PREVALENCE OF DEPRESSION AND ASSOCIATED FACTORS AMONG PATIENTS WITH EPILEPSY AT KENYATTA NATIONAL HOSPITAL, KENYA

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DECLARATION

The undersigned, declare that this thesis is my original work and has not, to the best of my knowledge, been submitted either wholly or in part to this or any other university for the award of any degree.

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LIST OF ABBREVIATIONS

AEDS: Anti-Epileptic Drugs

DSMV: Diagnostic and Statistical Manual of Mental Disorders, 5th Edition

ICD: International Classification of Diseases

KNH: Kenyatta National Hospital

NICE: The National Institute for Health and Care Excellence

PHQ-9: Patient Heath Questionnaire Version 9

PWE: Person with Epilepsy

SPSS: Statistical Package for Social Sciences

WHO: World Health Organization

DEFINITION OF TERMS

Depression: A mental health disorder characterized by persistently depressed mood or loss of interest in activities, causing significant impairment in daily life.

Demographic:

Anhedonia: The inability to feel pleasure

Antidepressants: These are medications used to treat a major depressive disorder, some anxiety disorders, some chronic pain conditions, and to help manage some addictions.

Epilepsy: Is a group of chronic brain conditions characterized by recurrent epileptic seizures.

Outpatient: Those who attend a clinic in hospitals/ units for treatment but do not stay their overnights (get admitted)

Comorbidity: The presence of more than one disorder co-occurring with a primary condition

Psycho-social: Is relating to the combination of psychological and social behaviour

ABSTRACT

Introduction: Depressive disorders are common comorbidities occurring in approximately 34.5% of epileptic patients. Patients with depressive disorders are at high risk of self-harm and suicide. People with epilepsy are more likely to develop depression and other mood disorders even prior to having their first episode of seizure. Despite the high prevalence of epilepsy in sub-Saharan Africa and the established relationship between depression and epilepsy, the extent of comorbid epilepsy and depression in the region is still poorly understood.

Study Objective: To determine the prevalence and factors associated with depressive disorder among epileptic patients at the neurology outpatient clinic in Kenyatta National Hospital.

Methodology. This was descriptive cross-sectional study that was conducted at Kenyatta National Referral Hospital (KNH)- outpatient neurology clinic. Data was collected from 139 epileptic patients recruited via purposive sampling at the neurology outpatient clinic at the Kenyatta National Hospital. Data collection was done using a structured questionnaire. Both descriptive and inferential analysis was done using SPSS version 26.

Results: The results identified that, 39.6% were aged <30 years, 51.1% of the patients were male. In investigating marital status, 65.5% were single, 42.4 %(59) had secondary level education, 53.2%(74) of the respondents were unemployed. Further, 68% of epileptic patients had depression, (95%CI: 60% - 75.9%), 45.3% had mild depression, 36.8% had moderate depression, 15.8% had moderately severe depression while 2.1% had severe depression. Among patients with depression, 22.1% had a history of psychiatric illness in their family, the average age at first seizure was 22.8(SD±17) years with an average duration of seizures 12(SD±10) years. Generalized seizure 77.8 %(74) was a common type of seizure among patients, 92.6%(88) were using epileptic drugs with an average of 2(SD±0.8) different drugs. Multivariable analysis established that no formal education (AOR =16.83, 95%CI: 2.57 – 110.08, <0.001), discriminated because of epilepsy (AOR =6.61, 95%CI: 1.29 – 33.74, p =0.023), longer duration of seizure (AOR =1.07, 95%CI:1.02 – 1.13, p =0.006) and history of antiepileptic drugs default were independently associated with depression among epileptic patients.

Conclusion and recommendations: The prevalence of depression is high among adult epileptic patients which provides the need for regular assessment and integration of family social support and high-level awareness the of increased risk of depression within this group

CHAPTER ONE: INTRODUCTION AND BACKGROUND

1.1.Background

As per the World Health Organization global report on epilepsy (WHO, 2019), epilepsy was recorded as the 4th most common neurological disorder. This disorder is also referred to as seizure disorder, is characterized by recurrent unpredictable seizures which could vary in type due to a chronic underlying abnormal activity in the brain (Keezer et al., 2016). A seizure is a periodic occurrence in the brain caused by abnormally high or synchronized neuronal activity (Kasper et al., 2015).

Approximately 70 million of the world's population is epileptic (Ngugi, Bottomley, Kleinschmidt, Sander, & Newton, 2010). These figures imply that this neurological disorder forms 0.7 per cent of the world's burden of diseases and with regards to reported disability-adjusted life-years (DALYs) every year; 17 million (Whiteford, et al., 2013). In the United States, for instance, almost 150,000 new cases are diagnosed annually. In 2014 in Kenya, 18.6 per 100,000 people were diagnosed with epilepsy (WHO, 2014). However, in 2021, it was reported that a crude prevalence of 53.3/1,000 persons had both convulsive and non-convulsive seizures. This study was carried out in Kilifi County in Kenya (Kariuki, et al., 2021). Almost a decade ago, it was estimated that 1 in 26 persons at some point in their lives shall become epileptic. (Schachter, Shafer, & Sirven, 2013). This was to be attributed to several factors; genetics, infections of the brain, injuries and trauma to the head, changes in the brain structure causing electrical storm hence the seizures; which can happen either from birth or in adulthood and developmental disorders such as autism (Berg & Plioplys, 2012). Schachter, Shafer, & Sirven's (2013) prediction is becoming a fact; and there has been an increase of people diagnosed with epilepsy, especially in low and middle-income nations. The incidence report from Africa in 2021 indicated that 58 out of 1000 people in the population were suffering or diagnosed with epilepsy (WHO, 2021).

Depression is still not properly identified and treated despite the fact that it has a high prevalence and a significant impact (Elger et al., 2017). There are no well-defined pathways that have been shown to clearly identify how epilepsy can lead to clinical depression (Mula, 2017). It has been hypothesized that the pathophysiology of depression in PWE may be linked to anatomical abnormalities in several areas of the brain, monoamine pathways, cerebral glucose metabolism, the hypothalamic–pituitary–adrenal axis, and interleukin-1b (Fiest et al., 2014). The presence of depression among PWE can be associated with a variety of psychosocial difficulties on patients' lives, such as poor treatment adherence, poor quality of life, unemployment, lower educational status, increased burden and cost on healthcare services, and a higher risk for suicidal ideation (Conway et al., 2018). Even while a large number of researches from the Western world have reported the prevalence of depression among PWE as well as the detrimental effects of this condition, very few studies have focused on this topic in the nations that are located south of the Sahara (Fiest et al., 2013).

Since epilepsy is one of the most common conditions seen in psychiatry and neurological clinics, our focus is typically on finding effective ways to control patients' seizures (Mula, 2019b). Nevertheless, comorbidities that are connected with this illness receive much less attention than they should. The patient's genetic makeup is a significant contributor to the development of depressive symptoms in epileptic patients. Studies have indicated that in addition to the genetic loading, there are also certain particular causes of depression in individuals who have epilepsy (Kwong et al., 2016). Among these include biochemical irregularities in the synthesis of noradrenaline, dopamine, 5-hydroxytriptamine, and gamma-aminobutyric acid, as well as social stigmatization, discrimination, and limitations placed on activities that are part of daily life (GABA) (Valente & Filho, 2013).

This is a major concern seeing that, it is related to undesirable physical, social, and psychological consequences(WHO, 2016). This study focuses on the psychological aspect in

particular depression considered the widespread comorbidity amongst epileptic people. Major depressive disorder (MDD) is a major mood disorder affecting a person's social and professional functioning over time (Balibey et al., 2015). This is primarily because it presents with persistent feelings of sadness and dysthymic mood, loss of interest and anhedonia, changes in vegetative symptoms(sleep patterns, decreases libido and appetite), low energy, alogia and restlessness and generally slowed movement, and suicidal ideations and intent (APA, 2013).

As previously stated, depression is a widespread psychiatric disorder amid epileptic people. (Błaszczyk & Czuczwar, 2016). These researchers found that depression affected between 11% and 62% of patients with epilepsy globally while 34.5% were the estimated depressive cases among epileptic patients in East Africa and almost 30% in Southern and West Africa (Dessie et al., 2019; Keezer et al., 2016). A related study in Kenya among children with epilepsy to examine the prevalence of behavioural disorders, 46 per cent of the children had challenges. Attention issues, aggressive behaviour, social challenges, and withdrawal/depression were the four most common symptom clusters (Karanja, Kiburi, Kang'ethe, & Othieno, 2021). This study was done at KNH Neurology Paediatric clinic. Notably, there seems to be a paucity of published on adults with epilepsy and comorbid depression in Kenya.

Even though there has been a documented association of comorbidity between epilepsy and other psychiatric conditions and in particular depression, this relationship is not well understood (Vikash et al., 2021). Research into the impact of non-modifiable intrinsic factors and psychosocial factors has been done but not extensively.

Kanner (2011), indicated that several population-based investigations have revealed a bidirectional relationship between depressive illnesses and epilepsy, which is corroborated by experimental trials. The study focused on intrinsic factors and the findings revealed that a hyperactive hypothalamic-pituitary-adrenal (HPA) axis, associated neuroanatomic and

neuropathologic consequences, as well as disruptions in serotonergic, noradrenergic, -aminobutyric acid (GABA)ergic, and glutamatergic neurotransmitter systems, could be connected. The correlation by determining the potential shared pathogenic mechanism in both disorders. (Kanner, 2011). Another study supported these findings as the researchers reported that indeed a biological mechanism adequately explained the comorbidity (Butler, et al., 2019). According to the study, hormonal dysregulation caused by seizures and inter ictal epileptic form discharges disrupting the hypothalamic-pituitary-adrenal axis are likely to contribute to increased rates of depression in epilepsy patients. Błaszczyk & Czuczwar (2016), reported that people with epilepsy who had a family history of psychiatric disorder, such as depression, a lack of seizure control, and iatrogenic (pharmacologic and surgical) causes were more likely to develop depression.

It was however noted that psychosocial characteristics such as social coping and adaptability skills were risk factors for depression in epileptic patients (Błaszczyk & Czuczwar, 2016). Other factors such as social isolation, self, social stigmatization, or disability is linked to depression among people with PWE. Repeatedly, depression is due to a reaction to epilepsy's stigma and the low quality of life that comes with it. Depression also further deteriorates the quality of life with a high risk of suicide of PWE (Catena-Dell'Osso, Caserta, Baroni, Nisita, & Marazziti (2013), Ridsdale et al., 2018). Epilepsy's chronic nature is linked to socioeconomic consequences, increased health-care usage, restricted involvement in education and work due to seizures, and other health comorbidities.

However, despite the severity of the outcomes of the comorbidity, depression is still under-recognized and undertreated among adults with PWE in Kenya. Therefore, this study investigates the prevalence and the factors associated with depression amid PWE at Kenyatta National Hospital.

1.2.Problem statement

When compared to the general population, epileptic patients have a higher risk of depression (Dessie et al., 2019). However, generally, depression seems to be the most undetected disorder and hence frequently left unmanaged compared to other psychiatric disorders (M'bayo et al., 2017). This is a concern especially among PWE because it is associated to poor outcomes, quality of life, and poor observance to medication hence the significance of right diagnosis and depression management as part of holistic management of epilepsy (Gilkinson et al., 2021). The study seeks to determine the prevalence of depression amid epileptic adults at Kenya National hospital.

Even though there has been a documented association of comorbidity between epilepsy and depression, this relationship is not understood well (Mulugeta et al., 2016). Researches on the impact of non-modifiable intrinsic factors and psychosocial factors have not been extensively covered globally (Hopwood et al., 2021). There is little known in Kenya about the associated factors that connect depression and epilepsy and hence this explores this correlation. In general, there is scanty research on the severity of depression and its related causes in Kenyans with epilepsy with the goal of this research to fill the existing gaps.

CHAPTER TWO: LITERATURE REVIEW

2.1.Introduction

Common disorders include epilepsy, anxiety, and depression. As a result, it is not unexpected that many patients have both illnesses. Indeed, some researchers estimate that up to 55% of people with epilepsy develop depression in their life at some point (Hesdorffer et al., 2012). Despite this, there has been a surprising lack of research on the mechanisms of sadness and anxiety in epilepsy, as well as therapy options. Most clinics that handle epileptic cases are overburdened with referrals, so the consultation focuses on the patient's seizures and how to manage them; nonetheless, doctors who treat persons with epilepsy must be able to recognize the anxiety symptoms, particularly depression.

Although depression is a curable illness, it has a significant negative influence on one's quality of life (Munger Clary, 2014). Even though depression in epilepsy might be linked to seizures, inter-ictal depression is the most common complication. In addition to the established symptoms of anhedonia, inter-ictal depression or dysphoria is more likely than depression in adults without epilepsy to be linked with agitation, psychotic characteristics, or impulsive self-harm; a fact important to remember when faced with an agitated or hostile patient in the clinic(Kanner, 2012).

2.1.Aetiology of epilepsy

There are many causes of epilepsy. Epilepsy is due to an interaction of environmental, physiological, and genetic factors. Certain environmental aspects can trigger a seizure, such as hyperventilation in children, certain intense intermittent visual stimuli, and physiological factors such as stress or strong emotions can also trigger a seizure. The study of the impact of stress on seizure syndromes is important considering the high comorbidity of mood and anxiety disorders in epileptic individuals (Akanuma et al., 2008). Indeed, researchers have shown that

epileptic children report more anxiety and depressive symptoms than their peers(Ekinci et al., 2009).

Stress and depression are associated with behaviours and consequences that can affect the quality of life. For example, these symptoms because modulation of sleep is related to poor nutrition, and, in people with epilepsy, induce poor medication adherence. These factors increase the frequency of seizure episodes(Haut et al., 2007). In addition, stress, in some patients, is related to a sense of helplessness in the face of seizure episodes. This feeling may increase the incidence of seizures. Indeed, some patients, who identify stress and depressive symptoms as factors that may precipitate seizures, are sometimes able to reduce the occurrence of seizure episodes by consciously avoiding situations that may cause stress or depressive symptoms(Spector et al., 2000).

Stress has a deleterious impact on the hippocampus. This impact favours the onset of seizures and may increase their severity (Desgent et al., 2012). Consequently, the biological response to stress may, at different levels, have an impact on seizures. This hypothesis is strongly supported by numerous empirical studies in animals and a few studies in humans, reporting a link between epilepsy and stress hormones, prenatal and perinatal stress, and cumulative stress exposure. In adults with epilepsy, baseline levels of the stress hormones GCs and ACTH are significantly higher than in the normal population. Such baseline levels of stress hormones suggest an awareness of stress and future stress reactions(Galimberti et al., 2005).

By increasing the occurrence and severity of seizure episodes, stress impacts the cognitive function development in epileptic children (Sylla et al., 2020). However, this is not the only explanation for the effect of stress on the cognitive development of epileptic children. Indeed, stress, as previously described, has an impact on the hippocampal complex (Baron et al., 2018). Consequently, stress is associated with cognitive impairment of functions related to

hippocampal integrity. Thus, the added impact of stress to that of seizure syndromes on hippocampal cognitive functions should be all the more important. Thus, stress could have an impact on the development of cognitive functions through hippocampal alterations(Elger et al., 2004).

Apart from environmental and physiological factors, many disorders can be the cause of epilepsy and genetic factors play a major role in these. Changes (also known as "mutations") in genes cause only a few forms of epileptic disorders. These diseases can be passed down through the generations in a predictable pattern of inheritance or they might develop spontaneously as a result of novel mutations. The combination of many genes with environmental conditions causes most genetic epilepsies. In such cases, there is a tendency for epilepsy to run in families, but the inheritance pattern is mainly hard to recognize. Other disorders of genetic origin that favour the occurrence of epilepsy in a greater proportion than in the common people include certain inherited metabolic conditions, certain genetic syndromes, and certain chromosomal abnormalities (Anney et al., 2014).

There are partial and complex seizures that occur differently in patients (Elger et al., 2017). There is no loss of consciousness in a simple partial seizure with symptoms such as dizziness, twitching of limbs, and alterations in sense of taste. Complex partial seizures are characterized by a loss of awareness or consciousness, as well as additional symptoms such as looking blankly, being unresponsive, and performing repetitive movements (Lund et al., 2019). In the diagnosis of epilepsy among patients, a physician performs a neurological examination as well as a complete physical to identify the cause of the seizures (Misra et al., 2019). Tests that are conducted include an electroencephalogram (EEG) aimed at measuring the electrical activity of the brain. Imaging tests can also be conducted on the head. Anti-epileptic drugs are commonly used in reducing seizures (Mula, 2019a). However, vagus nerve stimulators may aid in the treatment of epilepsy where medication cannot bring relief.

2.2.Depressive disorder Etiology

Major depressive disorder (MDD) is a common and serious medical illness with a negative impact on your feelings, thoughts, and actions. Thankfully, it can also be treated. Depression manifests itself as sadness and/or a loss of interest in previously enjoyed activities. It can lead to a variety of mental and physical problems, as well as a decrease in your ability to function at work and at home (Mullins et al., 2016). This condition affects roughly 1 in 15 adults (6.7%) annually and 1 in 6 individuals (16.6%) will develop it at some time in their life. Depression can hit at any age, although late adolescence and early adulthood are the most typical times for depression with studies showing that women are more likely than men to suffer from depression. According to some studies, one-third of women will experience a major depressive episode at some point in their life. Following an acute stressor, many people may have a single major depressive episode and recover with minimal implication for future risk (Talarowska et al., 2011).

However, the majority of people who have one major depressive episode (50%–80%) will have recurring episodes and occasional subclinical symptoms, with the probability of recurrence increases with each episode. Many of these characteristics revolve around reactions to stresses and the processing of emotional information appearing to play a role in the development of major depression. Gender and developmental variables can influence the aetiology of diseases (Stringaris, 2017).

According to most etiological explanations for depression, stressful conditions cause depression in those who are vulnerable due to biological and psychological characteristics and circumstances. Environmental stresses such as acute life events, chronic stress, and childhood trauma have all been related to depression (Otte et al., 2016). Personal vulnerabilities in depression are linked to cognitive, interpersonal, and personality factors. Biological,

environmental, and human vulnerabilities interact in a bidirectional process to contribute to the development of depression, and depressive moods can also affect these vulnerabilities.

Several genetic variations have been related to a higher risk of depression in response to stress. Top of the list are genes involved in the serotonin system (5-HT). Emotions, sleep, circadian rhythm, thermoregulation, appetite, aggression, sexual behaviour, pain sensitivity, and sensorimotor responsiveness are only a few of the biological pathways influenced by serotonin (Sullivan et al., 2012). Reduced 5-HT levels, decreased 5-HT transporter uptake, altered 5-HT receptor binding, and tryptophan depletion have all been associated with a variety of psychological and psychiatric illnesses, including depression.

Electroconvulsive Therapy (ECT) is a medical treatment for people who have severe major depression and have not responded to other treatments. A short electrical stimulation of the brain is conducted while the patient is anesthetized. ECT is typically given twice or three times a week for a total of six to twelve treatments (Kanner, 2012).

Depression comorbidity

Research has showed that depression occurs regularly as a comorbidity among epileptic patients. The common depressive disorders presenting include mood regulation disorder and multi-dimensional disorder.

Mood regulation disorder

It is blatantly obvious that a feeling of depression on its own is insufficient to diagnose a mental health condition (Jin et al., 2019). For instance, being depressed is the appropriate affective response to having to endure hardship (Joormann & Siemer, 2014). Epilepsy and other severe chronic diseases, unfortunately, present an excessive number of opportunities to have valid reasons for feeling bad. We propose redefining affective disorders as disorders of mood management rather than shifts in mood state as the primary diagnostic criteria. The previously

recognized diagnostic criteria are elucidated by this proposition. For instance, "loss of pleasure" is a key symptom of depressive disorders (DSM-IV–TR, ICD-10), and it refers to the absence of formerly shown positive affective responses to still pleasurable stimuli. This can be a result of a number of factors, including genetics, lifestyle, and environment (i.e., altered mood regulation resulting in an inadequate affective response) (Finlay-Jones, 2017).

In people who are otherwise healthy, a persistently depressed mood that lasts for more than two weeks or so is probably insufficient (with the exception of situations in which bereavement or other similarly traumatic life events have occurred), and it may therefore reasonably serve as a reliable indicator of mood dysregulation (Pilc et al., 2008). On the other hand, things can appear very different among patients who have serious chronic conditions like epilepsy. For these individuals, the diagnostic emphasis should be placed more explicitly on mood dysregulation, which refers to an inadequate affective response with relation to the patient's personality and the patient's present life circumstances (Gibson et al., 2022). It is possible that the estimates of the prevalence of mental illnesses will change if neuropsychiatric screening techniques are modified to consider the conditions of a chronic disease.

Multi-Dimensional Disorder

A depressive mood is characterized by vegetative symptoms such as chronic fatigue, sleep disorders, energy, decreased libido, and elevated stress; affective symptoms such as feeling blue, loss of pleasure, ill temper, and irritability; behavioural changes such as withdrawing from social and other activities; and cognitive alterations (rumination, hopelessness, loss of self-esteem, or feelings of guilt) (Shih, 2014). Our observations in clinical practice have shown that the proportions of these characteristics of depression are different in patients who have epilepsy compared to people who do not have epilepsy. If the conventional psychiatric criteria

for major depression are used, it is likely that depressive mood abnormalities in epilepsy patients will be classified as subsyndromic rather than major (Fatjó & Bowen, 2020).

Alterations in physical and behavioural symptoms appear to be more prominent than changes in cognitive symptoms in epilepsy patients who are depressed (Preston et al., 2020). On the other hand, the vegetative and affective symptoms might have been the result of the antiepileptic drug, and the behaviour might have shifted as an attempt to deal with the possibility of seizures (e.g., self-protection or avoidance of embarrassing situations). This highlights how crucial it is, while doing a neuropsychiatric evaluation of mood states, to consider aspects connected to epilepsy (Preston et al., 2020).

Epilepsy as an etiological model for depression

We assume that mental states (such as moods) are emergent properties of the material organism, particularly the brain(Elger et al., 2017). This presupposition suggests that strong psychophysiological correlations exist between the two aspects, despite the fact that they are not the same thing and cannot be reduced to one another (Josephson et al., 2017). Epilepsy provides compelling instances for both a complicated psychosocial aetiology of depression and for the participation of intrinsic neuroetiological elements, which is consistent with the non-reductionist approach that we have been discussing (Fiest et al., 2014).

Depression is considered as the result of overwhelming life obstacles (i.e., stress) in combination with an individual's predisposition to become depressed, according to the framework of the diathesis–stress paradigm (i.e., a disadvantageous organic or psychological disposition or vulnerability) (Kanner, 2003). To be more specific, stress is a psychophysiological reaction that occurs as a result of an actual or perceived mismatch between the demands of life and the resources that are available to cope with those demands. This idea was also discussed under the guise of allostatic load.

Evidently, epilepsy and other seizure diseases that do not involve epilepsy represent a condition with unusual and severe requirements to be met in daily life. The burden of epilepsy might include injuries and hospitalizations that are caused by seizures, cognitive and behavioural impairments, restricted mobility, decreased educational outcomes, lower socioeconomic and marital status, and humiliation and social stigma (Błaszczyk & Czuczwar, 2016). The fact that the prevalence of depression is the same in patients who have non-epileptic seizures and in parents who are otherwise healthy who are caring for a child who has epilepsy highlights the role that seizure-related stress plays in the aetiology of depression. Patients who have active epilepsy are more likely to experience depression (Hoppe & Elger, 2011).

The paradigm of learned helplessness continues to be the most often used one for the induction of depressive-like behaviour in experimental animals. Methods such as the forced swim test include subjecting the individual to consistent and uncontrollable unpleasant stimulation that is typically life-threatening (Tahirovic, 2018). Patients who suffer from seizures, regardless of whether or not they have epilepsy, appear to have exactly the same kind of experience, which is evidently the same type of experience. Helplessness, from a cognitive standpoint, manifests itself as an increasing reliance on an external locus of control and a diminished awareness of one's own internal locus of control. Several investigations have found evidence that patients with epilepsy have altered styles of cause attribution (Fecske et al., 2020).

The inability to experience pleasure on its own may be linked to changes in the mesocorticolimbic dopamine pathway, also known as the reward system of the brain. Epilepsy patients who have been subjected to social stigmatization or uncomfortable situations because of their seizures may be more likely to withdraw from social activities that would otherwise serve to reinforce their condition (Conway et al., 2018). In addition, the patient may have been cautioned from participating in particular activities because of the unacceptable health risks associated with them in the event that seizures manifest themselves. As a consequence of this,

patients give up engaging in pleasurable physical and social activities, which has a significant detrimental impact on the patients' overall well-being (Fecske et al., 2020).

Alterations in depressive mood have been documented not only as a common precipitant of seizures but also as a symptom of extended (lasting over 2–3 days) postictal recovery in patients who have had epileptic seizures. It is important to emphasize that postictal depression accompanied by intense feelings of suicide ideation has only been observed in a single patient (Singh et al., 2017). It seems futile to differentiate interictal depression from peri-ictal depression in patients who encounter numerous seizures each month because they both appear to cause depression. Patients who do not have epilepsy but suffer from major depression have been shown to have electro pathophysiological changes that are comparable to epileptogenic abnormalities. Both phenobarbital and primidone are known to cause depression as a significant adverse effect. There have been reports of levetiracetam causing psychiatric adverse effects such as irritability and aggressiveness in patients. Despite the fact that this is an issue that is still being discussed, the Food and Drug Administration (FDA) published a black box warning that identified an increased risk of suicidality for all antiepileptic medicines (Mula, 2019b).

Treating Depression in Epilepsy

It is an empirical matter of discovering the safest, most successful, and most efficient means to normalize mood regulation, and one that has been the subject of a heated discussion regarding the use of antidepressant medicines vs psychotherapy as a treatment for depression (i.e., restitution the ability to experience adequate affective response). In general, the vast majority of specialists concur with us that significantly additional trials involving therapeutic intervention are required (Kanner, 2011).

Antidepressant Drugs

Inducing states of happiness through the use of unethical and illegal drugs is not the goal of the treatment of depression with pharmaceuticals (or inhibiting negative feelings) (Fiest et al., 2013). Instead, and more ambitiously, medical drug treatment should aim at the restitution of normal mood regulation, which is the ability to feel adequate positive and negative emotional response. This is the ability to experience normal mood regulation. However, during the last fifty to seventy years, there has been no significant advancement in the treatment of depression that has been able to be made (Schmitz, 2005). Recent meta-analyses have shown that serotonin reuptake inhibitors, also known as SSRIs, have only a somewhat effective therapeutic effect, and even then, only for severe depression (which is less prevalent in epilepsy). The rising prevalence of antidepressant medication in the United States over the course of the past three decades has not been shown to have any discernible impact on the country's suicide rate (Li et al., 2019).

Surprisingly little empirical evidence supports the use of selective serotonin reuptake inhibitors (SSRIs) for the treatment of depression in patients who have epilepsy. Patients diagnosed with epilepsy have not been the subject of any controlled research studies involving antidepressants that are currently on the market (Rayner, 2017). Mood benefits were found in studies with a single treatment arm, however these studies also found a relatively low rate of therapy adherence and frequent side effects. Patients with epilepsy who take antidepressants continue to show increased scores for sad mood, according to numerous studies on epilepsy (Gauld et al., 2021).

Psychotherapy

A moderate efficacy has been properly proven for cognitive-behavioural therapy (CBT), acceptance and commitment therapy, and behavioural activation therapy, despite the fact that publication bias must also be addressed for studies on the psychotherapy of depression. CBT

was also shown to be effective in patients suffering from depression who also had somatic chronic diseases, such as epilepsy (Yang et al., 2020). In one study, it was shown that there is a possibility of preventing depression in adolescents who had recently had epilepsy. There are currently a number of clinical programs that are being developed to investigate various methods of providing psychotherapy assistance to epilepsy patients. One of these methods is the utilization of technologies that are based on the internet (Yıldırım et al., 2018).

The presence of stress can be traced back to two distinct causes: the first is an unfavourable personal disposition, and the second is the presence of objective life demands (Yıldırım et al., 2018). As a consequence of this, patient assistance should also address real-life situations, which are outside the purview of specialists working in the medical and health care fields. It is possible for rehabilitative care programs and counselling by social workers and psychologists to help to the improvement of the family situation, personal connections, career or educational affairs, and leisure activities, all of which have the potential to reduce stress. In addition, psychological training that is separate from therapy has the potential to increase coping abilities as well as the ability to compensate for cognitive deficiencies that have an impact on everyday life (D'Amico, 2018).

2.3.Prevalence of depression among epileptic patients

The prevalence of depression amongst people with epilepsy has been increasing globally ranging between 11 and 62% depending on the setting and management approach, making it the most frequent psychiatric comorbidity in this population (S. Czuczwar, 2016). Fiest et al did a study in 2013 trying to establish the prevalence of depression amongst epileptic people. They included 14 studies that reported a total of 29,891 epileptic people with a general prevalence of active depression of 23.1%. The fourteen studies reported 1,217,024 participants with an overall OR of active depression of 2.77 with a confidence interval of between 2.09 and 3.67 in patients with epilepsy. In addition, 4 types of research showed 5,454 epileptic people

with an overall prevalence of 13.0 per cent (95 per cent CI 5.1–33.1), whereas three studies reported on 4,195 individuals with an overall OR of 2.20 (95 per cent CI 1.07–4.51) for adults with epilepsy (Fiest et al., 2013). These findings clearly show that PWE are more likely to have depression than those without epilepsy. In this same study, it was also established that among PWE, depression is more common among those leaving in Africa.

A cross-sectional study done in the United Arab Emirates to compare the prevalence of anxiety and depression among epileptic patients, the study enrolled 186 patients in investigating the prevalence of depression using the Patient Health Questionnaire nine-item depression scale (PHQ-9). The findings revealed that 25% of the PWE had depression (Alsaadi et al., 2015).

In 2018, Asadi-pooya et al conducted a study on depression in Asians on PWE who are likely to be depressed. In many countries, high-quality data is sparse, and authenticated screening methods to study the prevalence of depression in PWE are still lacking in many languages [e.g., the Neurological Disorders Depression Inventory for Epilepsy (NDDI-E)]. Given the high prevalence of depression among PWE, screening all PWE regularly for early detection and adequate treatment of depression would be a fair approach.

Depression, on the other hand, is usually under-diagnosed and untreated in PWE, which is connected to higher job absenteeism, health-care utilization, and direct costs of medication (Asadi-Pooya et al., 2018).

In the Sub-Saharan region, Dessie et al did a systematic review which included 167 studies done on the continent between December 2, 2017, and February 30, 2018. The findings revealed a prevalence of depression amongst epileptic people at 32.71% on the continent and 34.52% in East Africa (Dessie et al., 2019).

Engidaw et al. in 2017 did a study and found that, out of the 402 study participants, the depression prevalence among epileptic people was 48% (Engidaw et al., 2017) In Aga Khan

University Teaching Hospital Nairobi, Kiko et al did a cross-sectional study which included 327 PWE, 16.5% had a diagnosis of depression(Kiko, Kitazi, Yonga, & Jowi, 2015).

There is abundant proof that epileptic people face a variety of psychosocial issues, the most serious of which is depression, which has a significant impact on their quality of life. Epileptic patients have a higher risk of depression than the public, and the rate of depression in these individuals is much higher. Clinical presentation of depression among epileptic patients

The dominance of certain emotions determines the mood, but it is also influenced by cognitive thought, behavioural predispositions, and the condition of the autonomic nervous system (Elger et al., 2017). The aptitude of an individual to cope with various environmental situations is strongly influenced by their mood. Most people's moods are quite stable, and brief periods of change usually pass in a few hours (Lacey et al., 2016).

According to the International Classification of Diseases, unipolar depression is defined by core symptoms of low and depressed mood, lack of interest and pleasure (anhedonia), and diminished energy and exhaustion that remain for at least two weeks (ICD-10) (occurring most days for most of the time). Depression manifests itself in a variety of ways, including disturbed sleep, poor focus or indecisiveness, low self-confidence, poor or increased appetite, suicidal thinking, agitation or pausing of movements, and feelings of guilt or self-blame.

A depressive episode is classified as mild if at least four symptoms (including at least two major symptoms) are present (F32.0); minor depression often permits the patient to continue working and living normally. A moderate depressive episode (F32.1) is defined by five or six depression symptoms, during which a patient's work and life may be affected. All three main symptoms should be present in a severe major depressive episode, with seven or more symptoms. Severe depression has a terrible impact on daily activities of a person and can even be fatal (WHO, 2019). In many nations, depression is under-diagnosed and undertreated.

Only one-third of those who match the diagnostic criteria for depression get diagnosed; less than one-third of those diagnosed receive effective therapy, and less than half of those treated stay compliant three months after commencing treatment. The risk of suicide is 30 times higher in persons with depression (Maske et al., 2017). As a result, prompt diagnosis and cutting-edge management can save patients' lives.

The National Institute for Health and Care Excellence (NICE) recommendations for depression in individuals with a chronic health problems include a case identification algorithm that can be used in epilepsy (D'Amico, 2018). People who complain of sad feelings, sorrowful, or loss of hope for the past one or more months, little or no interest or pleasure in doing things should be examined by a physician who is specialized in mental health. Inquiries about emotions of worthlessness, poor focus, death thoughts, and psychosocial functioning should be included in the more extensive examination. The impact of the underlying chronic disease and its treatment must be considered in the full assessment (Tahirovic, 2018).

2.4.Factors associated with depression in epileptic patients

In a case-control study published in 2020 in China, Ho et al. discovered that female patients, older age, temporal lobe epilepsy, and a higher number of antiepileptic medicines taken were all linked to depression in epilepsy patients. Other epilepsy-related characteristics such as aetiology, seizure type, and epileptic focus laterality showed no differences (Ho et al., 2020). The study's findings suggest that a better understanding of clinical aspects should help with medical management and research into co-morbid depression in epilepsy patients.

Vallée et al. (2019) investigated epidemiologic factors associated with depression among epileptic people in France and established that depression was associated with anxiety, suicidal thoughts, a lower quality of life, nonspecific nerve stimulation, anticonvulsant benzodiazepine medication or mental medicine, and biotherapy or polytherapy antiepileptic drug compared to

monotherapy. This condition was considerably related to anxiety, suicidal ideas, anticonvulsant benzodiazepine medication, and lower quality of life in the multivariate model (Vallée et al., 2019). The study demonstrated the significance of interdisciplinary collaboration amid neurologists and psychiatrists to improve the overall epileptic patient management.

Engidaw et al. (2020) established that educational status, high perceived stress, poor social support, the onset of illness less than six years, seizure frequency of more than 12 per year, and polytherapy were independent predictors of depression among PWE in Ethiopia (Engidaw et al., 2020). The findings shows that the prevalence of depression is still high and thus, there need to control for associated factors (Engidaw et al., 2020). Epileptic patients with high-perceived stress, low educational status, and limited social support should get special attention by clinicians. Trained health practitioners should also conduct an early depression-focused routine screening for epileptic patients. It is also important to think about collaborating with mental health service providers.

In a single-centre study conducted in Guinea in 2020 among 140 PLWE on depression, the findings revealed that 64% of the patients were taking anti-seizure drugs, the duration of epilepsy was 11 years while 71 per cent of the patients had received at least one seizure in the past four weeks. The prevalence of depression was established to be 66% where 43% had mild depression, 19 per cent had moderate while 4% had moderate to severe and 0.1% had severe depression. Multivariate analysis found that the incidence of seizures in the past month was associated with depression. However, the findings revealed that there was no major relation linking demographic factors and depression (Sylla et al., 2020).

Kim et al (2018) conducted a meta-analysis that included 6607 studies that were assessed by searching five databases including Medline, Embase, Cochrane Library, SCOPUS, and Web of Science databases. After screening, 35 studies were included in the analysis. The findings

revealed that the prevalence of major depressive disorder in patients with epilepsy was 21.9%. sub-group analysis found that continent explained the heterogeneity among the selected studies. There was a high prevalence of the depressive disorder in females compared to males (Kim et al., 2018).

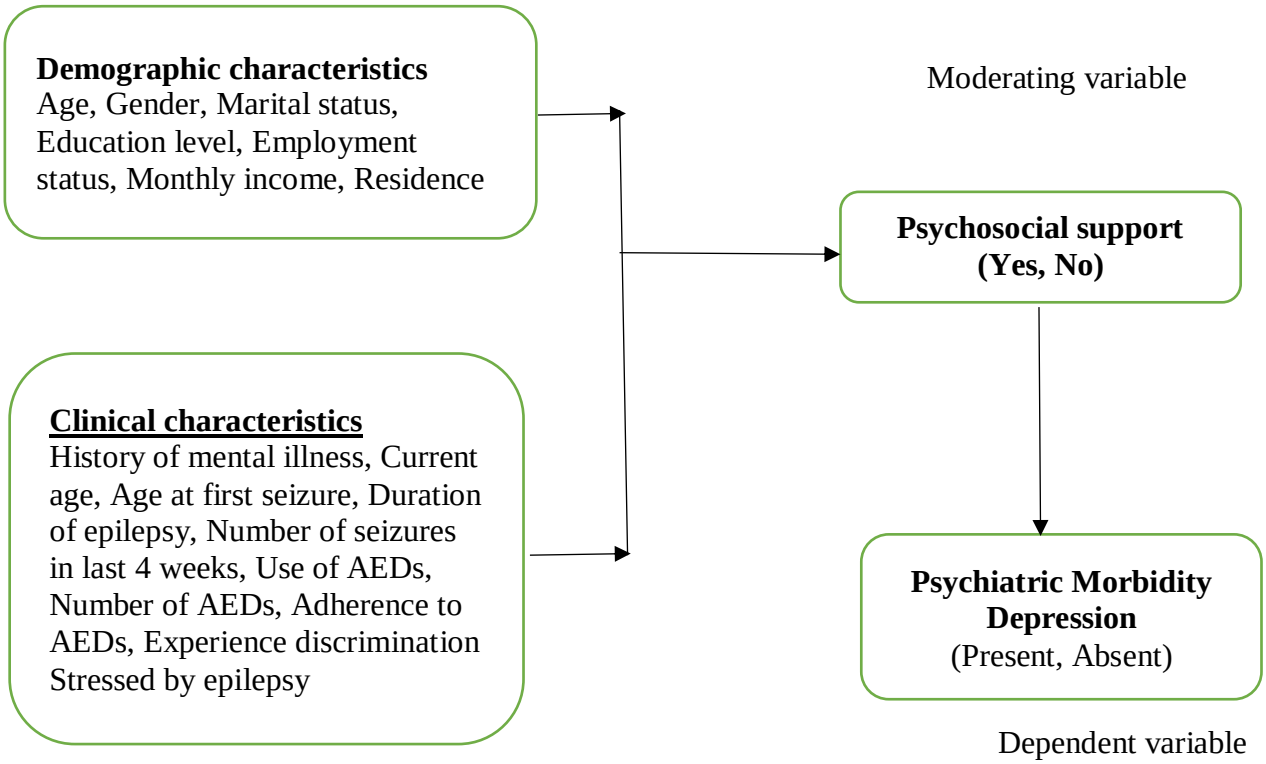
Chaka et al. (2018) investigated the determinants of depression among epileptic patients, factors associated with depression were being female, being single, perceived stigma, poor adherence to medication, and current substance use (Chaka et al., 2018). Similarly, Angelo (2018) found that low level of education, seizure frequencies of more than 3 per month, age of epilepsy onset which is 11 years or below, low antiepileptic drug adherence, and lack of knowledge about epilepsy were found to be independent predictors of depression among epileptic patients(Angelo, 2018). As a result, a large proportion of epileptic patients suffered from depression, which could predispose them to a variety of health problems. Seizure frequencies, age at beginning of epilepsy, low antiepileptic treatment adherence, and a lack of understanding of epilepsy were all identified to be contributing factors to depression. Kiko et al. from Nairobi's Aga Khan Hospital were unable to uncover any factor of depression in this sample (Kiko et al., 2015).

2.5.Research gap

Epileptic patients are faced with myriad of challenges which negatively influence their quality of life. Depression is one of the major challenges facing epileptic patients globally. The findings from literature have showed that there is varied prevalence of depression among epileptic patients as well as associated factors. Within the local context, there is limited literature on the magnitude of depression which the current study sought to investigate. Thus, the focus on depression was mainly because from literature, it is the commonly occurring mental disorder among epileptic patients.

2.6.Conceptual Framework

Independent factors



Source (Author, 2021).

2.7.Justification of the study

Patients with epilepsy are at increased risk of depression compare to the general population. Depression is the most common comorbidity in this population and affects 11 to 62% of this population across different settings in the world, and 34.5% in East Africa (Dessie et al., 2019;

Keezer et al., 2016). Estimates from community survey of epilepsy in Kilifi County Kenya show overall prevalence of active convulsive epilepsy to be 4·5 per 1000. It has been found that in patients with refractory epilepsy presence of depression is one of the most important variables that affect their quality of life, even more than the seizure frequency and severity (Ngugi et al., 2013). The only available study done on this question in Nairobi by Kiko et al. however, the study did not provide factors associated with depression. Thus, this study intends to fill these gaps and provide scientific evidence on the prevalence and factors associated with depression among people living with epilepsy. The study was conducted at Kenyatta National Hospital which is the biggest referral hospital. The study site was selected mainly because the researcher having worked at the neurology clinic noticed many of patients showing signs of depression which warranted a broader understanding of the magnitude of the problem while also identifying the associated factors.

2.8.Significance of the study

The findings of this study will be used by the Ministry of health to provide a guide in policymaking in the management of PWE having depression. The results will enable clinicians and patients to understand factors associated with depressive disorders among PWE to suspect them, screen for them, and provide timely interventions as well as for purposes of planning and management for the hospital.

2.9.Broad Objective

To determine the prevalence of depression and associated factors among patients with epilepsy at Kenyatta National Hospital

2.10. Specific Objectives

1. To determine the prevalence of depression among patients with epilepsy at Kenyatta National Hospital.

2. To establish clinical presentation of epileptic patients with depression at Kenyatta National Hospital.

3. To investigate the factors (socio-demographic factors and clinical factors) associated with depression among patients with epilepsy at Kenyatta National Hospital.

CHAPTER THREE: METHODOLOGY

3.1. Study Design

The research adopted a cross-sectional research design. This is a quantitative research approach where the researcher collected and analyzed numerical data based on the identified objectives. The study recruited epileptic patients attending the clinic at Kenyatta National Hospital neurology clinic at one point in time where the prevalence of depression and associated factors will be determined.

3.2 Study setting

This study was done at the Kenyatta National Hospital, neurology clinic Kenyatta National hospital was selected majorly because it is the leading referral hospital in Kenya with a neurological clinic that has many patients making it easier to attain sample size within shortest time. This medical facility provides various services for patients countrywide and is located 4 kilometres from the central business district, off Ngong Road along Hospital Road, Nairobi. It occupies 45.7 hectares of land and is the biggest Kenyan referral hospital with 1400 beds. It is used as a teaching hospital for the College of Health Sciences of the University of Nairobi (UON) and the Kenya Medical Training College of Kenya. The neurology clinic was used as the study area for this research and is one of the several services offered on an outpatient basis and is part of the department of neurology. The clinic runs once a week and reviews patients with neurological or suspected neurological conditions. On average, it has an annual attendance of 3,384 patients with roughly 17% of them comprising people living with epilepsy.

3.2.Target Population

Epileptic patients attending a neurology clinic at Kenyatta National Hospital

3.3.Inclusion Criteria

- Patients with epilepsy attending Neurology Clinic Kenyatta National Hospital.
- Patients who have been diagnosed and treated for 6 months at the clinic
- Patients aged 18 years old and older

3.4.Exclusion criteria

- Patients who do not consent
- Patients who were unable to communicate because of the illness
- Patients with other neurological disorders other than epilepsy

3.5.Sample size determination

In determining the sample size, we used Fisher's formula with finite population correction.

$$n = \frac{NZ^2pq}{E^2(N-1) + Z^2pq}$$

Where n is the desired sample size,

N= population size (average number of patients with epilepsy attending the neurology clinic per month is 66. Data from (records). Therefore, N= 66 × 3 = 198)

Z= value from the standard normal table corresponding to the desired confidence level. (Z= 1.96 for 95% CI)

P= expected proportion of depression in the population (based on a previous study reference) was found to be (34.5%)

E= desired precision (0.05)

q = 1- p

$$n = \frac{198 \times 1.96^2 \times 0.345 \times 0.655}{0.05^2(198-1) + 1.96^2 \times 0.345 \times 0.655}$$

This gives a sample of 126

The final sample size was **139** after factoring in a 10% margin for errors in data collection.

3.6.Sampling technique

The study adopted a consecutive sampling technique targeting respondents based on the inclusion criteria that has been adopted in the study. The researcher approached the patients at neurology clinic as they came for their clinic session consecutively until the sample size was attained.

3.7.Study variables

Independent variables: Epilepsy

Dependent: Depression

Mediator: Demographic, clinical characteristic and Medication adherence and side effects

3.8.Research tool

A researcher-designed questionnaire that focussed on the socio-demographic and clinical characteristic data of the patients was used. This questionnaire focussed on variables such as age, gender, history of mental illness, residence, and income among other factors.

3.8.1. The Patient Health Questionnaire version 9 (PHQ-9)

The PHQ-9 is a 9-item self-administered screening and severity assessment tool for depression using the DSM-IV guidelines for depressive disorders. Each of these nine categories is graded on a four-point Likert scale (0–3), with total scores ranging from 0 to 27 and five severity levels: minimal (0–4), mild (5–9), moderate (10–14), moderately serious (15–19), and extreme (20–27). The scores can also be presented in a binary format, with a score of 10 or higher indicating a diagnosis of major depression with an 88 percent sensitivity and specificity (Kroenke et al., 2001). This tool has also been validated in an African setting with an accuracy ranging between 86 to 91 percent (Nolan et al., 2018). The PHQ-9 was found to have high

validity and reliability in a study conducted in Western Kenya when considered as a measure of depressive disorders among PLWHIV (Monahan et al., 2009). The PHQ-9 is also available in Kiswahili.

3.9.Pre-testing

Pretesting of the tool was done at Kenyatta National Hospital neurology clinic before the commencement of the actual data collection. A 10% of the total sample population was used in pretesting. Pre-testing was done to investigate the flow of the data questions and whether they are easily understood. Corrections were done to based on the feedback from the pretest to ensure that the questions included can be used to answer the research objectives established.

3.10. Validity and reliability

Internal validity of the study was achieved by severally reviewing the information collected and recorded during the interviews and also from administered questionnaire. External validity was achieved through having no influence on the selection of study participants. In ensuring reliability of the tools, an expert psychiatrist and statistician was engaged to ensure that the questions included in the study can help achieve the intended research objectives. The research assistant was trained to ensure that they communicate the intended research goal to the participants.

3.11. Consenting process

The researcher with the help of two research assistants approached patients attending the neurologic clinic. They were engaged to establish a positive rapport and explain the purpose of the study. Consent was also sought through explaining the information needed. Only those who consent were recruited.

3.12. Data collection procedure

The process of data collection started after receiving consent from the ethics committee, hospital administration and head of unit/ department. The researcher requested a room or section of the clinic where the study was done in privacy hence ensuring the confidentiality of the participants. The researcher requested assistance from the nurse in charge to access the patient's files to help determine the patients diagnosed with treatment for epilepsy for 6 months before data collection. Once the researcher determined the foregoing inclusion criteria, she approached the respondent. The researcher introduced the study and the informed consent form to willing respondents. The respondent signed the consent form as verification of voluntary participation. The research distributed copies of the questionnaires to the patient to fill for self-administration. The data collection process took approximately 10 minutes per respondent. The data collection process took 2 months.

3.13. Quality assurance

The data collection tool was filled by a trained research assistant under the guidance and supervision of the principle investigator to obtain the demographic and clinical data. The research assistant recruited had a minimum of diploma in nursing qualification, therefore knowledgeable. Additionally, the research assistants were trained for two days to ensure that they are well conversant with the research tool and ethical research practices. The first day of training was used to familiarize with the research tool. The second day of training focussed on interacting with the respondents and tests the tool. The principle investigator (PI) led the data collection procedure and continuously monitors research assistants in ensuring that they collect quality data.To avoid duplicate findings, the questionnaires were assigned serial numbers. Following collection, the data was reviewed on a weekly basis to ensure completeness. Continuous data entry was made into a password-protected Epi data database. The Principal

Investigator recruited a qualified statistician who assessed, clean and analyze the data to achieve the intended goals.

3.14. Data entry and Storage

The filled questionnaires were locked in a safe cupboard awaiting data entry and analysis. The available data in soft copy form was stored in a password-protected laptop only accessed by the researcher or with approval from the researcher. The questionnaires were safely stored for five years; after which they will be destroyed.

3.15. Data analysis

The data cleaning and analysis was done using SPSS version 26. Descriptive statistics was used to analyse the socio-demographic and clinical characteristics of the patients and presented as frequencies and percentages for categorical data and as means with standard deviations for continuous data. Data analysis was performed objectively:

The prevalence of depression among patients with epilepsy at Kenyatta National Hospital

The prevalence of depression was calculated as a proportion of those patients with depressive symptoms among those with epilepsy and reported as percentage.

Prevalence of depression = (Number of respondents diagnosed with depression / Total sample under investigation) X 100.

Establish clinical presentation of epileptic patients with depression at Kenyatta National Hospital.

Descriptive analysis will be conducted to establish the clinical presentation of epileptic patients with depression. Frequencies (n) and percentages (%) will be calculated to investigate the commonly occurring clinical presentations.

To investigate the factors (socio-demographic factors and clinical factors) associated with depression among patients with epilepsy at Kenyatta National Hospital.

Chi-square or Fischer's test for association was used to investigate the association between categorical independent variables and presence of depression among epileptic patients. Independent sample's t-test was used to investigate whether there is difference in depression and continuous independent variables. Multi-variable analysis was conducted to identify independent factors associated with depression among epileptic patients. Adjusted odds ratio (AOR)were calculated to determine the extent of the existing association obtained. Level of significance will be 0.05.

3.16. Study Limitations

The participants may have forgotten the actual details of events, and due to the fact that cognitive decline is common occurrence in epilepsy, thus the data collection was prone to recall bias.

The authenticity of self-reported assessment tools is sometimes marred with participant maximizing or minimizing symptoms and false reports on use therefore results may not give a true presentation of the illness.

3.17. Ethical Consideration

The study sought approval from the KNH-UoN Ethics committee for reviewed ethical aspects of the study. Approval was sought from the KNH administration to ensure that there is compliance with laid-down research procedures and access to patient information within the hospital. Confidentiality, anonymity, and privacy were guaranteed throughout the study. All the Covid-19 prevention guidelines were observed.

The recruited participants in the study will be required to sign consent showing their agreement with the study protocols and processes. Strict confidentiality and anonymity shall be observed

when collecting, storing, processing data, and handling the results. Summary of study findings were presented to KNH administration.

All Covid-19 prevention measures/protocols were observed during data collection.

As for the potential risks of the study; there were no harmful physical effects on the participants because the study is non-invasive. However, in the event a participant gets distressed, the researcher is a trainee psychiatrist and can manage or refer appropriately to the Mental Health Department at the Kenyatta National Hospital.

3.18. Study Results Dissemination Plan

The findings of the study were distributed to the Department of Psychiatry at the University of Nairobi, Kenyatta National hospital administration and the results published in a peer-reviewed journal.

CHAPTER FOUR: RESULTS

4.1.Introduction

The study examined the prevalence of depression and Associated Factors among Patients with Epilepsy at Kenyatta National Hospital. One hundred and thirty nine respondents were recruited. All the questionnaires were returned for data analysis indicating 100% response rate. The study flow chart is as shown in Figure 1.

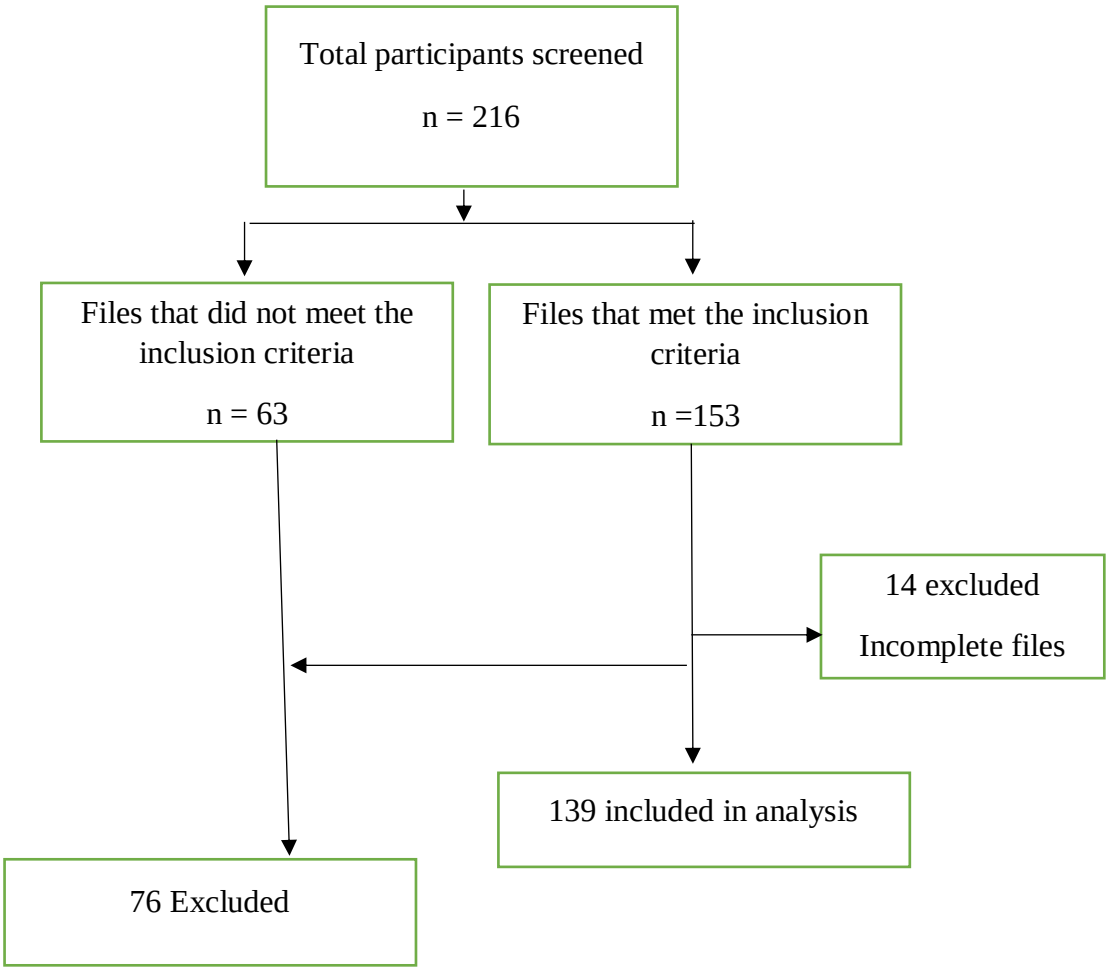


Figure 1: Study Flow Chart

4.2.Demographic characteristics of epileptic patients at Kenyatta National hospital

Less than half, 39.6%(55) of the respondents were aged less than 30 years, 51.1%(71) were male. Majority, 65.5%(91) were single. Education status revealed that 42.4%(59) had secondary level education, 53.2%(74) of the respondents were unemployed. Assessing estimated monthly income, 56.1%(78) were earning between USD 101- 200as shown in Table 1.

Table 1: Demographic Characteristics of Epileptic Patients at Kenyatta National Hospital

Demographic factors	Frequency	Percent
Age of the patient		
Less than 30 years	55	39.6
30 - 39 years	37	26.6
40 - 49 years	27	19.4
50 years or more	20	14.4
Gender		
Male	71	51.1
Female	68	48.9
Marital status		
Single	91	65.5
Married	48	34.5
Education level		
No formal education	17	12.2
Primary	35	25.2
Secondary	59	42.4
Tertiary	28	20.1
Employment status		
Employed	32	23.0
Unemployed	74	53.2
Self employed	33	23.7
Monthly estimated income (USD)		
<100	20	14.4
101- 200	78	56.1
201- 300	24	17.3
>300	17	12.2
Residence		
Urban	97	69.8
Rural	42	30.2
Religion		
Christian	139	100.0

4.2.1. Respondents rating on social support

The results showed that, 43.9% () had high family social support rating, 41% () had moderate while 15.1(21) had low family social support rating as shown in Figure2

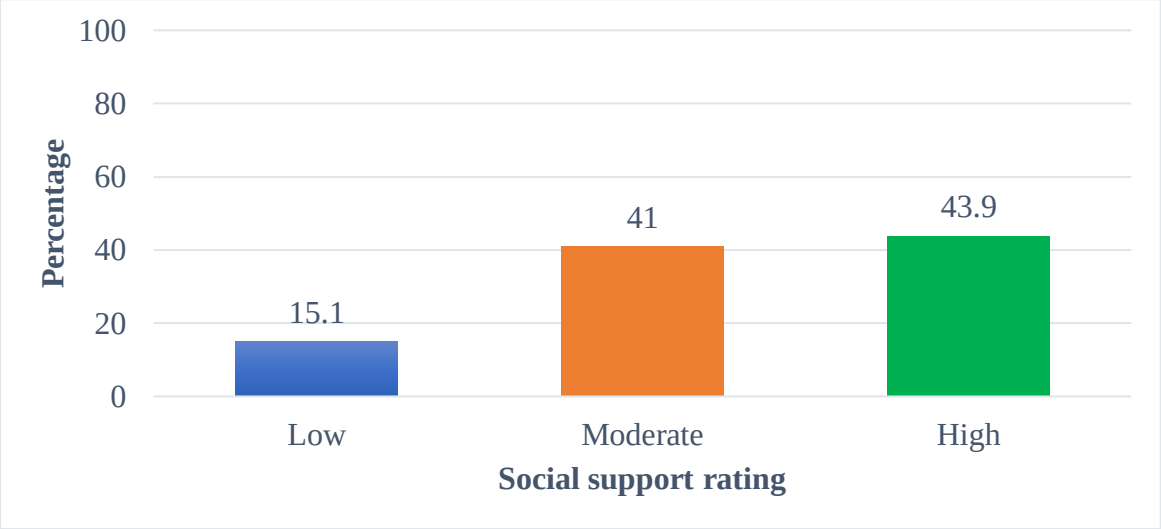


Figure 2: Respondents Rating on Social Support

4.2.2. Experiencing discrimination due epilepsy

Majority, 77.7%(108) of the respondents asserted that they were not experiencing any form of discrimination due to their medical condition as shown in Figure 3.

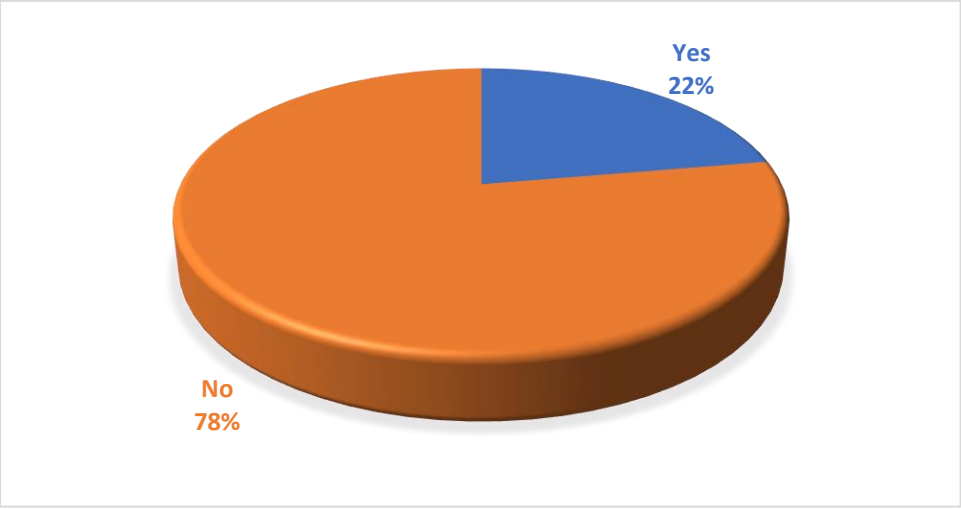


Figure 3: Experiencing Discrimination Due to Epilepsy

4.2.3. Clinical characteristics of epileptic patients at Kenyatta National Hospital

The findings revealed that, 17.3%(24) of the respondents had history of psychiatric illness in their families. The findings also showed that, 54.7%(76) had seizure onset between 1 – 19 years. In examining types of seizure, 80.6%(112) had generalized epilepsy. The average duration of seizure was 13 (SD±10) years, 94.2%(131) of the respondents had antiepileptic drugs (SD±0.8).

Table 2: Clinical Characteristics of Epileptic Patients at Kenyatta National Hospital

Clinical factors	Frequency	Percent
Family history of psychiatric illness		
Yes	24	17.3
No	115	82.7
Age at first seizure (Mean ±SD) years	21±16.4	
1 - 19 years	76	54.7
20 - 40 years	42	30.2
41 years and older	21	15.1
Type of seizure		
Generalized epilepsy	112	80.6
Focal epilepsy	16	11.5
Unspecified	11	7.9
Duration of seizure (Mean ±SD) years	13.7±10	
1 - 10 years	60	43.2
11 - 20 years	52	37.4
20 years or more	27	19.4
Number of seizures in last one month		
None	74	53.2
1 - 3 seizures	30	21.6
>3 seizures	35	25.2
Having epileptic drugs		
Yes	131	94.2
No	8	5.8
Number of drugs (Mean ±SD) drugs	2±0.8	
Medication group		
Monotherapy	71	51.1
Dual therapy	60	43.2

Types of drugs

The results indicate that 34.50% were on Carbamazepine, 31.7% were on Sodium Valproates, 2.9% Phenytoin, 3.6 levetiracetam and 2.9%phenobarbitol and 24.4 were on other medications like lamotrigen and clonazepam

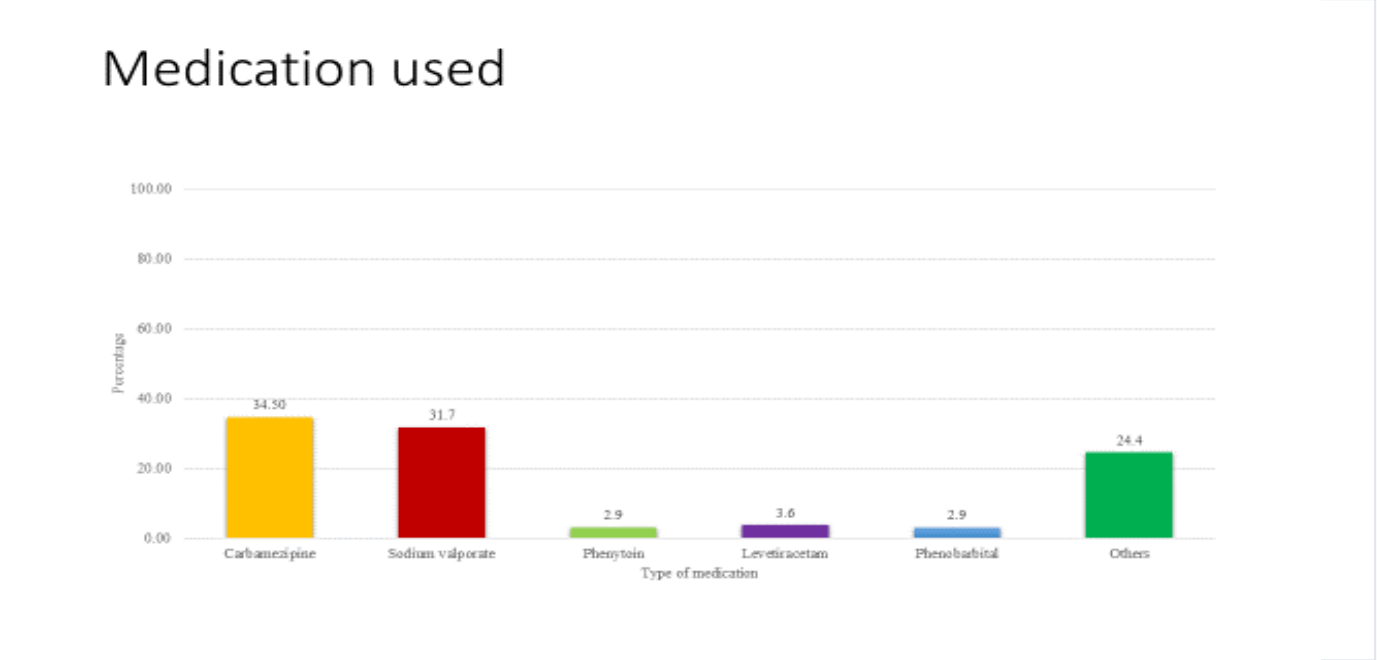


Figure 4: Medication Used

4.3.Prevalence of depression among epileptic patients at Kenyatta National hospital

PHQ-9 tool was used to assess depression where the findings revealed that, 68% (95) of epileptic patients had depression,95%CI: 60% - 75.9%.

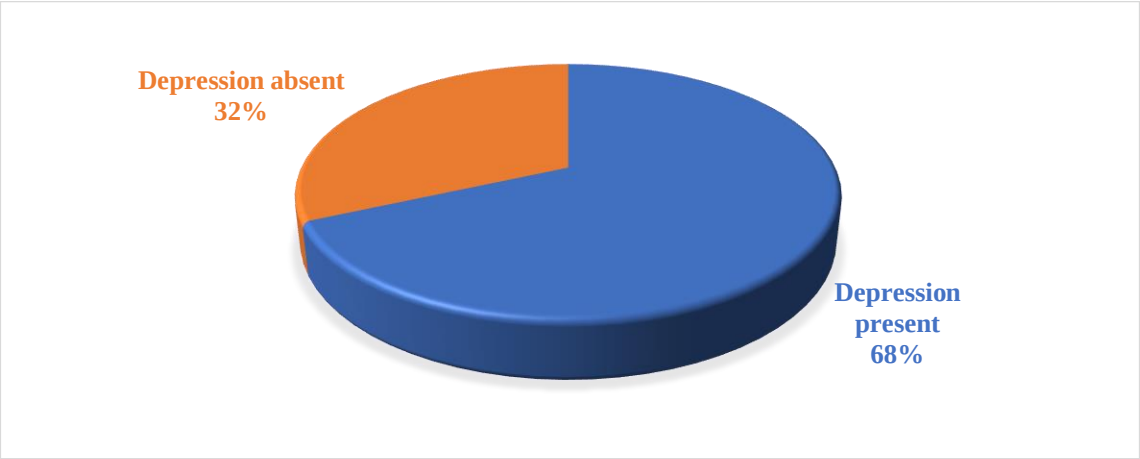


Figure 5: Prevalence of Depression

4.3.1. Severity of depression among respondents

The findings established that, 45.3%(43) had mild depression, 36.8%(35) had moderate depression, 15.8%(15) had moderately severe depression while 2.1%(2) had severe depression as shown in Figure 6.

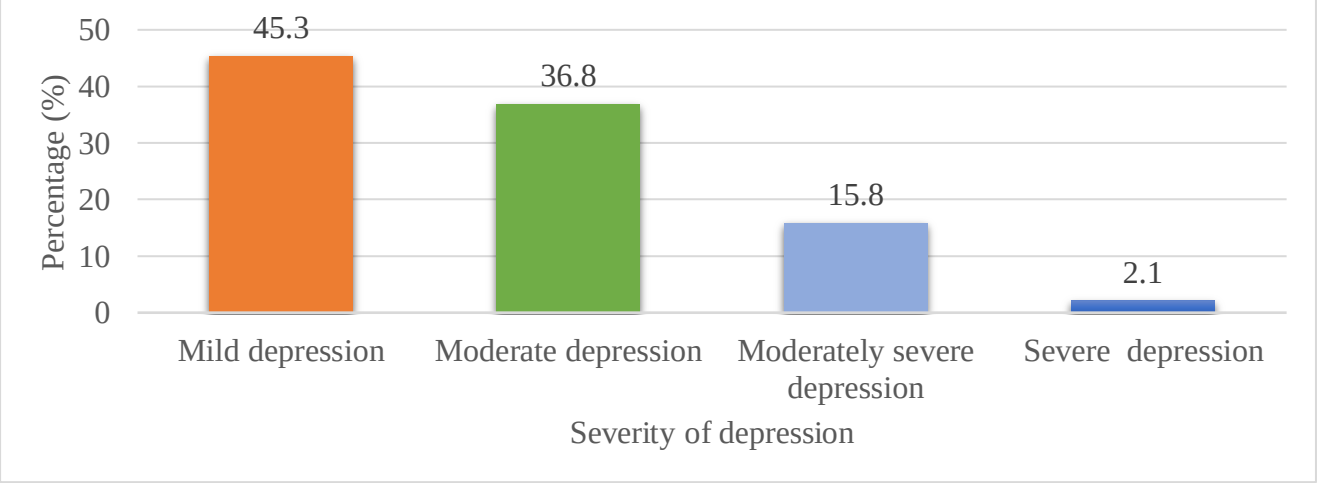


Figure 6: Severity of Depression

4.4.Clinical presentation of epileptic patients with depression at Kenyatta National Hospital

In investigating clinical presentation of epileptic patients with depression, 22.1%(21) had history of psychiatric illness in their family. Almost half, 49.5%(47) had their seizure onset between the age of 1 and 19 years with 47.4%(45) having duration of epilepsy between 1 and 10 years. The type of seizures assessed showed that generalized seizure 77.9%(74) were common types of seizures among patients, 92.6%(88) were using epileptic drugs with an average of 2(SD±0.8) different drugs. The findings also showed that, 42.1%(40) had discontinued their drugs as shown in Table 4.

Table 3: Clinical Presentation of Epileptic Patients with Depression at Kenyatta National Hospital

Clinical factors	Frequency	Percent
History of psychiatric illness		
Yes	21	22.1
No	74	77.9
Age at first seizure	22.8±17	
1 - 19 years	47	49.5
20 - 40 years	31	32.6
41 years and older	17	17.9
Duration of seizure	12±10	
1 - 10 years	45	47.4
11 - 20 years	37	38.9
20 years or more	13	13.7
Type of seizure		
Generalized epilepsy	77.9	77.9
Focal epilepsy	12.6	12.6
Unspecified	9.5	9.5
Number of seizures in last one month		
None	49	51.6
1- 3 seizures	21	22.1
>3 seizures	25	26.3
Duration of disease		
1 - 10 years	45	47.4
11 - 20 years	37	38.9
20 years or more	13	13.7
Use epileptic drugs		
Yes	88	92.6
No	7	7.4
Number of epileptic drugs	2.0±0.8	
Medication group		
Monotherapy	53	60.2
Dual therapy	35	39.8
History of AED default		
Yes	40	42.1
No	55	57.9

4.5.Factors associated with depression among epileptic patients at Kenyatta National hospital

4.5.1. Demographic factors associated with depression among epileptic patients at Kenyatta National hospital

The findings as presented in Table 5 showed that, education level $\chi^2(2) = 27.133$, $p = 0.010$, family social support rating $\chi^2(1) = 9.987$, $p = 0.002$, discrimination victim$\chi^2(1) = 8.907$, $p = 0.002$, were significantly associated with depression among epileptic patients. There was significant association between depression in epileptic patients and the level of education, having moderate social support immediate family members.

Table 4: Demographic Factors Associated with Depression among Epileptic Patients

	Depression				
Demographic factors	**Present n(%)**	**Absent n(%)**	**df**	**χ^2**	**P-value**
Age					
Less than 30 years	35(63.6)	20(36.4)			
30 - 39 years	31(83.8)	6(16.2)	3	6.322	0.097
40 - 49 years	18(66.7)	9(33.3)			
50 years or more	11(55.0)	9(45.0)			
Gender					
Male	48(67.6)	23(32.4)	1	0.037	0.858
Female	47(69.1)	21(30.9)			
Marital status					
Single	62(68.1)	29(31.9)	1	0.06	0.549
Married	33(68.8)	15(31.3)			
Education level					
No formal education	14(82.4)	3(17.6)			
Primary	32(91.4)	3(8.6)			
Secondary	40(67.8)	19(32.2)	2	27.133	**0.010**
Tertiary	9(32.1)	19(67.9)			
Employment status					
Employed	22(68.8	10(31.3)			
Unemployed	51(68.9)	23(31.1)	2	0.057	0.972
Self employed	22(66.7)	11(33.3)			
Monthly income estimate(USD)					
<100	14(70)	6(30)			
101-200	55(70.5)	23(29.5)	3	0.938	0.816
201-300	16(66.7)	8(33.3)			
>300	10(58.8)	7(41.2)			
Residence					
Urban	67(69.1)	30(30.9)	1	0.078	0.843
Rural	28(66.7)	14(33.3)			
Social support rating					
Low	19(90.5)	2(9.5)			
Moderate	42(73.7)	15(26.3)	2	9.987	**0.002**
High	34(55.7)	27(44.3)			
Discrimination					
Yes	28(90.3)	3(9.7)	1	8.907	**0.002**
No	67(62.0)	41(38.0)			

4.5.2. Clinical factors associated with depression among epileptic patients at Kenyatta National hospital

Clinical factors associated with depression among epileptic patients was investigated as shown in Table 6. Family history of psychiatric illness $\chi^2(1) = 4.92$, p =0.020, duration of seizure t(137) =- -2.405, p =0.018, number of epileptic drugs t(137) =- -2.483, p =0.005 and history of drug default $\chi^2(1) = 7.613$, p =0.007 were significantly associated with depression among epileptic patients. We found having family history psychiatric illness, the duration of epilepsy, being on 2 or more anticonvulsants and having a history of defaulting on anticonvulsants were some of the clinical factors that were significantly associated with depression among epileptic patients.

Table 5: Clinical Factors associated with Depression among Epileptic Patients at Kenyatta National Hospital

Clinical factors	Depression				
	Present n (%)	**Absent n(%)**	**df**	**χ^2or t**	**P-value**
History of psychiatric illness					
Yes	21(87.5)	3(12.5)	1	4.92	**0.020**
No	74(64.3)	41(35.7)			
Age at first seizure (Mean) years	23	20	137	1.031	0.304*
Type of seizure					
Generalized seizure	74(66.1)	38(33.9)	3	1.518	0.678
Focal epilepsy	12(75.0)	4(25.0)			
Unspecified	9(81.8)	2(18.2)			
Duration of epilepsy (Mean) years	12	17	137	-2.405	**0.018***
Use epileptic drugs					
Yes	88(67.2)	43(32.8)	1	1.441	0.216
No	7(87.5)	1(12.5)			
Medication Group					
Monotherapy	53(74.6)	18(25.4)	1	3.925	0.062
Dual therapy	35(58.3)	25(41.7)			
Number of drugs (Mean)	2	1	137	-2.83	**0.005***
History of AED default					
Yes	40(83.3)	8(6.7)	1	7.613	**0.007**
No	55(60.4)	36(39.6)			

**independent t-test*

4.6.Bivariable and Multivariable analysis of factors associated with depression among epileptic patients at Kenyatta National hospital

Bivariable analysis revealed that having no formal education (OR =9.85, 95%CI: 2.25 – 43.18, p =0.002), discrimination victim (OR =5.71, 95%CI: 1.63 – 19.98, p =0.002) having self-perceived stress (OR =2.51, 95%CI: 1.2 – 5.26, p =0.018), family history of psychiatric illness (OR =3.88, 95%CI: 1.09– 13.79, p =0.02) longer duration of seizure (OR =1.04, 95%CI: 1.0– 1.08, p =0.018), more different types of drugs (OR =2.0, 95%CI: 1.2– 3.26, p =0.007) and history of antiepileptic defaults (OR =3.27, 95%CI: 1.51– 7.79, p =0.004) were associated with increased risk of depression among epileptic patients. Having low (OR =0.13, 95%CI: 0.03 – 0.62, p =0.010) or high family social support (OR =0.45, 95%CI: 0.21– 0.98, p =0.044) was associated with decreased chance of developing depression among epileptic patients.

Multivariable analysis established that patients with no formal education were 17 times more likely to have depression compared to those with tertiary level education, AOR =16.83, 95%CI: 2.57 – 110.08, <0.001, Those who had been discriminated because of their epilepsy were 6.6 times more likely to be depressed compared to those who were not discriminated, AOR =6.61, 95%CI: 1.29 – 33.74, p =0.023. p =0.006. an increase in one year of the duration of seizure was associated with 7% increased likelihood of having depression, AOR =1.07, 95%CI:1.02 – 1.13, p =0.006. Patients with epilepsy who had history of AED default use of AEDs were 4.7 times more likely to have depression compared to those who have not have history of AEDs default use of AEDs.

Table 6: Bivariable and Multivariable Analysis of Factors Associated with Depression among Epileptic Patients at Kenyatta National Hospital

	Bivariate analysis		**Multivariate analysis**	
Factors	**OR (95%CI)**	**P-value**	**AOR (95%CI)**	**P-value**
Education				
No education	9.85(2.25 - 43.18)	**0.002**	16.83(2.57 - 110.08)	**<0.001**
Primary level	0.44(0..07 - 2.44)	0.346	0.67(0.09 - 5.21)	0.698
Secondary level	2.22(0.57 - 8.65)	0.252	2.72(0.51 - 14.56)	0.241
Tertiary level	Ref		Ref	
Social support rating				
Low	Ref		Ref	
Moderate	0.13(0.03 - 0.62)	0.010	0.25(0.04 - 1.39)	0.113
High	0.45(0.21 - 0.98)	0.044	0.53(0.18 - 1.55)	0.248
Discrimination				
Yes	5.71(1.63 - 19.98)	0.002	6.61(1.29 - 33.74)	**0.023**
No	Ref			
Family History of psychiatric illness				
Yes	3.88(1.09 - 13.79)	0.02	5.56(0.93 - 33.33)	0.061
No	Ref		Ref	
Duration of seizure	1.04(1.0 - 1.08)	0.018	1.07(1.02 - 1.13)	**0.006**
Number of AEDs	2.0(1.2 - 3.26)	0.007	1.42(0.74 - 2.77)	0.293
History of AED default				
Yes	3.27(1.51 - 7.79)	0.004	4.67(1.4-15.65)	**0.012**
No	Ref		Ref	

CHAPTER FIVE: DISCUSSION

5.1.Demographic characteristics of study participants

The study investigated the prevalence of depression and associated factors among patients with epilepsy at a national referral hospital in Kenya. The findings revealed that the average of participants was 35 years, 39.6% of the patients were aged less than 30 years while 26.6% were aged between 30 and 39 years. These findings are comparable to a study in Taiwan which revealed that majority of the respondents, 83.6% of the patients with epilepsy were aged below 39 years (Chen et al., 2005). Further a multicentre cross-sectional study conducted in Spain found that the average age of 36 years. The prevalence of epilepsy increases with increasing age with peak age between 20 – 29 years (Salas-Puig et al., 2021). The present study also identified that more than half, 51.5% were male. These findings align with Chen et al. (2005) in a study conducted in Taiwan which found that 54% of the patients with epilepsy were male. However, our findings contrast those from a study conducted in Germany which found that 58% were female(Willems et al., 2022) which found that more than half of the respondents 58% and 51% were female respectively. The occurrence of epilepsy has been relatively comparable. The difference in incidence of epilepsy between male and females is usually attributed to male's greater exposure to risk factors for lesional epilepsy and acute symptomatic seizures. However, idiopathic generalized epilepsies (IGEs), which may represent some 15-20% of all epilepsies, are more common among females. Also, the behaviour of some common epilepsy syndromes such as mesial temporal sclerosis may differ between genders with isolated auras more common among females and secondary seizure spread more likely in males (McHugh & Delanty, 2008). Our current study also found that 65.5% of the epileptic patients were single. These findings compare with those from (Mahrer-Imhof et al., 2013) in a study done in Switzerland which found that, 63% of patients with epilepsy were single while 5% were either separated or divorced. Epilepsy has been a major hindrance to successful marriages

due to underlying associated healthcare risks. Studies have showed that epilepsy has been a major factor for individuals staying single or divorce. According to a study conducted in Japan including adults with epilepsy found that seven of the 29 patients who had been divorced had epilepsy as the cause. Only one of the seven patients had informed his or her spouse about the disease prior to marriage. Seizures were observed after marriage or the condition was discovered through treatment in the remaining six patients, resulting in divorces (Wada et al., 2004).

5.2.Prevalence of depression

Our current study revealed that the prevalence of depression among epileptic patients was 68%. These findings are in line with previous studies which have reported high prevalence of depression in 63% of epileptic patients in tertiary hospitals (Sheer, 2012). Another study in Nigeria found that, 85% of epileptic patients had depression (Onwuekwe et al., 2012). However our findings in current study showed relatively higher prevalence of depression in PWE compared to majority of past studies (Alsaadi et al., 2015)(Dessie et al., 2019)(Engidaw et al., 2017)(Kiko, Kitazi, Yonga, & Jowi, 2015). Alsaadi et al. (2015) in a study conducted in United Arab Emirates revealed that 25% of PWE had depression. The difference observed in this context may be attributed to the study settings and available quality of care. Our present study was conducted in Kenya which has a relatively low-level health system when compared to United Arab Emirates. Dessie et al. (2019) in a systematic review in Africa revealed that prevalence of depression in people with epilepsy was 32% and slightly higher in East Africa region. Kiko et al. (2015) in a study done in Kenya at Aga Khan Hospital found the prevalence of depression in PWE as 16.5%. The difference could be attributed to the instruments used in measurement of depression among epileptic patients. In our study, PHQ-9 was administered to measure depression while in their study, Beck-Depression Inventory was utilized. This could explain the difference identified. Further, the difference could be due to the fact that Kenyatta

National hospital is the leading national referral hospital hence receives referral patients and those who seek specialized care hence likely to have a higher prevalence of depression among epileptic patients. Further, the discrepancy might be due to using different diagnostic criteria in detecting depression, different in sample size and choosing epileptic patients with different seizure types, variable frequency, and severity.

Epilepsy is a neurological condition that affects a substantial number of people and is characterized by repeated and unexpected seizure activity. It is also connected with major psychological and social repercussions. It is estimated that around 46 million individuals around the world are afflicted with this public health problem, making it a worldwide issue that has to be addressed. Epilepsy only accounts for one percent of the overall global burden of disease, but it makes up eighty percent of the burden in poor nations. The combined prevalence of depression among epilepsy patients was found to be 32.71 percent in a systematic study that was carried out in Sub-Saharan Africa; however, the regional sub-group research showed that the combined prevalence in East Africa was 34.52 percent and 29.69 percent, respectively, in Southern Africa; this information was also gleaned from the study.

In terms of its prevalence in Ethiopia, the numbers at Benchimaji, Mettu, and Jimma Hospitals were as follows: 51,2 percent, 48.1 percent, and 49.3 percent, respectively. In a manner analogous, the intuition-based analysis performed at Amanuel Specialized Hospital utilizing PHQ-9 was 43.8 percent, while the HADS instruments yielded results of 43.8 percent and 32.8 percent. In addition, the percentage of epileptic patients who were depressed was found to be 45.2% in a study that was carried out in the preceding six years at the University of Gondar Comprehensive Specialized Hospital.

Patients diagnosed with epilepsy may struggle with a number of co-morbid conditions, one of the most common of which is depression. It is marked by symptoms such as changes in food,

disturbed sleep habits, increased or decreased level of activity, poor attention and concentration, and significantly reduced emotions of self-worth, as well as extreme forms, such as a desire to end one's life or attempts at suicide. Epilepsy and depression are hypothesized to interact in both directions, making the relationship a bicuspid one. However, a diagnosis of epilepsy does not automatically result in a state of depression. It is possible that the seizure will start at this point.

More than 80 percent of people who are pregnant and have an untreated psychiatric condition live in low-income regions, which is where psychiatric comorbidity is frequently misdiagnosed and untreated. Among the 50 million PWE around the world, 9.5% to 85% are also likely to suffer from depressive disorders. Depending on the environment, some studies find a low prevalence of depression among epilepsy patients while others report a high prevalence of depression in this population. This is a significantly higher rate than that seen in patients with other chronic conditions, which is the primary reason for psychiatric hospitalization and the use of psychotropic drugs.

5.3.Characteristics of patients with depression among epileptic patients

Our findings revealed that 22% of the patients with depression had family history of psychiatric illness. These findings were higher compared to a study conducted in Ethiopia which revealed that 7% of patients with depression had family history of psychiatry illness (Engidaw et al., 2020). Similarly, another study in Ethiopia also found that family history among patients with depression was lower at 3.4% (Salas-Puig et al., 2021). The average age at first seizure in our present study was 22.8 years with duration of seizures being 12 years.

The results from current study also showed that, the type of seizures assessed showed that 77.9% had generalized seizure. These findings are comparable to a study done in United Kingdom which found that majority of patients with generalized seizure were at increased risk

of mental illness among epileptic patients (Fiest et al., 2016). Similarly, another study investigating new perspectives in epilepsy and depression found that generalized tonic-clonic seizures were the most common types of epilepsy occurring in patients with depression. Majority of patients with depression, 92.6% in our current study were on epileptic drugs with 40% who had history of AEDs default. Use of anti-epileptic drugs has been associated with improved quality of life among epileptic patients although discontinuation of epileptic drugs increases the risk of complications such as mental health issues.

5.4.Factors associated with depression in epileptic patients

Current findings have showed that, level education was associated with depression among epileptic patients. The findings revealed that patients with no formal education were 17 times more likely to have depression compared to those with tertiary level education. This is comparable to Chaka et al. (2018) who identified that low level of education was a significant predictor of increased depression among epileptic patients. Another study done at Aga Khan hospital in Kenya also established that, low level of education or no education was associated with increased risk of depression (Kiko et al., 2015). This is mainly due to the fact that having higher level of education is associated with increased knowledge level to make informed decisions regarding care and management of epilepsy. Our current findings also established that those who had been discriminated because of their epilepsy were 6.6 times more likely to be depressed compared to those who were not discriminated. Discrimination has been largely associated with increased mental health issue among patients who are isolated. These findings align with those from (Mula & Kaufman, 2020) who found that discrimination is a major predictor of depression in epileptic patients. Discrimination and stigma have negative effect on the commitment to improve efficiency and quality of care which are detrimental to the wellbeing of epileptic patients. Stigma leads to discrimination and abuses of civil and human rights, as well as limited access to healthcare and non-adherence or reduced adherence to

treatment, all of which increase morbidity and mortality. Despite ongoing attempts to reduce stigma associated with these disorders, little is known about the occurrence of double stigma, or the consequence of having two stigmatized conditions at the same time.

longer duration of seizure was associated with increased risk of depression. History of anti-epileptic drug default was significantly with higher risk of depression. History of antiepileptic drug defaults increased risk of complications such as depression among epileptic patients. Discontinuation of drugs is based on varied reasons. Up to 88% of patients experience adverse effects from antiepileptic drugs. These include dizziness, sedation, cognitive and neuropsychiatric symptoms, which can negatively affect quality of life. There are also concerns regarding bone health and an increased risk of fractures as a long-term complication with some antiepileptic drugs (Laue-Gizzi, 2021).

5.5.Strengths of the study

The current study strengthens the imperative to screen for depression in epilepsy patients.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1.Conclusion

The present study has showed that there is high prevalence of depression among epileptic patients, 68%. 45.3% had mild depression, 36.8% had moderate depression, 15.8% had moderately severe depression while 2.1% had severe depression. Clinical presentation of epileptic patients with depression identified that, 22.1% had history of psychiatric illness in their family. The average age at first seizure was 22.8 years with average duration of seizures 12 years. Generalized seizure was the common types of seizure, 92.6% were using epileptic drugs with an average of 2 different drugs. The findings also showed that, 42.1%(40) had history of AEDs default. No formal education, those who had been discriminated because of their epilepsy, longer duration of seizure, patients who discontinued use of AEDs were independently associated with depression among epileptic patients.

6.2. Recommendations

- To integrate depression screening tool in neurologic clinic for early diagnosis of depression among epileptic patients.
- To encourage social support from family members and caregivers to promote their psychological wellbeing.
- Health care providers to provide health education to all epileptic patients to held understand the importance of adherence to medication and its influence on quality of life.
- Develop health education programs for patients and their family about the disease and risk factors for developing depression among adult patients with epilepsy through lectures and educational materials.

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APPENDICES

Appendix I: Consent Form

Introduction

I am Dr. Hodan Cawil Jamac currently a medical resident at the Department of Psychiatry, Uuniversity of Nairobi is conducting a study on depression among patients with epilepsy and would like to request for your participation

Study purpose

The main objective of this study is to determine the prevalence and factors associated with depressive disorders among epileptic patients at the neurologic clinic of Kenyatta National Hospital.

Study procedure

Your participation in this survey is entirely voluntary and if you decide to participate, you are free to withdraw at any time without repercussions with regards to your professional standing at the facility. There will be no compensation provided for participating in the study. The respondents who meet the inclusion criteria will be engaged and requested to participate in the study by one of the two research assistants who will be assisting in data collection.

Potential benefits

By participating in the study, you will help in generating information on the development of depression among epileptic patients. The findings of this study will be used to determine the prevalence of depression among epileptic patients. Information from this study may also be used by the Ministry of health to provide a guide in policymaking in the management of epileptic patients with comorbid depression. The results will also enable clinicians and patients to understand factors associated with depression among epileptic patients to suspect them, screen for them, and provide timely interventions.

Risks, stress, and discomfort: There are no direct foreseen risks in you participating in this study. However, the study will require you to spare at most 10 minutes of your time and fill the questionnaire. If there are any questions you do not want to answer, you are obliged to skip. In addition, you have the right to decline giving information.

Cost and risk of loss of Confidentiality: There will be no direct cost incurred by you neither will you receive any money for participating in this study. Data including questionnaires and files from the study will be kept locked in a cabinet during the study period. Your data will be labeled with your unique identity and your name concealed to maintain confidentiality when taking part in the study. Furthermore, your name will not appear in any report or publication of the research and all your personal information will be handled with a high level of confidentiality.

Voluntary Participation and withdrawal: Remember, your participation is entirely voluntary. Should you consider changing your mind midway, you have the right to do so and you shall not suffer any consequence whatsoever.

Sharing of results: The results of this study may be presented during scientific and academic forums and may be published in scientific medical journals and academic papers.

Participants consent

I confirm that the researcher has explained fully the nature of the study and the extent of activities that I will be asked to undertake. I confirm that I have had adequate opportunity to evaluate and ask questions about this study. I understand that my participation is voluntary and that I may withdraw at any time during the study, without having to give a reason. I agree to take part in this study by filling in the questionnaire.

Signed by participant…… Date……..

In case of any issues or challenges related to this study, please contact me Principal investigator: Dr. Hodan Cawil Jamac 254742 572 775 or Supervisors, Dr. Pius Kigamwa at pkigamwa@africaonline.co.ke and Dr. Roseline Okoth at Roselyneogalla@yahoo.com or KNH/UON ERC Secretariat on Tel.2726300 ext 44102, uonknherc@uonbi.ac.ke

Thank you for sparing your precious time dedicated to participating in this study exercise.

Researcher's statement

Interviewer: I certify that the purpose, potential benefits and possible risks associated with participating in this research have been explained to the above participant and the individual has consented to participate.

Signature_____ Date_____

Appendix II: Study Questionnaire
PREVALENCE OF DEPRESSION AND ASSOCIATED FACTORS AMONG PATIENTS WITH EPILEPSY AT KENYATTA NATIONAL HOSPITAL

Respondent code……. Date……

Instructions: ***Please Tick one answer***

Section A: Socio-demographic characteristics

1. Age……(years)
2. Gender?

   Male [ ] Female [ ]
3. What is your marital status?

   Single [ ] Married [ ] Separated/widowed [ ] Divorced [ ]
4. Level of education

   No formal education [ ] Primary [ ] Secondary [ ] Tertiary [ ]
5. Employment status

   Government [ ] Private [ ] Self-employed [ ] Unemployed [ ]
6. Estimated monthly income (Ksh)……
7. Residence

   Rural [ ] Urban [ ]
8. Religion

   Islam [ ] Christianity[ ]

   Others (specify)…….
9. How did you rate your social support (immediate family—parent, sibling, child)?

   (a) Low, (b) Moderate, (c) High
10. Are you experiencing any discrimination due to your diagnostic of epilepsy?

    Yes [ ] No [ ]
11. Would you consider yourself stressed by epilepsy?

    Yes [ ] No [ ]

Section B: Clinical characteristics

1. Has any member of your family (immediate family- parents, siblings, child) ever been diagnosed with a psychiatric illness?
   Yes [ ] No [ ]
2. What type of seizure Doctor said you have? ……
   …….
3. Age at seizure onset (years)……..
4. At which age did the first seizure episode occur? (years)……
5. How long you have been living with a seizure?
6. How many seizures have you had in the last month?
7. Do you use anti-epileptic drugs?
   Yes [ ] No [ ]
8. How many different anti-epileptic drugs have you been taking in the last two weeks?
9. What type of anti-epileptic drug you are on?.....
10. Have you ever discontinued your antiepileptic medication?
    Yes [ ] No [ ]
11. Have you ever been hospitalized because of a seizure?

SECTION D: PATIENT HEALTH QUESTIONNAIRE -9

Over the past 2 weeks, how often have you been bothered by any of the following problems?	**Not At**	**Sever Days**	**More Than the Days**	**Near Eve Da**
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed or hopeless	0	1	2	3
3. Trouble falling asleep, staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself - or that you're a failure or have let yourself or your family	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or, the opposite - being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

Column Totals

_____ +

_____ +

_____

Add Totals Together

10. If you checked off any problems, how difficult have those problems made it for you to Do your work, take care of things at home, or get along with other people?

Not difficult at all ☐ Somewhat difficult ☐ Very difficult ☐ Extremely difficult

Kiambatisho III: Fomu ya Idhini

Utangulizi

Mimi ni Dr. Hodan Cawil Jamac kwa sasa ni mkazi wa matibabu katika Idara ya Psychiatry, Chuo kikuu cha Nairobi inafanya utafiti juu ya unyogovu kati ya wagonjwa wenye kifafa na ningependa kuomba ushiriki wako.

Madhumuni ya kujifunza

Lengo kuu la utafiti huu ni kuamua maambukizi na sababu zinazohusiana na matatizo ya unyogovu kati ya wagonjwa wa kifafa katika kliniki ya neurologic ya Hospitali ya Kitaifa ya Kenyatta.

Utaratibu wa masomo

Ushiriki wako katika utafiti huu ni wa hiari kabisa na ikiwa unaamua kushiriki, wewe ni huru kujiondoa wakati wowote bila athari kuhusiana na msimamo wako wa kitaaluma katika kituo. Hakutakuwa na fidia iliyotolewa kwa ajili ya kushiriki katika utafiti. Washiriki ambao wanafikia vigezo vya kuingizwa watahusika na kuombwa kushiriki katika utafiti na mmoja wa wasaidizi wawili wa utafiti ambao watasaidia katika ukusanyaji wa data.

Faida zinazoweza kutokea

Kwa kushiriki katika utafiti, utasaidia katika kuzalisha habari juu ya maendeleo ya unyogovu kati ya wagonjwa wa kifafa. Matokeo ya utafiti huu yatatumiwa kuamua kuenea kwa unyogovu kati ya wagonjwa wa kifafa. Taarifa kutoka kwa utafiti huu inaweza pia kutumiwa na Wizara ya Afya kutoa mwongozo katika sera katika usimamizi wa wagonjwa wa kifafa na unyogovu wa comorbid. Matokeo pia yatawawezesha waganga na wagonjwa kuelewa mambo yanayohusiana na unyogovu kati ya wagonjwa wa kifafa kuwashuku, kuwapima, na kutoa hatua za wakati.

Hatari, mafadhaiko, na usumbufu:

Hakuna hatari za moja kwa moja zilizotabiriwa kwako kushiriki katika utafiti huu. Hata hivyo, utafiti unahitaji wewe vipuri katika zaidi ya dakika 10 ya muda wako na kujaza dodoso. Ikiwa kuna maswali yoyote ambayo hutaki kujibu, unalazimika kuruka. Kwa kuongeza, una haki ya kukataa kutoa habari.

Gharama na hatari ya kupoteza usiri:

Hakutakuwa na gharama ya moja kwa moja itakayopatikana na wewe wala hautapokea pesa yoyote ya kushiriki katika utafiti huu. Data ikiwa ni pamoja na maswali na faili kutoka kwa utafiti zitawekwa katika baraza la mawaziri wakati wa kipindi cha utafiti. Data yako itaandikwa na utambulisho wako wa kipekee na jina lako limefichwa ili kudumisha usiri wakati wa

kushiriki katika utafiti. Zaidi ya hayo, jina lako halitaonekana katika ripoti yoyote au uchapishaji wa utafiti na maelezo yako yote ya kibinafsi yatashughulikiwa kwa kiwango cha juu cha usiri.

Ushiriki wa hiari na uondoaji:

Kumbuka, ushiriki wako ni wa hiari kabisa. Ikiwa unafikiria kubadilisha mawazo yako katikati, una haki ya kufanya hivyo na hautapata matokeo yoyote.

Kushiriki matokeo:

Matokeo ya utafiti huu yanaweza kuwasilishwa wakati wa vikao vya kisayansi na kitaaluma na inaweza kuchapishwa katika majarida ya matibabu ya kisayansi na karatasi za kitaaluma.

Washiriki wakubali

Ninathibitisha kwamba mtafiti ameeleza kikamilifu asili ya utafiti na kiwango cha shughuli ambazo nitaulizwa kufanya. Ninathibitisha kwamba nimepata fursa ya kutosha ya kutathmini na kuuliza maswali kuhusu utafiti huu. Ninaelewa kwamba ushiriki wangu ni wa hiari na kwamba ninaweza kujiondoa wakati wowote wakati wa utafiti, bila kutoa sababu. Ninakubali kushiriki katika utafiti huu kwa kujaza dodoso.

Imesainiwa na mshiriki..... Tarehe.....

Ikiwa kuna masuala yoyote au changamoto zinazohusiana na utafiti huu, tafadhali wasiliana nami mchunguzi Mkuu: Dr. Hodan Cawil Jamac 254742 572 775 au Wasimamizi, Dk. Pius Kigamwa katika pkigamwa@africaonline.co.ke na Dk Roseline Okoth katika sekretarieti ya Roselyneogalla@yahoo.com au KNH/UON ERC kwenye Tel.2726300 ext 44102, uonknherc@uonbi.ac.ke Asante kwa kutoa muda wako wa thamani kujitolea kushiriki katika zoezi hili la kujifunza.

Taarifa ya Mtafiti Mahojiano:

Ninathibitisha kuwa kusudi, faida zinazowezekana na hatari zinazowezekana zinazohusiana na kushiriki katika utafiti huu zimeelezewa kwa mshiriki hapo juu na mtu binafsi amekubali kushiriki.

Signature_____ Date_____

Kiambatisho cha IV: Dodoso la Utafiti

KUENEA KWA UNYOGOVU NA SABABU ZINAZOHUSIANA MIONGONI MWA WAGONJWA WENYE KIFAFA KATIKA HOSPITALI YA KITAIFA YA KENYATTA

Msimbo wa kijibu.....

Tarehe.....

Maagizo: Tafadhali Tick jibu moja

Sehemu A: Tabia za kijamii na idadi ya watu

1. Umri..... (miaka)
2. Jinsia? Mwanaume [] Mwanamke [ ]
3. Hali yako ya ndoa ni nini? Upekee [ ] Ndoa [ ] Kutengwa /widowed [ ] Talaka [ ]
4. Kiwango cha elimu Hakuna elimu rasmi [ ] Msingi [ ] Sekondari [ ] Tertiary [ ]
5. Hali ya ajira Serikali [ ] Binafsi [ ] Kujiajiri [ ] Wasio na ajira [ ]
6. Makadirio ya mapato ya kila mwezi (Ksh).....
7. Makazi Vijijini [ ] Mjini [ ]]
8. Dini Uislamu [ ] Ukristo[ ] Wengine (bainisha).....
9. Ulipimaje msaada wako wa kijamii (familia ya karibu-mzazi, ndugu, mtoto)?

Chini, (b) Wastani, (c) Juu

10. Je, unakabiliwa na ubaguzi wowote kwa sababu ya utambuzi wako wa kifafa?

Ndiyo [ ] Hapana [ ]

11. Je, utajiona kuwa umefadhaika na kifafa?

Ndiyo [ ] Hapana [ ]

Sehemu B: Sifa za kliniki

12. Je, mwanachama yeyote wa familia yako (wazazi wa karibu wa familia, ndugu, mtoto) amewahi kukutwa na ugonjwa wa akili? Ndiyo [ ] Hapana [ ]
13. Ni aina gani ya kifafa daktari alisema una?

    .....

14. Umri katika mwanzo wa mshtuko (miaka)....

15. Ni wakati gani tukio la kwanza la kifafa lilitokea? (miaka).....

16. Umekuwa ukiishi kwa muda gani?

17. Ni kiasi gani cha fedha ulichokuwa nacho katika mwezi uliopita?

18. Unatumia dawa za kuzuia kifafa? Ndiyo [ ] Hapana [ ]

19. Ni dawa ngapi tofauti za kupambana na kifafa ambazo umekuwa ukichukua katika wiki mbili zilizopita?

20. Ni aina gani ya dawa ya kupambana na kifafa uliyowasha?.....

21. Umewahi kuacha dawa yako ya antiepileptic? Ndiyo [ ] Hapana [ ]

22. Umewahi kulazwa hospitali kwa sababu ya kifafa?

PHQ-9 Swahili Version

KIDODOSI JUU YA AFYA YA MGONJWA -9 (PHQ-9)

Katika kipindi cha wiki mbili zilizopita ni mara ngapi umesumbuliwa na matatizo haya yafuatayo? *(Tumia "✔" ili kuashiria jibu lako)*	**Haijatoke zea kabisa**	**Siku kadhaa**	**Zaidi ya nusu ya siku hizo**	**Takriban kila siku**
1. Kutokuwa na hamu au raha ya kufanya kitu	0	1	2	3
2. Kujisikia tabu sana au kukata tamaa	0	1	2	3
3. Matatizo ya kupata usingizi au kuweza kulala au kulala sana	0	1	2	3
4. Kujisikia kuchoka au kutokuwa na nguvu	0	1	2	3
5. Kutokuwa na hamu ya kula au kula sana	0	1	2	3
6. Kujisikia vibaya-au kujiona kuwa umeshindwa kabisa au umejiangusha au kuikatisha tama familia yako	0	1	2	3
7. Matatizo ya kuwa makini kwa mfano unaposoma gazeti au kuangalia TV	0	1	2	3
8. Kutembea au kuongea taratibu sana mpaka watu wakawa wameona tofauti? Au kinyume chake kwamba hutulizani na unahangaika sana kuliko ilivyo kawaida	0	1	2	3
9. Mawazo kuwa ni afadhali zaidi ufe au ujidhuru kwa namna fulani	0	1	2	3

FOR OFFICE CODING 0 + _____ + _____ + _____

=Total Score: _____

Kama ulitia alama matatizo yoyote, matatizo hayo yamefanye iwe vigumu kivipi kwako kufanya kazi yako, kushughulikia vitu nyumbani, au kutangamana na watu wengine?

Sio ngumu hata kidogo	**Ngumu kiasi**	**Ngumu sana**	**Ngumu zaidi**
☐	☐	☐	☐

Imetengenezwa na Drs. Robert L. Spitzer, Janet B.W. Williams, Kurt Kroenke na wenza wake, na ruzuku ya kielimu kutoka kwa Pfizer Inc. Hakuna kibali kinachohitajika ili kuzalisha upya, kutafsiri au kuonyesha au kusambaza.

Appendix V: Study Time Frame

Activities	**August - September 2021**	**October 2021**	**November – January 2021/22**	**February – April 2022**
Proposal Writing √				
Presentation of the Proposal for Approval				
Ethics Approval				
Data collection				
Data Analysis				
Presentation				

Appendix VI: Study Budget Estimates

Category	Remarks	Units	Unit Cost	Total (Ksh.)
Proposal Development	Printing drafts Proposal copies	1000 pages 3 copies	5 1000	5000 3000
Data Collection	Stationery pack (pens, paper)	400	50	25000
Ethical clearance		2000	1	2000
Data Entry	Data Clerk	1	7000	7000
Data Analysis	Statistician	1	35000	35000
Thesis write up	Printing drafts Printing Thesis	1000 10	5 1500	5000 15000
Contingency Fund				5000
Total				**102,000**

Appendix V: Similarity report

PREVALENCE OF DEPRESSION AND ASSOCIATED FACTORS AMONG PATIENTS WITH EPILEPSY AT KENYATTA NATIONAL HOSPITAL

ORIGINALITY REPORT

15%	12%	8%	4%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Minale Tareke Tegegne, Tilahun Belete Mossie, Andargie Abate Awoke, Ashagre Molla Assaye et al. "Depression and anxiety disorder among epileptic people at Amanuel Specialized Mental Hospital, Addis Ababa, Ethiopia", BMC Psychiatry, 2015 Publication	1%
2	worldwidescience.org Internet Source	1%
3	www.vingle.net Internet Source	<1%
4	www.hindawi.com Internet Source	<1%
5	hrcak.srce.hr Internet Source	<1%
6	discovery.ucl.ac.uk Internet Source	<1%
	erepository.uonbi.ac.ke	

7	Internet Source	<1%
8	Kanner, A.M.. "Depression in epilepsy: prevalence, clinical semiology, pathogenic mechanisms, and treatment", Biological Psychiatry, 20030801 Publication	<1%
9	www.ncbi.nlm.nih.gov Internet Source	<1%
10	Submitted to The University of Dodoma Student Paper	<1%
11	Submitted to Excelsior College Student Paper	<1%
12	Submitted to Touro College Student Paper	<1%
13	e-tarjome.com Internet Source	<1%
14	journals.plos.org Internet Source	<1%
15	Shiv Kumar Sah, Nabin Rai, Mukesh Kumar Sah, Milan Timalsena, Gayatri Oli, Nagendra Katuwal, Hemav Rajbhandari. "Comorbid depression and its associated factors in patients with epilepsy treated with single and multiple drug therapy: A cross-sectional study	<1%