proceed?

Yes…… **No**…….

This study has been given the go-ahead by The Kenyatta National Hospital-University of Nairobi Ethics and Research Committee. Protocol No. __

What Is This Study About?

The researchers listed above are interviewing individuals who have a clinical diagnosis of active epilepsy and are on treatment. The purpose of the interview is to find out if you are adhering to your drugs and if your epilepsy is controlled Participants in this research study will be asked some questions.

What Will Happen If You Decide To Be In This Research Study?

If you consent to take part in this research, the following things will happen:

You will be asked questions in a private area by a trained interviewer. This will ensure that you feel comfortable during the interview process. The interview session will last about 20 to 30 minutes.We will request your phone number so that we can contact you if the need arises. Your contact information will only be used by the people working on this study. The purpose of having your contact information will be because of possible missing data on the study questionnaire.

Risks Associated With This Research

There is a potential risk of loss of privacy. We will always maintain confidentiality. Code numbers will be used to identify you in a password-protected computer database. Moreover, all paper records will be kept in a locked storage cabinet. However, no system of protecting your confidentiality can be secure, so it is still possible that someone could find out you were in this study and could find out information about you. If there are any segments you wish not to answer to, you can skip them. You have the right to refuse the interview, or any questions asked during the interview.

Benefits Associated with This Research

At the end of the study, I will hand over the findings to the University of Nairobi, the Department of Clinical Medicine and Therapeutics, and KAWE. Any useful information that will improve the quality of care e.g. the MMAS-4 scores will be shared with the patient and their physician for appropriate action. The information collected will also contribute to science and will help in the management of other patients in future. There shall, however, be no monetary rewards for taking part in this research.

What If You Have Questions In Future?

In case of any queries or concerns during the duration of the study, you may contact the following:

1. Dr. Eve Koile,
   The University of Nairobi,
   Department Of Clinical Medicine And Therapeutics,
   Mobile: 0728-990894.
   Or
2. Chairperson, KNH/UoN Ethical Review Committee,
   Tel : 020-2726300/0722829500/0733606400/Ext 44102,
   P.O. Box 20723, Nairobi.
   Email address : uonknh_erc @uonbi.ac/ke.
   Or
3. KAWE- Kenya
   TEL**:** +254 722 594 268/ +254 777 594 268
   Po Box 60790 – 00200 Nairobi, Kenya.
   Email: info@kawe-kenya.org
   The Mirage Tower 3, Mezzanine 1, suite No. 13,
   off Waiyaki Way, Westlands, Nairobi.

What Are Your Other Choices?

Your participation in this research is voluntary. You are free to refuse to take part and can terminate and pull out of this research at any time.

Appendix IV: Consent/Assent Form

Participant's statement

I have been explained to about this research by Dr. Eve Koile/her Assistant, and my questions answered in a language that I understand. The risks and benefits have been explained to me. I understand that my participation in this study is voluntary and that I am at liberty to withdraw from this research at any time. I freely agree to participate in this research study.

I understand that the PI will always maintain confidentiality and that my rights will be respected.

I Agree To Take Part In This Research	**Yes** ☐	**No** ☐
I Agree To Give Contact Information	**Yes** ☐	**No** ☐
Participant's Name: ……..…….		
Participant's Signature/ Thumb Stamp……... Date……		

Investigator's Statement

I, the Principal Investigator, have fully explained the relevant details and purpose of this research study to the participant above. I hereby do believe that the participant has understood and has freely given his/her consent.

Researcher's Name _____ **Date** _____

Signature: _____

Role in the study _____

Contact information.

Dr. Eve Koile

Telephone number: 0728990894

Appendix V: Assent form (Patients below 18 years of age)

I, (parent/guardian) ……...of……hereby give consent my child/relative to participate in this study. I have been adequately informed that my son/daughter is being recruited in a study to find out about adherence to Anti-epileptic drugs and seizure control. The investigator has also informed me that his/her participation in this study is voluntary and will not exclude him/her from their routine care even if he/she were to opt out. She has also informed me that I will not be required to pay for any part of the assessments done for the purposes of this study.

Patient's Parent/Guardian:

Sign: ……

Name: ……

Date: ……

Appendix VI: Screening Proforma (Kiswahili)

Kitambulisho cha Pili

Study No.: …….

Umri: …….

Tarehe ya kuzaliwa: ……

Jinsia: Mwanamke ☐ Mwanamme ☐

Je umekubali kushiriki katika utafiti huu inayohusu jinsi unavyo tumia madawa yako ya kifafa?

Ndio ☐

La ☐

Appendix VII: Participant Information And Consent Form Adherence To Anti-Epileptic Drugs And Seizure Control Among Patients Attending KAWE Clinics In Nairobi County(Kiswahili)

Kiambatisho Cha Tatu: Fomu Ya Habari Kwa Wanaoshiriki Na Idhini

Mtafiti Mkuu:

Dkt. Eve Koile – UoN

Watafiti Wenza:

Prof. K.M Bhatt- UoN
Dkt. Thomas Kwasa- UoN
Dkt. Osman Miyanji- KAWE

Utangulizi:

Jina langu ni Dkt Eve Koile. Nimesajiliwa na Kenya Medical Practitioners and Dentist Board. Ninasomea masomo ya Internal Medicine kataka Chuo Kikuu cha Nairobi. Ningependa kukufahamisha kuhusu, na kuwasajili katika utafiti huu unaofanywa na watafiti ambao wametajwa hapo juu. Umuhimu wa fomu hii ni kukujulisha yale unatakiwa kujua kabla ya kuamua kushiriki katika utafiti huu. Unaweza kuuliza maswali yoyote kuhusu umuhimu wa utafiti huu, faida na hasara zake kama zipo, haki zako ikiwa utajitolea kushiriki na chochote ambacho hujaelewa. Utakapoelewa utahitajika kutia sahihi kwenye fomu hii.

Unapaswa kuelewa kuwa;

i. Haifai kulazimishwa kushiriki ila kwa uamuzi wako mwenyewe.
ii. Unaweza kujitoa kwenye utafiti huu wakati wowote ule bila kutoa sababu.
iii. Matibabu yako yataendelea kama kawaida hata utakapo kataa kushiriki katika utafiti huu.

Tutakupatia fomu nyingine ili uweze kuiweka.

Je, niendelee?

Ndio……. **La**……

Utafiti huu umeidhinishwa na KNH-Chuo Kikuu cha Nairobi ethics &Research committee.

Protocol No…….

Utafiti Huu Unahusu Nini?

Watafiti waliotajwa hapo juu wanauliza maswali watu ambao wanaugua ugonjwa wa kifafa na pia ambao wanatumia dawa. Umuhimu wa haya maswali ni kufanya uchunguzi iwapo unatumia madawa yako kwa jinsi inavyotakikana. Watakaoshiriki katika utafiti huu wataulizwa maswali.

Yatakayo Fuata Iwapo Utaamua Kushiriki Katika Utafiti Huu.

Ukikubali kushiriki katika utafiti huu: Utaweza kuulizwa maswali kwa siri na kwa kipindi cha dakika 20- 30.Tutakuomba nambari yako ya simu ambayo itatumika tu na wale wanaohusika katika utafiti huu pekee. Sababu zinazoweza kufanya sisi kukupigia simu ni kama vile fomu kutojazwa vikamilifu.

Je Kuna Hatari Zinazohusiana Na Utafiti Huu.

Utafiti wa aina hii uko na uwezo wa kuleta usumbufu wa Kisaikolojia, soshiolojia, hisia na hatari zinginezo. Juhudi za kupunguza hatari hizi zinapaswa kuwekwa. Moja wapo ya hatari ni kupoteza usiri wako lakini tunaahidi kuwa tutaziweka habari zako kuwa siri. Pia, huenda ukahisi usumbufu unapojibu maswali. Kama kuna swali ambalo hutaki kulijibu uko na uhuru wa kukosa kulijibu.

Je, Kuna Umuhimu Wa Kushiriki Kwenye Utafiti Huu.

Baada ya kukamilisha utafiti huu, nitapeana majibu yangu kule University of Nairobi, Department of Clinical Medicine and Therapeutics na KAWE. Matokeo haya pia yatachangia kwa kuboresha sayansi. Hakutakuwa na kupeana pesa kwa wale watakao changia utafiti huu.

Je Uko Na Maswali Mengine?

Iwapo kuna maswali yoyote kuhusu kushiriki katika utafiti huu,tafadhali piga simu au tuma ujumbe kwa manambari haya.

1. Dr. Eve Koile,
   University of Nairobi,
   Department Of Clinical Medicine And Therapeutics,
   Mobile: 0728-990894.
   Or
2. Chairperson, KNH/UoN Ethical Review Committee,
   Tel : 020-2726300/0722829500/0733606400/Ext 44102,
   P.O. Box 20723, Nairobi.
   Email address : uonknh_erc @uonbi.ac/ke.
   Or
3. KAWE- Kenya
   TEL**:** +254 722 594 268/ +254 777 594 268
   Po Box 60790 – 00200 Nairobi, Kenya.
   Email: info@kawe-kenya.org
   The Mirage Tower 3, Mezzanine 1, suite No. 13,
   off Waiyaki Way, Westlands, Nairobi.

Je, Kuna Uamuzi Mwingine?

Uamuzi wa kuhusishwa kwenye utafiti huu ni wako mwenyewe. Unaweza kujiunga au kujitoa kwenye utafiti huu wakati wowote.

Appendix VIII: Consent/Assent Form (Kiswahili)

Participant's statement

Nimeelezwa kuhusu utafiti huu na Dkt. Eve Koile/wasaidizi wake, na maswali yangu yamejibiwa kwa lugha ninayoelewa. Nimeelewa faida na hatari zinazotokana na utafiti huu. Nimeelewa kwamba kushiriki kwangu sio kwa lazima na ninaweza kujitoa wakati woote ule. Nakubali kushiriki katika utafiti huu

Naelewa kuwa juhudi zimewekwa kuhakikisha kwamba Habari nitakazozitoa zitakuwa siri.

Nakubali Kushiriki Katika Utafiti Huu	**Ndio** ☐	**La** ☐
Nakubali Kupeana Nambari Yangu Ya Simu Kuwezesha Mawasiliano	**Ndio** ☐	**La** ☐
Jina La Mshirika …….		
Sahhi Ya Mshirika/Alama Ya Kidole……... Tarehe……		

Kauli ya Utafiti

Mimi niliyetia sahihi kwenye karatasi hii nimeeleza kwa kina mambo yote ambayo mshiriki aliyetajwa hapo juu anapaswa kuelewa na amekubali kushiriki katika utafiti huu bila kulazimishwa.

Jina la mtafiti _____ **Tarehe**_____

Sahihi: _____

Jukumu kwenye utafiti

_____

Kwa maelezo Zaidi, wasiliana na

Dr. Eve Koile

Nambari ya simu: 0728990894

Appendix IX: Kauli Ya Mzazi/Mchunguzi:

Mimi, (Mzazi/mchunguzi Mkuu)…….wa……..nimekubali mtoto/jinsia wangu kushiriki katika utafiti huu wa kujua iwapo unatumia madawa yako kwa jinsi inavyotakikana. Nimeelewa kwamba kushiriki kwangu sio kwa lazima na ninaweza kujitoa wakati woote ule. Hakuna malipo wowote nitakayotoa wakati wowote kaika utafiti huu.

Sihihi ya mzazi/mchunguzi mkuu: ……

Jina: ……

Tarehe: ……

Appendix X: Structured Questionnaires

PART 1: PERSONAL DETAILS

STUDY NUMBER ……..

Are you the one suffering from epilepsy Yes……. No……

If no, Relationship to index: …….

1. **Mother**
2. **Father**
3. **Guardian**

Today's Date: ……..

Patient Contact No: ……..……

RESIDENCE: ……..……..…….

Date of Birth: ……..…….

Age: ……...…….

Gender: Male…… Female……

Informed Consent Obtained: Yes / No [ ]

Part 2: Socio-demographic Information

Question	Response	Code
1. Religion	1. Catholic 2. Protestant 3. Islam 4. Traditional 5. None 6. Other (specify)	☐
2. Education level	1. None 2. Nursery 3. Primary finished 4. Primary Not finished 5. Secondary finished 6. Secondary Not finished 7. College 8. University 9. Other (specify)	☐
3. Occupation	1. Farmer 2. Trader/Business 3. Casual laborer 4. Professional 5. Student 6. Unemployed 7. Other (specify)	☐
4. Marital status	1. Never married/ Single 2. Married 3. Separated 4. Divorced 5. Widowed	☐
5. Number of siblings in your family	Number	☐
6. Position of a sibling with epilepsy in the family	1. Firstborn 2. Middle 3. Last born	☐
7. Does any other member of your family have a history of epilepsy?	1. None 2. First Degree Relative 3. Second Degree Relative 4. Third Degree Relative	☐

Part 3: Adherence to Medication

Morisky Self-Reported Medication Adherence Scale		
Question	**Response**	**Code**
1 (a). Do you ever forget to take your medications?	1.Yes 0. No	
(b). Are you careless at times in taking your medication?	1.Yes 0. No	
(c). When you feel better do you sometimes stop taking your medicine?	1.Yes 0. No	
(d). Sometimes if you feel worse when taking your medicine, do you stop taking it?	1.Yes 0. No	
(e). Total Self-Reported Medication Adherence Score (a+b+c+d)	Total Score	

IF THE PATIENT SCORES 0, GO TO QUESTION 2, IF THE PATIENT SCORES >1, ANSWER QUESTION 2,3.

Various factors influence how people take medications prescribed to them by the doctor. Thinking of your seizure medication, please answer the following questions:		
Question	**Response**	**Code**
2. What are the factors that encourage you to take your epilepsy drugs regularly? ***(Select any or all that apply)***		
(a) Understanding instructions by the doctor	1.Yes 0. No	
(b) Understanding the need for long term treatment	—	
(c) Understanding the need for medication	—	
(d) Understanding the effectiveness of medication	—	
(e) Availability of family support system	—	
(f) Making medication a habit	—	
(g) Accessibility /Availability of medication	—	
(h) Good patient-doctor relationship	—	
(i) Keeping medication in sight	—	
(j) Others (specify):		
Question	**Response:**	**Code**
3. What factors might discourage you from taking your seizure medication regularly? ***(Select any or all that apply)***		
(a) Misunderstanding instructions by the doctor	1.Yes 0. No	

(b) Misunderstanding of the need for long-term treatment	—	☐
(c) Lack of understanding of the need for medication	—	☐
(d) Lack of understanding of the effectiveness of Medication	—	☐
(e) Continuity of seizures despite treatment	—	☐
(f) Infrequent seizures	—	☐
(g) Drug side effects	—	☐
(h) Lack of family support system	—	☐
(i) Lack of access to medication	—	☐
(j) Fear of getting addicted to medication	—	☐
(k) Cost of medication	—	☐
(l) Forgetting	—	☐
(m) Dissatisfaction with treatment	—	☐
(n) Traveling	—	☐
(o) Others (specify):		☐

PART 4: SEIZURE FREQUENCY AND SEVERITY

Question	Response	Code
1. How many years have you (your child) had seizures		
2. Duration of follow-up in KAWE clinic	1. Years (Specify year) 2. Months (if less than 1year) (specify)	☐
3a). Have you (your child) ever sought epilepsy treatment in another medical facility?	1. Yes 2. No	☐
b) If ***yes,*** what was the reason for transfer to KAWE clinics.		
4. How often did you (your child) get seizures before starting the antiepileptic drugs?	1. Daily 2. Weekly 3. Monthly 4. Other	☐
5. Thinking back, on average, how many seizures did you (your child) have, for the 3 months before starting your medication?	1. None 2. 1-3 3. 4-6 4. >6	☐
6a). How many seizures did you (your child) experience in the last 6 months?	1. None 2. 1-3 3. 4-6 4. >6	☐
b). How long do the seizures last?	1. Less than 5 minutes 2. 5-10 minutes 3. 11-20 minutes 4. 21-30 minutes 5. More than 30 minutes 6. Don't know	☐
7. Do you (your child) have generalized or partial seizures?	1. Partial (Focal) 2. Generalized 3. Not sure	☐
8. When was your (your child's) last convulsion?	1. Less than 1 month ago 2. Months ago (Specify) 3. Years ago (Specify)	☐
9. Have you (your child) ever been seriously injured during a seizure? ***No go to 11***	1. Yes 0. No	☐
10. If yes, specify the type of injury	1. Burns 2. Broken bones 3. Cuts 4. Bruises 5. Other (specify)	☐
Thinking of the drugs used to control seizures, please answer the following questions:		
11. For how many years have you (your child) been taking medication to control seizures?	1. <1 year 2. 1-3 years 3. 4-5 years 4. >5 years (Specify)	☐

12a. Number of the type(s) of antiepileptic drugs given at the start of treatment?	1. 1 drug 2. 2 drugs 3. 3 drugs 4. 4 drugs	☐
12b. Are you (your child) still using the antiepileptic drug(s) that you were given at the start of your treatment? **(*If yes, go to No. 13*)**	1. Yes 2. No	
12c. If ***no***,		
i) Select 1st antiepileptic drug(s)	1. Phenobarbital 2. Phenytoin 3. Sodium valproate 4. Carbamazepine 5. Clonazepam 6. Topiramate 7. Lamotrigine 8. Levetiracetam	
ii) Select 2nd antiepileptic drug(s)	1. Phenobarbital 2. Phenytoin 3. Sodium valproate 4. Carbamazepine 5. Clonazepam 6. Topiramate 7. Lamotrigine 8. Levetiracetam	
iii) Select 3rd antiepileptic drug(s)	1. Phenobarbital 2. Phenytoin 3. Sodium valproate 4. Carbamazepine 5. Clonazepam 6. Topiramate 7. Lamotrigine 8. Levetiracetam	
iv) Reasons of change of antiepileptic drug(s)	1. Side effects a. Tiredness b. Dizziness c. Weight gain d. Nausea e. Others(specfy) 2. Poor seizure control 3. Non-availability of AEDs 4. High cost of drugs 5. Other(specify)	☐
13. How many antiepileptic drugs do you (your child) currently take	1. None 2. 1 drug 3. 2 drugs 4. 3 drugs 5. 4 drugs	☐

14. Which antiepileptic drug(s) do you (your child) currently take? **(*Obtain from prescription leaflet*)**	1. Phenobarbital 2. Phenytoin 3. Sodium valproate 4. Carbamazepine 5. Clonazepam 6. Topiramate 7. Lamotrigine 8. Levetiracetam	☐
15. Do you think your (your child's) seizures are controlled?	1. Controlled 2. Uncontrolled 3. Not sure	☐
16. How long do you (your child) take to go for more seizure drugs after the previous ones are over?	1. Before they are over 2. The day they are over 3. Up to one week after they are over 4. Up to one month after they are over	☐
17. Do you (your child) have another medical condition(s) for which you (your child) are chronically on medication? ***Yes-answer 18,19,20*** ***No, go to 21***	1. Yes 2. No	☐
18. Specify the condition(s)		
19. How many times per day do you (your child) take your medication?	1. Once 2. Twice 3. Thrice 4. Four times	☐
20. How many types of drugs do you (your child) take each day to control your (your child's) other disease(s)?	1. 1-2 2. 3-4 3. 4-6 4. >6	☐
21a) Have you (your child) used any alternative/other treatment methods for your (your child's) epilepsy? ***(If no go to Part 5)***	1.Yes 2. No	☐
b) If yes specify in what form?	1. Herbs 2. Traditional healers 3.Religious/Faith-based Intervention 4. Acupuncture 5. Other (Specify)	☐
c) Are you (your child) still using the alternative treatment methods?	1. Yes 2. No	☐
d) If yes specify which one		

Part 5: Perception on Epilepsy and Seizure Control

Question	Response	Code
1. Have you fully understood the nature of your disease?	1. Yes 2. No	
2. Have you accepted to live with your disease	1. Yes 2. No	
3. Did you (your child) know about epilepsy before you (your child) were diagnosed with it?	1. Yes 2. No	
4. Where did you (your child) learn about epilepsy?	1. Health care worker 2. Media – Print, Radio, Television 3. Outreach campaign 4. Friends and relatives 5. Other	
5. What do you think is the cause of your (your child's) epilepsy?	1. Central nervous system infection – malaria, meningitis 2. Birth complications 3. Head injury 4. Inherited 5. Fever 6. Emotional stress 7. Religious 8. Witchcraft 9. Not sure/Don't know 10. Other	
6. How can your (your child's) epilepsy be controlled?	1. Antiepileptic drugs 2. Religious intervention 3. Cultural practices/rituals 4. Herbs 5. Other	
7. What are your (your child's) expectations from antiepileptic drug therapy?	1. Complete cure from seizures 2. Reduction in seizure frequency 3. No effect 4. Not sure 5. Other	

Appendix XI: Structured Questionnaire (Kiswahili)

PART 1: PERSONAL DETAILS

STUDY NUMBER: ……

Je, ni wewe unaye uguwa ugonjwa wa kifafa Ndio……. La……

Iwapo la, Uhusiano na aliye na kifafa:……

1. **Mama**
2. **Baba**
3. **Mlezi**

Tarehe ya leo: ……..……

Nambari ya Simu: …….

Makao: ……..…….

Tarehe ya Kuzaliwa:……..……..

Umri: ……...……

Jinsia: Mume…… Kike……

Idhini kupatikana: Ndio / La [ ]

Part 2: Socio-demographic Information

Question	Response	Code
1. Dini	1. Katoliki 2. Protestanti 3. Uislamu 4. Dini za utamaduni 5. Hakuna 6. Nyingine (fafanua)	☐
2. Kiwango ya masomo	1. Hakuna 2. Shule ya chekechea 3. Kumaliza shule ya msingi 4. Kutomaliza shule ya msingi 5. Kumaliza shule ya upili 6. Kutomaliza shule ya upili 7. College 8. Chuo kikuu 9. Nyingine (fafanua)	☐
3. Kazi	1. Mkulima 2. Mfanya biashara 3. Jua kali 4. Mtaalamu 5. Mwanafunzi 6. Sina kazi 7. Nyingine (fafanua)	☐
4. Hali ya ndoa	1. Sijawahi olewa 2. Nimeolewa 3. Tumeachana 4. Niko na talaka 5. Mimi ni mjane	☐
5. Nambari ya Watoto katika familia yenu	Nambari	☐
6. Nafasi yako (ya mtoto anaye kifafa) katika familia yenu	1. Kifungua Mimba 2. Wa katikati 3. Kitinda Mimba	☐
7. Je,kunaye mtu mwingine katika familia yenu anaye uguwa ugonjwa wa kifafa?	1. Hakuna 2. Jamaa wa kiwango ya kwanza 3. Jamaa wa kiwango ya pili 4. Jamaa wa kiwango ya tatu	☐

Part 3: Adherence to Medication

Morisky Self-Reported Medication Adherence Scale		
Question	**Response**	**Code**
1 (a). Je, we husahau kutumia dawa yako?	1. Ndio 0. La	
(b). Je, we huwa hujali wakati mwingingine unapomeza madawa yako?	1.Ndio 0. La	
(c). Ukipata nafuu, je we huwacha kutumia madawa yako?	1.Ndio 0. La	
(d). Wakati mwingine, ukijihisi vibaya baada ya kumeza dawa ya kifafa, je wewe huwacha kuyatumia hayo madawa?	1.Ndio 0. La	
(e). Total Self-Reported Medication Adherence Score (a+b+c+d)	Total Score	

Mgonjwa Akipata Alama 0, Enda Swali 2, Mgonjwa Akipata Alama >1, Jibu Maswali 2,3

Various factors influence how people take medications prescribed to them by the doctor. Thinking of your seizure medication, please answer the following questions:		
Question	**Response**	**Code**
2. **Je, ni nini hufanya ukumbuke kutumia madawa yako mara kwa mara? *(Chagua yote ama ile inayokuhusu)***		
(a) Kuelewa maagizo kutoka kwa daktari	1.Ndio 0. La	
(b) Kuelewa mbona unafaa kutumia madawa kwa muda mrefu	1.Ndio 0. La	
(c) Kuelewa mbona unaitaji kutumia madawa	1.Ndio 0. La	
(d) Kuelewa ufanisi wa madawa	1.Ndio 0. La	
(e) Msaada kutoka kwa familia	1.Ndio 0. La	
(f) Kufanya utumizi wa madawa kuwa tabia	1.Ndio 0. La	
(g) Kupatikana kwa madawa	1.Ndio 0. La	
(h) Uhusiano bora kati ya daktarin na mgonjwa	1.Ndio 0. La	
(i) Kuweka madawa mahali ambapo inaonekana	1.Ndio 0. La	
(j) Zingine (Fafanua):		
Question	**Response:**	**Code**
3. **Ni nini hufanya ukose kuyatumia madawa yako mara kwa mara? *(Chagua yote ama ile inayokuhusu)***		
(a) Kukosa kuelewa maagizo kutoka kwa daktari	1. Ndio 0. La	
(b) Kukosa kuelewa mbona unafaa kutumia madawa kwa muda mrefu	1.Ndio 0. La	
(c) Kukosa kuelewa mbona unahitaji kutumia madawa	1.Ndio 0. La	

(d) Kukosa kuelewa uzuri wa madawa	1.Ndio 0. La	
(e) Kifafa kuendelea ilhali unameza dawa	1.Ndio 0. La	
(f) Kifafa kufanyika kwa mara tu	1.Ndio 0. La	
(g) Kupata madhara ya madawa ya kifafa	1.Ndio 0. La	
(h) Ukosefu wa msaada kutoka kwa familia	1.Ndio 0. La	
(i) Kukosekana kwa madawa	1.Ndio 0. La	
(j) Kuogopa uraibu wa madawa	1.Ndio 0. La	
(k) Bei ya dawa	1.Ndio 0. La	
(l) Kusahau	1.Ndio 0. La	
(m) Kutoridhika na matibabu	1.Ndio 0. La	
(n) Kusafiri	1.Ndio 0. La	
(o) Zingine (Fafanua):		

Part 4: Seizure Frequency and Severity

Question	Response	Code
1. Umekuwa (mtoto wako) na ugonjwa wa kifafa kwa miaka mingapi?		
2. Umekuwa (mtoto wako) ukifuatiliwa huku KAWE kwa muda mgapi?	1. Miaka (Fafanua ni mwaka gani) 2. Miezi (iwapo chini yam waka moja) (fafanua)	
3a). Umewahi (mtoto wako) tafuta matibabu ya kifafa kutoka kwa hospitali nyingine?	1. Ndio 2. La	
b) Iwapo ***ndio***, nini sababu ya kukuja KAWE.		
4. Je, ni kwa mara ngapi ulikuwa ukipata (mtoto wako) matukio ya kifafa kabla ya kuanza madawa za kifafa?	1. Kila siku 2. Kila wiki 3. Kila mwezi 4. Zingine	
5. Ukikumbuka, kwa kijumla, ulipata (mtoto wako) vipindi vingapi vya kifafa, miezi mitatu kabla ya kuanza madawa za kifafa?	1. Hakuna 2. 1-3 3. 4-6 4. >6	

6a). Umepata (mtoto wako) vipindi vingapi vya kifafa kwa hii miezi sita iliyopita?	1. None 2. 1-3 3. 4-6 4. >6	☐
b). Kipindi kimoja cha kifafa hukaa kwa muda ngapi?	1. Chini ya dakika tano 2. Dakika 5-10 3. Dakika 11-20 4. Dakika 21-30 5. Juu ya dakika 30 6. Sijui	☐
7. Je, uko (mtoto wako) na aina gani ya kifafa?	1. Partial (Focal) 2. Generalized 3. Sina hakika	☐
8. Kipindi ya kifafa ya mwisho ilikuwa lini?	1. Chini ya mwezi moja uliyopita 2. Miezi kadhaa (fafanua) 3. Miaka kadhaa (fafanua)	☐
9. Je, umewahi(mtoto wako) jeruhiwa wakati ambao umepata kifafa? ***La, enda 11***	1. Ndio 0. La	☐
10. Kama ndio, Fafanua ni Jereha aina gani	1.Kuchomeka 2. Mifupa kuvunjika 3. Kujikata 4. Vigwaruzo 5. Zingine (Fafanua)	☐
Thinking of the drugs used to control seizures, please answer the following questions:		
11. Je, ni kwa miaka mingapi umekuwa (mtoto wako) ukitumia madawa ya kutibu kifafa?	1. Chini yam waka moja 2. Miaka 1-3 3. Miaka 4-5 4. Juu ya miaka 5 (Fafanua)	☐
12a. Je, ulikuwa ukitumia aina ngapi ya madawa ulipoanaza matibabu	1. 1 2. 2 3. 3 4. 4	☐
12b. Je, bado unatumia (mtoto wako) dawa (madawa) ulioanzishwa nao, wakati ulipoaanza kupata matibabu? ***(Iwapo ndio enda 13)***	1. Ndio 2. La	
12c. Iwapo ***la,***		
i) Chagua jina la dawa ya kwanza	1. Phenobarbital 2. Phenytoin 3. Sodium valproate 4. Carbamazepine 5. Clonazepam 6. Topiramate 7. Lamotrigine 8. Levetiracetam	

ii) Chagua jina la dawa ya pili	1. Phenobarbital 2. Phenytoin 3. Sodium valproate 4. Carbamazepine 5. Clonazepam 6. Topiramate 7. Lamotrigine 8. Levetiracetam	
iii) Chagua jina la dawa ya tatu	1. Phenobarbital 2. Phenytoin 3. Sodium valproate 4. Carbamazepine 5. Clonazepam 6. Topiramate 7. Lamotrigine 8. Levetiracetam	
iv) Nini sababu ya kubadilishwa dawa ***(chagua yoyote inayuhusika)***	1. Athari ya dawa a. Uchovu b. Kizunguzungu c. Kuongeza kilo d. Kichefuchefu e. Zingine(fafanua) 2. Kifafa kuendelea licha ya kumeza dawa 3. Kukosekana kwa madawa 4. Bei ghali ya dawa 5. Zingine (Fafanua)	☐
13. Je sasa unatumia (mtoto wako) madawa aina ngapi ya kutibu kifafa?	1. Hakuna 2. 1 3. 2 4. 3 5. 4	☐
14. Ni dawa gani unatumia (mtoto wako) sasa? **(*Angalia pia cheti cha daktari*)**	1. Phenobarbital 2. Phenytoin 3. Sodium valproate 4. Carbamazepine 5. Clonazepam 6. Topiramate 7. Lamotrigine 8. Levetiracetam	☐
15. Je, unadhani kifafa yako (ya mtoto wako)umedhibitiwa?	1. Imedhibitiwa 2. haijadhibitiwa 3. Sina hakika	☐
16. Je, wewe (mtoto wako) hukaa kwa muda gani kabla kuendea madawa mengine, baada ya yale ulikuwa nazo kuisha?	1. Kabla kuisha 2. Siku ambayo yameisha 3. Hadi wiki moja baada ya madawa kuishap 4. Hadi mwezi moja baada ya madawa kuisha	☐

17. Je, unayo (mtoto wako) ugonjwa mwingine ambao unatumia madawa kila siku? ***Ndio jibu 18,19,20*** ***La, enda 21***	1. Ndio 2. La	☐
18. Fafanua ni ugonjwa gani		
19. Unatumia (mtoto wako) madawa mara ngapi kwa siku kwa huu ugonjwa?	1. Mara moja 2. Mara mbili 3. Mara tatu 4. Mara nne	☐
20. Unameza (mtoto wako) madawa aina ngapi kwa nia ya kutibu huu ugonjwa mwingine?	1. 1-2 2. 3-4 3. 4-6 4. >6	☐
21a) Umewahi (mtoto wako) tumia njia nyingine, ili kujaribu kutibu kifafa yako (ya mtoto wako)? ***(Iwapo La, Enda Part 5)***	1.Ndio 2. La	☐
b) Iwapo ndio fafanua gani	1. Dawa ya kienyeji 2. Waganga 3. Kuombewa 4. Acupuncture 5. Nyingine	☐
c) Je, bado unatumia (mtoto wako) hizi njia nyingine ya matibabu?	1. Ndio 2. La	☐
d) Iwapo ***ndio,*** fafanua gani		

Part 5: Perception on Epilepsy and Seizure Control

Question	Response	Code
1. Je, umeelewa kikamilifu kuhusu uonjwa wako wa kifafa?	1. Ndio 2. La	
2. Je, umekubali kuishi na ugonjwa huu wa Kifafa?	1. Ndio 2. La	
3. Je, ulikuwa umejua kuhusu kifafa kabla ya ugonjwa wako (ya mtoto wako)	1. Ndio 2. La	
4. Ulijulia (mtoto wako) wapi kuhusu ugonjwa wa kifafa?	1. Mhuduma wa afya 2. Vyombo vya habari – Gazeti, Radio, Televisheni 3. Kampeni za afya 4. Marafiki na watu wa jamii 5. Zingine	
5. Je, unadhani ni nini ilisababisha kifafa yako(ya mtoto wako)?	1. Ugonjwa ya ubongo- malaria, meningitis 2. Matatizo wakati wa kuzaliwa 3. Majereha ya kichwa 4. Kupitishwa (kurithishwa) katika familia 5. Joto ya mwili 6. Mafadhaiko 7. Kidini 8. Uchawi 9. Sijui 10. Zingine	
6. Je, kifafa yako (ya mtoto wako) inaweza dhibitishwa kwa njia gani?	1. Madawa ya kifafa 2. Kidini 3. Njia za utamaduni 4. Dawa ya kienyeji 5. Zingine	
7. Je, ni nini matarajio yako (ya mtoto wako) unapoyatumia madawa haya ya kifafa?	1. Kifafa kuisha milele 2. Kiwango ya kifafa kupungua 3. Kutokuwa na tokeo lolote 4. Sina hakika 5. Zingine	