PREVALENCE OF PSYCHIATRIC MORBIDITY IN CARDIO VASCULAR ACCIDENT PATIENTS ATTENDING NEUROLOGY CLINIC AT KENYATTA NATIONAL HOSPITAL: NAIROBI COUNTY, KENYA

BY

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1

1 2017
DECLARATION

I hereby declare that this is my original work and has not been presented for a degree in any other university.

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ABSTRACT

Cerebro vascular accidents or strokes are a major cause of morbidity in the both developing and developed countries. The burden of psychiatric morbidity in stroke patients is not well documented in developing countries such as Kenya. This study will determine the prevalence of psychiatric morbidity amongst stroke patients. The study design adopted was a cross sectional study. The setting of the study was the out patient neurological clinic at the Kenyatta National Hospital Teaching and Referral hospital, Nairobi. A total number of 210 cases of stroke patients were taken up in the study. The sampling technique used was systematic random sampling. The stroke patients were identified at the neurological clinic using the outpatient files and the investigator liaised with the clinic staff to recruit all patients who meet the inclusion criteria for the study. Data was collected using researcher administered Mini plus 6.0 assessment tool and a socio demographic questionnaire. The data was then analyzed using SPSS (Statistical package for social sciences) version 22, chi square, multiple regression and ANOVA and then presented using graphs, bar charts and tables. Overall prevalence of psychiatric morbidity was 32.85% among 210 patients who constituted the study population. Specific diagnoses recorded were depression (19%), generalized anxiety disorder (9.5%), alcohol dependence (2.3%) and bulimia nervosa (1.9%). Sociodemographic variables were not significantly associated with psychiatric morbidity.
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# ABBREVIATIONS & ACRONYMS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>ADL</td>
<td>Impairment in activity of daily living</td>
</tr>
<tr>
<td>GAD</td>
<td>Generalized anxiety disorder.</td>
</tr>
<tr>
<td>KNH</td>
<td>Kenyatta National Hospital</td>
</tr>
<tr>
<td>OCD</td>
<td>Obsessive compulsive disorder</td>
</tr>
<tr>
<td>OPD</td>
<td>Out patient department</td>
</tr>
<tr>
<td>PC</td>
<td>Parkinson Disease</td>
</tr>
<tr>
<td>PSD</td>
<td>Post stroke depression</td>
</tr>
<tr>
<td>PTSD</td>
<td>Post traumatic stress disorder</td>
</tr>
<tr>
<td>CAGE</td>
<td>Cut down, Annoyed, Guilty and Eye opener</td>
</tr>
<tr>
<td>AUDIT</td>
<td>Alcohol Use Disorders Identification Test</td>
</tr>
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OPERATIONAL DEFINITIONS

Neurologic disorders: Any disorder of the body nervous system. Structural, biochemical or electrical abnormalities in the brain, spinal cord or other nerves and can result in a range of symptoms.

Psychiatric morbidity: Psychiatric morbidity generally refers to the incidence of both physical and psychological deterioration as a result of a mental or psychological condition.

Somatoform disorders: Somatoform disorders are mental illnesses that cause bodily symptoms, including pain. The symptoms can't be traced back to any physical cause. And they are not the result of substance abuse or another mental illness.

Stroke rapidly developing clinical signs of local (at times focal) disturbance of cerebral function lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin. Also called a cerebrovascular accident
CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The World Health Organization (WHO) has tabulated in its annual morbidity reports that ischaemic heart disease and stroke are now the most common causes of mortality in the world. The established risk factors such as arterial hypertension, diabetes mellitus, cigarette smoking, hyper-lipidaemia, micro-vascular rupture, sickle cell disease, HIV/AIDS infection and cerebral malaria are encountered in the developing countries. World Health Organization (WHO) defined stroke as a “rapidly developing clinical signs of local (at times focal) disturbance of cerebral function lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin.

The World Health federation tabulates that 15 million people suffer stroke every year, nearly 6 million people die and another 5 million are left permanently disabled. Stroke is an important cause of impairment and disability. It often results in major changes in a person’s life: stroke survivors can suffer loss of health, occupation, social and community roles, income and independence. In the developed countries researchers have studied the prevalence of psychiatric morbidity in this special population. Unfortunately in the developing countries such as Kenya, there is a gap which this study will attempt to fill in. Studies done in other regions in the world have demonstrated the psychiatric morbidity exists in patients with cerebrovascular accidents. The entire spectrum of psychiatric illness can be seen after an episode of stroke. Most common of psychiatric ailments seen are depression, anxiety disorders, emotional incontinence/pseudo bulbar affect and catastrophic reactions. However cases of post stroke psychosis having
symptoms like hallucinations, delusions and agitated behaviour thus forming acute psychosis due to organic cause are very rare. (Rabins et al, 1991)

Studies done in Africa to look at the psychiatric co morbidity have been shown that stroke patients have a psychiatric morbidity of 36 % (Ajiboye et al, 2012) and 37.8 % (Obiora et al, 2013). This shows that psychiatric morbidity is significant in stroke population. This study will demonstrate the psychiatric morbidity in a hospital based setup in a referral hospital in a developing country.

1.2 Problem Statement

Psychiatric morbidity is common amongst stroke survivors with a prevalence of 36 % - 37.8 % in studies done in Nigeria (Ajiboye, 2012), (Obiora, 2013). This is quite significant as the WHO has stated that strokes are a common cause of morbidity and mortality in the world (WHO 2017). The developing countries are getting more stroke disease burden due to sedentary lifestyle, adopting a more western diet, obesity and the increase in chronic diseases such as diabetes and hypertension. It is important for all stakeholders in health especially in the developing countries to effectively manage the stroke population and to help in disease treatment well. Developed countries have studied the psychiatric morbidity in stroke population in detail as evidenced in the published studies. These countries have thus ensured that their health services do cater for psychiatric morbidity in stroke survivors by availing comprehensive psychiatric services in outpatient stroke clinic and centers. This is not the case in developing countries such as Kenya which suffer a shortage of specialist psychiatry services even for the general population (Kenya Mental health policy, 2015). There is need to reach out to the stroke population and offer comprehensive psychiatric care. This study will thus determine the prevalence and nature of
psychiatric morbidity in stroke population. The study findings will be shared with health stake
holders with a view of offering this special population comprehensive psychiatric care.

1.3 Justification

The aim of the study is to demonstrate the prevalence and nature of psychiatric morbidity
amongst stroke population. Most of the studies the researcher encountered have been done in
developed countries with a prevalence of 20 – 30 % (Hacket et al, 2014). The number of studies
done in Africa are very few with the researcher encountering only 2 similar studies done in
Nigeria which showed a prevalence of 36 % (Ajiboye et al, 2012) and 37.8 % (Obiora et al,
2013). There is a need in eastern Africa to determine the prevalence of psychiatric morbidity
amongst stroke population in Kenya. All other African studies done were hospital based as the
researchers study. Stroke population have been found to have all neuropsychiatric
manifestations but psychosis is rare (Rabins et al, 1991). This study will demonstrate
psychiatric morbidity amongst stroke population and thus help to empower stake holders in
health care to provide psychiatrists and allied workers to treat the stroke population. Stroke is on
the increase in Kenya due to lifestyle diseases of diabetes and hypertension and at KNH stroke
patients constitute half of all the outpatient neurology clinic attendees. No psychiatric services
are offered at the clinic which is run by neurologists and neurosurgical teams. By providing
evidence of psychiatric morbidity in this study, the researcher will be able to help stake holders
provide comprehensive psychiatric services at KNH outpatient neurology clinic and this can be
rolled out in all public and private stroke outpatient centers in Kenya. The study demonstrates
that there is burden of psychiatric morbidity in stroke out patients. This special population also
requires psychiatric services just as the general population.
1.3.1. Hypothesis

Null Hypothesis (Ho) There is no relationship between stroke and psychiatric morbidity

Alternate hypothesis There is a relationship between stroke and psychiatric morbidity

1.4 Research Questions

1. What is the prevalence of psychiatric morbidity in stroke patients attending neurology outpatient clinic at KNH?

2. What is the nature of psychiatric morbidity in stroke patients attending neurology outpatient clinic at KNH?

3. What is the diagnosis of the psychiatric morbidity in the patients file in comparison the study findings?

1.5 Broad Objective

To determine the prevalence and nature of psychiatric morbidity in stroke outpatients in KNH.

1.5.1 Specific Objectives

1. To determine the prevalence of psychiatric morbidity in stroke patients attending neurology outpatient clinic at KNH

2. To describe the nature of psychiatric morbidity in stroke patients attending neurology outpatient clinic at KNH

3. To establish the psychiatric diagnosis in the patients file in comparison to the study findings?
1.6 Significance of the study

The study will determine the psychiatric morbidity in stroke patients to facilitate timely psychiatry referral and treatment. Most similar studies were done in developed countries with very few studies done in developing countries. In Kenya, no similar study has been done.

1.7 Conceptual Framework

Adopted from (Ajzen & Fishbein, 1980) and Literature review.

The conceptual framework is based on the theory of reasoned action and literature review. The theory of reasoned action postulates that behavior is influenced by several factors among them, ones belief about the outcome of an action, ones assessment that a particular behavior is desired by significant others and a motivation to comply with the views of the significant others (Ajzen & Fishbein, 1980). With this theory in mind, literature review revealed that psychiatric morbidity in stroke patients is influenced by socio-demographic variables and the neurologic disorders suffered, and also influenced by substance abuse.
CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

Understanding psychiatric morbidity among social groups and society at large is a frequent concern of both scientific researchers and various administrative officials. Assessing the phenomena allows researchers and officials to better grasp the relationship between psychiatric
conditions and activities, predisposing diseases, environments and social structures. Neuropsychiatric disorders are common after stroke. The entire spectrum of psychiatric illness can be seen after an episode of stroke. Most common of psychiatric ailments seen are depression, anxiety disorders, emotional incontinence/pseudo bulbar affect and catastrophic reactions. However cases of post stroke psychosis having symptoms like hallucinations, delusions and agitated behaviour thus forming acute psychosis due to organic cause are very rare. (Rabins, Starkstein, Robinson. Risk factors for developing atypical schizophreniform psychosis following stroke. 1991)

2.1 socio-demographic factors and neuropsychiatric disorders
In a study done in Nigeria, Ajiboye, Abiodun, Tunde-Ayinmode, Buhari, Sanya, Wahab (2013), the patients’ age, marital status, educational status, gender, religion, occupation and duration of illness were not significantly associated with psychiatric morbidity. Also the laterality of stroke, physical disabilities resulting from stroke, and being hypertensive or diabetic were not significantly associated with psychiatric morbidity.

2.2 Stroke and psychiatric manifestation
A stroke is caused by interruption of the blood supply to the brain, due to burst blood vessel or blocked blood vessel due to a clot. This results in disruption in the supply of oxygen and nutrients resulting in brain damage (WHO, 2017) The effect of a stroke depend on the part of the brain that’s is injured and the severity.(WHO, 2017).

Stroke is the most common cause of mortality worldwide and the third most common in developed countries (Robinson, 2010). A stroke can produces a wide range of mental/emotional disorders. Examples of some of the neuropsychiatric disorders associated with stroke include post stroke depression, mania, bipolar disorder, and anxiety disorder, apathy without depression,
psychotic disorder, pathological affect and catastrophic reaction (Singh, Lenin, Wangjam & Singh L, 2006).

Post stroke depression is among the most common neuropsychiatric complications associated with stroke. Prevalence rate varies depending on the setting in which the patient was examined. Studies from developed countries have reported prevalence rates of 21.6% for major depression and 20.0% for minor depression in acute rehabilitation hospitals and 24.0% and 23.0% respectively in the outpatient clinics in which duration of stroke varies between 3 months and 3 years (Hacket, Kohler, O’brien & Mead, 2014). There is significant association between lesion location and development of post stroke depression has been reported especially during the first few months following stroke and the most frequently associated lesion location is left- anterior lesion. The time since occurrence of stroke appears to be the most crucial variable in determining whether there is increased frequency of mood disorders among patients with injury or dysfunction to the frontal regions of the left hemisphere (Hacket etal, 2014). Post stroke depression usually affects around 30-50% of all stroke patients within the first two years post-stroke, about 50% of these patients meet criteria for major depression, about 50% of these patients meet criteria for minor depression (dysthymic disorder). Bimodal (or multimodal) distribution may develop in the immediate post-stroke period, in 20% of stroke survivors it develops during the acute and rehabilitation hospitalization periods. Onset may be delayed by several months where by in 25% of outpatient stroke survivors when depression develops in the late (>12 month) period after stroke, causal relationship to stroke is at best uncertain (Singh, Lenin, Wangjam & Singh L, 2006).

There is an association between physical disability and post stroke depression. Patients with post stroke depression with left hemispheric lesions have also been shown to have significantly more
cognitive impairment on Mini Mental State Examination (MMSE) than non-depressed patients with similar lesions. There is also significant co morbidity between post stroke anxiety and post stroke depression. Reported prevalence rate ranges from 27.0% to 28.0%. Anxious- depressed patients have a significantly higher frequency of cortical lesions than depression only group (Hacket et al, 2014). Depression has been reported up to 24 months after stroke. Depression may involve a spectrum of mood disorders, including major and minor depression, "vascular depression," and dementia-related depression. Vascular depression (predating stroke) is associated with anhedonia and psychomotor retardation as well as with older age at onset, fewer feelings of guilt, and higher degrees of cognitive impairment than that seen in "primary" major depression (Singh, Lenin, Wangjam & Singh L, 2006).

Vascular depression may predict subsequent stroke, myocardial infarction, and greater mortality, although this relationship is complex. In addition, primary major depression may present with prominent cognitive symptoms, a condition referred to as depressive pseudodementia, which may itself be a prodromal state for later Alzheimer disease. Because these relationships between depression and dementia are imprecise at present, the physician is advised to offer treatment of depression early in the post-stroke period to maximize mood and cognitive function. A helpful screening mnemonic for depression is SIGECAPS: Sleep, Interest level, Guilt, Energy level, Concentration, Appetite, Psychomotor activity level, and Suicidal thoughts can be quickly examined with use of this mnemonic device. The presence of 5 or more of these symptoms (one of which must be depressed mood or decreased interest level) for 2 weeks is the threshold for a diagnosis of major depression (Hacket, Kohler, O’brien & Mead (2014). Sub-threshold cases involving clinically significant impairment may also be considered for psychopharmacologic therapy. Other depressive symptoms include tearfulness, pessimism, hopelessness, and nihilism.
Depression inventories such as the self-administered Beck Depression Inventory (BDI) and clinician-administered Hamilton Rating Scale for Depression (HDS) can be used to quantify depressive symptoms. The clinician-administered Post-Stroke Depression Rating Scale (PSDRS) addresses the "major" and "minor" forms of post stroke depression. Alternative self-administered scales for PSD and post-stroke anxiety disorders include the Geriatric Depression Scale (GDS) and General Health Questionnaire (GHQ). Generally, patients can complete the BDI, GDS, or GHQ; however, if a patient has significant cognitive deficits, he or she may not be able to report mood symptoms reliably, and clinician evaluation by the HDS or PSDRS may be more helpful. Evaluation for PSD must include an assessment of suicidality, with an urgent psychiatry referral to assess need for psychiatric hospitalization in actively suicidal patients. As part of the systemic workup for PSD, one should check thyroid-stimulating hormone (TSH) levels, since mild hypothyroidism may mimic depression (Hacket, Kohler, O'brien & Mead, 2014). The past literature suggests the hypothesis that depression is associated with decreased physical functional ability in stroke patients. On a medical rehabilitation ward, 21 stroke patients were evaluated for depression by psychiatric interview and self-report, and were also rated on the Barthel's Functional Index (BFI). The hypothesis was supported: Patients scoring 17 or higher on the Beck Depression Inventory (BDI) (N = 7) had lower initial scores on the BFI than patients with lower BDI scores. There was a trend for these seven depressed patients to improve more slowly, as ascertained by the BFI. Depression was suggested to lower functional ability by increasing fatigue, hopelessness, and decreasing motivation.

Depression plus anxiety have been found to be associated with left-cortical lesions whereas anxiety alone has been associated with right-hemisphere lesion. Longitudinal studies of post-stroke Generalized Anxiety Disorder (GAD) have shown that functional recovery of patients
with stroke was negatively affected by the presence of GAD (Paulucci, 2008). It has been suggested that the most probable explanation for this could be that the co-morbidity of PSD and GAD produced a longer duration of depression than PSD alone and this prolonged depression might lead to more profound adverse physical and social functioning outcome. Another condition associated with stroke is apathy (Hacket, Kohler, O’Brien & Mead, 2014). Apathy is regarded as a morbid negative state affecting free will, intellectual capacity and emotional responsiveness. Apathy has been associated with depression, older age, cognitive impairment, impairment in activity of daily living (ADL), as well as lesions of the posterior limb of the internal capsule. Catastrophic reactions, pathological affect, and post stroke psychosis are other disorders that may occur after stroke and probably influence the course of recovery and quality of life (Vataja & Kaste, 2013). There is paucity of reports on psychiatric morbidity following stroke in Nigeria, Sub-Saharan Africa and other developing countries, in general. An earlier Nigerian study among stroke patients mainly focused on PSD, in patients whose duration of stroke before presentation in the hospital was 5.6 months. A prevalence rate of 25.5% for depression (mild depression (9.8%), moderate depression (13.7%) and severe depression (2.0%)) was reported. Also 60.8% of the patients had right sided hemispheric location of the stroke and 39.2% had left sided hemispheric location (Vataja & Kaste, 2013). Gautam in a review article from India (a developing country) reported a prevalence rate of 31.8-35.5% for PSD among stroke patients. Studies have shown that neuropsychiatric complications associated with stroke may have negative effect not only on the social functioning and overall quality of life of stroke survivors but also on the recovery of their motor functioning as well. Depression following stroke has been the focus of most research whereas other complications such as anxiety or emotional ability have received relatively little attention (Vataja & Katse, 2013).
According to Ajiboye et al (2013), in a study done in Nigeria the specific psychiatric morbidity diagnoses reported in this study include 19.2% for depression, 9.6% for GAD, 2.4% for Harmful alcohol use and 1.2% each for somatoform disorder, phobia, delusional disorder and vascular dementia. Studies from the developed countries that focused mainly on PSD or post stroke anxiety disorder have reported prevalence rates of 20% to 40% for depression and 20% to 30% for GAD. Williams et al (2014) in a national cohort study of patients with primary diagnosis of ischaemic stroke discharged from any Veterans Affairs (VA) medical centre all over America, reported 2.8% for substance abuse, 1.5% for anxiety disorders, 0.5% for schizophrenia, 0.4% for personality disorders and 0.3% for affective disorders. In another study from a developed country (Western Australian)(Almeida & Xiao, 2007), alcohol related disorders accounted for 16.2%, dementia 12.1%, delirium 7.6%, psychotic disorders 6.7%, depression or dysthymia 5.5% and other mental health disorders 4.2%. In an Italian study (Beghi et al, 2009), depression accounted for 27% (mild depression 14.6%, moderate depression 4.9%, severe depression 7.2%), anxiety disorder 12% and personality disorders 10.2%. Post traumatic stress disorder has also been reported as a co-morbid disorder of stroke and it accounted for 23.1% with other co-morbid psychiatric disorders accounting for 54.7% (Wang et al, 2011).

2.2.1 Neuropsychiatric Manifestations which Occur Commonly After Stroke

Post stroke depression is a common psychiatric complication of stroke. Approximately 20% of patients who sustain a stroke meet criteria for major depressive disorder in the post stroke period; another 20% meet criteria for minor depression following stroke (Paulocci, 2008). Rapid diagnosis and treatment of post stroke depression are crucial, as rehabilitative efforts in the days following a stroke are critical in the overall functional recovery of post stroke patients. If left
untreated, episodes of post stroke depression last for months and even years (Robottom & Weiner, 2009). Patients who have post stroke depression appear to have less ability to participate in their rehabilitation, and some studies suggest that post stroke depression leads to a worsened long-term functional outcome.

A number of psychosocial risk factors appear to increase the likelihood of developing post stroke depression. These include a history of major depression, post stroke social isolation, living alone, and, possibly, a family history of major depression. In addition, the risk of developing post stroke depression also appears to correlate with the severity of physical disability resulting from the stroke. Other variables, including cognitive impairment, age, and gender, have not been consistently associated with the development of post stroke depression. Post stroke anxiety is also common; approximately one fourth of post stroke patients meet criteria (except for duration criteria) for generalized anxiety disorder (GAD) in the post stroke period (Kanner, 2005). This post stroke anxiety is also associated with decreased functional recovery, which can persist for years after the stroke. Patients with GAD in the acute post stroke period appear to have decreased abilities to perform activities of daily living (ADLs) when compared to post stroke patients without anxiety. Post stroke mania occurs less frequently; it develops in less than 1% of post stroke patients. Symptoms of post stroke mania are similar to those of primary mania (Paulocci, 2008).

Another neuropsychiatric manifestation of stroke is a “catastrophic reaction,” a collection of symptoms (involving intense desperation and frustration) that is uncharacteristic of the patient's pre stroke personality. This occurs in roughly 10% of post stroke patients and is strongly associated with post stroke depression as well as a personal and family history of psychiatric
disorders (Williams, Ghose $ Swindle, 2014). Finally, pseudobulbar affect or emotional incontinence, a clinical syndrome involving frequent and easily provoked spells of emotion (typically manifest by laughing and crying), is seen in approximately 10% to 15% of post stroke patients (Horne, 2010). In its most common form, brief fits of crying or laughing occur with appropriate changes in mood; in more serious cases, crying or laughing may develop in situations inappropriate to the context.

Teasdale et al. (2001) studied the relationship between stroke and suicide in Demark from 1979-1993 – Database of 114,098 patients with stroke discharged from the hospital during the study period with a registry of causes of death over the same time period – Identified 359 suicides in this population – The annual rate of suicide among persons with stroke was nearly twice that of the general population. Suicide risk was greatest among stroke patients 50 years or younger. Duration of hospitalization was inversely associated with suicide risk, being lowest among those hospitalized longer than three months post stroke and highest among those hospitalized less than two weeks post stroke stroke. The time of suicide does not bear a clear relationship to the time of stroke, although the risk for suicide appeared to be greatest in the first five years following stroke. In both studies, annual suicide rates following stroke were lowest among persons age 80 years or older, although the risk in this group remained elevated in comparison to the general population.

2.3 Correlation between Lesion Location and the Development of Post stroke Neuropsychiatric Sequelae

Controversy exists with regard to the correlation between lesion location and post stroke depression. Initially it was thought that the frontal lobes and a right parietal location were most
frequently associated with post stroke depression. However, more recent analyses (including a large meta-analysis by Carson and coworkers have found no correlation between lesion location and post stroke depression (Robinson, 2010). If there is a correlation between stroke location and the presence of post stroke depression, it appears that strokes of the left frontal cortex and left basal ganglia are most often associated with the development of post stroke depression (Almela & Xiao, 2007).

Anxiety associated with post stroke depression is most often seen with left-sided lesions, while patients with isolated anxiety may more often have right-hemispheric lesions. Post stroke mania appears to occur most often with right hemispheric lesions, especially when they occur in the right orbitofrontal region or the right thalamus. Catastrophic reactions are strongly associated with left frontal strokes (Wang etal, 2014).

Laterality may affect severity of post-stroke depression in Major depression occurs 50% in left hemisphere stroke and 16% in right hemisphere stroke. Minor depression was equally common (25%) in both groups. Lateralized relationship between post-stroke depression and cognitive impairment, shows major depression occurring after a left-hemisphere stroke is associated with significant cognitive impairments. Importantly, treatment of post-stroke depression may improve cognitive functioning as well as depression. Major depression occurring after a right-hemisphere stroke is not strongly associated with cognitive impairment. However, this may be an artifact of assessment methods and not a true difference. Mild pre-existing subcortical atrophy appears to predispose to development of post-stroke depression. Among all demographic variables, personal or family history of depression may influence post stroke depression risk. Premorbid
“neuroticism” (based on the Five Factor Model of personality) may increase post-stroke depression risk (Almelda & Xiao, 2007).

CHAPTER THREE: MATERIALS AND METHODS

3.0 Introduction

This chapter covers the research design and methodology, including sampling method, study population, data collection, data analysis and ethical considerations.

3.1 Study Design

The study adopted a Cross sectional study design. Cross sectional design was based on observations made at one point in time. Cross sectional studies can be generalized because they are representative of given populations; they are the best suited in determining the prevalence
and in identifying associations that can then be more rigorously studied using a cohort study or randomized controlled study (Mann, 2003).

3.2 Dependent and Independent Variables

Behavior is influenced by several factors among them, ones belief about the outcome of an action, ones assessment that a particular behavior is desired by significant others and a motivation to comply with the views of the significant others (Ajzen & Fishbein, 1980). This theory and the literature review was guided the conceptual framework. Development of psychiatric morbidity in stroke patients was dependent on a number of factors like socio demographic characters (age, sex, religion etc).

3.3 Study Area

The study area was Kenyatta National Hospital in Nairobi County. KNH has a capacity of 1800 beds and has over 6000 staff members. The University of Nairobi Medical School, and several government agencies are located on the campus.

Established in 1901 with a bed capacity of 40, KNH became a State Corporation in 1987 with a Board of Management and is at the apex of the referral system in the Health Sector in Kenya. It covers an area of 45.7 hectares and within the KNH complex are College of Health Sciences (University of Nairobi); the Kenya Medical Training College; Kenya Medical Research Institute and National Laboratory Service (Ministry of Health).

KNH is the biggest referral hospital in Kenya, making it the prime study site for this study.

The specific study site will be the Kenyatta National Hospital Outpatient neurological clinic which runs every Monday. The clinic serves an annual number of 3384 patients and it offers specialist neurological services for stroke patients. It is run by neurological team assisted by
specialist nurses and subordinate staff. It caters to adults only. Stroke patients constitute 50% of all the weekly clinic attendees.

3.4 Study Population

All stroke patients attending KNH neurology clinic was the study population. From records, the average annual patient attendance in clinic is 3384.

3.5 Inclusion Criteria

(i) Well documented stroke (typical clinical picture supplemented by brain CT scan)

(ii) Ability and willingness to give informed consent to participate in the study.

3.6 Exclusion Criteria

(i) Inability to communicate both verbally and non verbally

(ii) Severe cognitive impairment.

(iii) Impaired consciousness that will make psychiatric assessment either impossible or unreliable

3.7 Sample Size Determination

Fisher formula was used to determine the sample size.

\[ n = z^{2}_{1-\alpha/2} \times p (1-p) \] (Mugenda & Mugenda, 1999)

\[ d^2 \]

\[ N= \text{Minimum sample size.} \]
\(\alpha=\) Level of significance (0.05).

\(Z_{1-\alpha/2}=\) Standard normal deviate at 95\%, confidence interval (1.96).

\(P=\) Proportion in the target population with specific characteristic (24\%) prevalence of psychiatric morbidity in neurology patients.

\(d=\) Absolute precision (Error margin), (0.05).

Therefore \(n=1.96^2 \times (0.24) (0.53)/0.05^2\)

\(n=191.\)

The minimum required sample size is 191. However, allowing for 10\% non-response the sample size will be adjusted upwards to 210.

### 3.8.1 Data Collection

The study researcher approached the doctors and nurses running the Kenyatta National Hospital neurology outpatient clinic and explained the study to be done. The researcher choose from the patients files the patients who meet the study’s inclusion criteria. The researcher was then wait for the patients after they have seen the neurologist and then explain what the study entails. Systematic random sampling was used and every other 2\textsuperscript{nd} patient was chosen to take part in the study. Written and informed consent was obtained. The researcher will then administer both the researcher designed socio demographic and mini plus 6.0 tool for 10 – 15 minutes.
3.8.1.1 Recruitment and Data Collection Procedure flowchart

3.8.2 Sampling Technique

The study researcher used systematic random sampling technique to collect data. The researcher confirmed the diagnosis of stroke in the patients file and will choose every other 2\textsuperscript{nd} patient with a stroke to participate in the study.
3.9 Instruments and Techniques

The study utilized Mini plus psychiatric assessment tool 6.0 which has standard closed ended structured questions to assess psychiatric morbidity in stroke patients. This was the prime method of data collection.

A socio demographic questionnaire will be used to collect other data like age, sex, religion, occupation, marital status, education level, pre existing psychiatric illness prior to stroke

3.10 Pre-test of Data Collection Tools

A Pre-test was done in Kiambu County Referral hospital Neurologic clinic to test validity and feasibility of the research tools. A sample size of 10 patients was used. This government county referral hospital is believed to have similar characteristics to those of the study site and similar locality that is Kiambu County. The pre-test aimed at assessing relevance, clarity, accuracy and flow of questions asked, the approximate time needed for each tool and the clarity of the instructions to the respondents.

3.10.1 Validity of the Study Tools

Validity is the degree to which a test measures what it purports to measure and consequently permits appropriate interpretation of scores. The study tools was pre tested before use to assess their validity.

3.10.2 Reliability of the Study Tools

Reliability is the measure of the degree to which a research instrument yields consistent results on repeated trials (Mugenda & Mugenda, 1999). The split half technique was used to assess the reliability and consistency of the study tool. In this method instruments was split into two and reliability co-efficient assessed by correlating results of the two halves. Cronbach Alpha 2004
reliability coefficient of 0.85 was obtained. This showed that the tool was reliable because for the tool to be relied the value should be equal to or greater than 0.7 for the whole instrument.

3.11 Data Collection

The researcher used Mini Plus 6 psychiatric assessment tool and a Researcher designed Socio demographic questionnaire (See Appendix II). The tool and questionnaire will be administered by the researcher to the consenting patients attending the outpatient neurologic clinic.

3.12 Data Management

The researcher collected process and analyze the date in an organized way, and is responsible for the quality and authenticity of the data and ensured that they are safely stored. The data was stored in lockable cabinets and in flash drives which was stored in the lockable cabinets. The researcher allowed the supervisors to access the research upon request. The researcher was also responsible for documentation and submission of both hard copies and soft copies to the Department of psychiatry for marking and grading and was also organize for long term storage at the University of Nairobi repository.

The role of supervisors (Prof Caleb Othieno and Dr Pius Kigamwa) is to correct the researcher as he collects data and to check for data quality, clarity and completeness. The supervisors was also be responsible for guiding the researcher on publication of the study in reputable journals.

3.13 Data Processing and Analysis

Quantitative data from the Mini plus was checked daily for completeness and coded for appropriate computer entry. Equivalent responses was pooled to arrange the response in different categories. The Quantitative data was managed by IBM Statistical Package for Social Sciences
The study utilized univariate and bivariate analysis. In univariate analysis, frequency distributions showed the distribution of the study population by background characteristics. In bivariate analysis, Chi-square and T-test exact test values were used to test the significance of the association between the dependent and independent variables. The threshold for statistical significance was set at P<0.05. The results will then be presented using tables, graphs, pie chart and figures.

3.14. Dummy Tables for Analysis

Table 4.12 Sociodemographic characteristics of stroke patients

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupation status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary language</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychiatric illness prior to Stroke</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 4.13 Psychiatric Morbidity

<table>
<thead>
<tr>
<th>Overall Psychiatric Morbidity</th>
<th>Depression</th>
<th>General Anxiety Disorder /GAD</th>
<th>Social Phobia</th>
<th>Nil Psychiatric Morbidity</th>
<th>Total</th>
</tr>
</thead>
</table>

### Table 4.14 Psychiatric Morbidity in association with socio demographic variable

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number Studied</th>
<th>Depression</th>
<th>General Anxiety disorder</th>
<th>Social phobia</th>
<th>Psychiatric Morbidity</th>
<th>Nil Psychiatric Morbidity</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.15 Ethical Considerations

The researcher explained to the study participant the purpose of the study and stressed that it is fully voluntary and that the study participant can withdraw at any one time with no repercussions.

The researcher also explained to the study participants that there are no rewards or monetary gain for participating in the study. The researcher is going to strive to maintain a relationship of honesty, trust and respect with the study participants.

The researcher meet to meet all the basic ethical principles of respect for persons, beneficence and justice.

At any one time if acute psychiatric illness is detected, the study participant were referred to KNH Mental health department to be seen by a Consultant psychiatrist.

Benefits of the Study

Identifying and treating stroke patients with psychiatric morbidity improved the quality of life of these patients. It will assist the hospital management in justification of the posting of a permanent psychiatrist in the neurology clinic. Psychiatry department should facilitate a rotation through the neurology clinic by psychiatric registrars. Reference point to other medical personnel and was aid in training and education. It will assist the hospital management in planning purposes on staffing the neurology clinic.

3.15.1 Research Ethics Committee Approval

Before data collection, ethical approval was obtained from University of Nairobi /Kenyatta National Hospital Research and ethics committee.

3.15.2 Consent for the Mini Plus assessment and Socio demographic questionnaire

Before data collection (yu & ghh, 2016), participants was informed that the study was voluntary and they would have a right to refuse to participate or discontinue at any time with no negative consequences. Before administration of the mini plus tool, informed consent was obtained from
each research participant, who signed a consent form as an indication of agreement to participate in the study (See Appendix I). Confidentiality of the respondents was maintained by ensuring the use of initials. On completion of the questionnaire the data collected was kept under a lockable cabinet throughout the duration of data collection and was only accessible to the researcher and supervisors. To maintain privacy one patient was assessed at a time in a closed room. Patient’s names were not be used and patient’s data was recorded with numbers.
CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION OF THE FINDINGS

4.1 Introduction

This chapter entails data presentation on the findings of the study. It has also data presentation, analysis and interpretation which were generated by the study. The data presented covered the prevalence of psychiatric morbidity, nature of psychiatric morbidity and psychiatric diagnosis stroke patients attending neurology outpatient clinic at KNH.

The chapter also presents analysis and findings of the study as set out in the research methodology. The study findings presented showed the prevalence of psychiatric morbidity in cardio vascular accident patients attending neurology clinic at Kenyatta national hospital: Nairobi County, Kenya. The data was gathered exclusively from the researcher designed socio demographic questionnaire and from the Mini plus 6.o tool. The results are presented in data tables, pie charts, bar graphs.

4.2. Response Rate

The study targeted 210 participants. From the study, 201 respondents were sampled by the researcher making a response rate of 100%. According to Mugenda and Mugenda (1999) a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent; therefore, the response rate obtained in this study was excellent for analysis and reporting.
4.3 Social demographic characteristics

Table 4.12 Social demographic characteristics

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-40</td>
<td>32</td>
<td>15.24</td>
</tr>
<tr>
<td>41-50</td>
<td>88</td>
<td>41.90</td>
</tr>
<tr>
<td>51-60</td>
<td>45</td>
<td>21.43</td>
</tr>
<tr>
<td>61-70</td>
<td>36</td>
<td>17.14</td>
</tr>
<tr>
<td>Above 70</td>
<td>9</td>
<td>1.29</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>126</td>
<td>60</td>
</tr>
<tr>
<td>Female</td>
<td>86</td>
<td>40</td>
</tr>
<tr>
<td>Ethno - lingual</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kikuyu</td>
<td>70</td>
<td>33.33</td>
</tr>
<tr>
<td>Maasai</td>
<td>12</td>
<td>5.71</td>
</tr>
<tr>
<td>Kipsigis</td>
<td>16</td>
<td>7.62</td>
</tr>
<tr>
<td>Kamba</td>
<td>20</td>
<td>9.52</td>
</tr>
<tr>
<td>Luo</td>
<td>30</td>
<td>1.43</td>
</tr>
<tr>
<td>Luhy</td>
<td>6</td>
<td>2.86</td>
</tr>
<tr>
<td>Meru</td>
<td>4</td>
<td>1.90</td>
</tr>
<tr>
<td>Others</td>
<td>52</td>
<td>24.76</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;10,000</td>
<td>19</td>
<td>9.05</td>
</tr>
<tr>
<td>11,000-20,000</td>
<td>22</td>
<td>10.48</td>
</tr>
<tr>
<td>21,000-30,000</td>
<td>30</td>
<td>14.29</td>
</tr>
<tr>
<td>31,000-40,000</td>
<td>90</td>
<td>42.86</td>
</tr>
<tr>
<td>41,000-50,000</td>
<td>20</td>
<td>9.52</td>
</tr>
<tr>
<td>&gt;50,000</td>
<td>29</td>
<td>13.81</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christians</td>
<td>170</td>
<td>80.95</td>
</tr>
<tr>
<td>Muslims</td>
<td>20</td>
<td>9.52</td>
</tr>
<tr>
<td>Others</td>
<td>11</td>
<td>5.23</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>88</td>
<td>40.90</td>
</tr>
<tr>
<td>Employed</td>
<td>74</td>
<td>33.33</td>
</tr>
<tr>
<td>Unemployed</td>
<td>22</td>
<td>10.48</td>
</tr>
<tr>
<td>Others</td>
<td>26</td>
<td>12.38</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>126</td>
<td>60</td>
</tr>
<tr>
<td>Single</td>
<td>26</td>
<td>12.38</td>
</tr>
<tr>
<td>Separated</td>
<td>2</td>
<td>1.42</td>
</tr>
<tr>
<td>Others</td>
<td>56</td>
<td>26.67</td>
</tr>
</tbody>
</table>
Majority 88(41.90%) of the respondents indicated that they were aged between 41 to 50 years while 45(21.43%) of the respondents indicated they were aged between 51 to 60 years. 36(17.14%) of the respondents indicated that they were aged between 61 to 70 years while 32(15.24%) were aged between 30-40 years. Only 9(1.29%) of the respondents indicated they were aged above 70 years. The study also showed that 126(60%) males participated in the study as well as 86(40%) females participated in the study. The study also targeted the ethno lingual spoken by the participants. The information collected showed that 33.33% were Kikuyu, 9.52% were Kamba, 7.62% were Kipsigis, 5.71% were Maasai, 2.86% were Luhya, 1.90% were Meru and 1.43% were Luo. Level of income was also included in the socio demographic questionnaire which showed that 42.86% of the study participants received income between 31,000 and 40,000 kenyan shilling as income per month. 14.29% of the participants were receiving income of 21,000 to 30,000 shilling per month. About 13.81% of the respondents were receiving over 50,000 shilling per month while 10.48% of the respondents were receiving between 11,000-20,000 per month. Only, 9.05% of the respondents were receiving less 10,000 shilling per month. The study also sought to find out the religious beliefs of the study participants. The study demonstrated that 80.95% of the participants prophesied to Christianity, 9.52% prophesied to Islam and 5.23% prophesied to other religious beliefs. The study showed that majority of the study participants 40.90% were engaged in business, 33.33% were employed, 12.38% were involved in various activities as a source of incomes 10.48% were unemployed. Majority of the study participants were married 60%, 26.67% stated that they were not married or single, 12.38% were single and 1.42% were separated.
4.4 Prevalence of Psychiatric Morbidity

The researcher was interested in knowing the prevalence of psychiatric morbidity in stroke outpatients. The researcher used a socio demographic questionnaire and mini plus 6.0 tool to collect the data. The overall psychiatric morbidity was found to be 32.85% from 210 study participants.

Pie chart 1.0 Shows prevalence of psychiatric morbidity
### Psychiatric Morbidity Table 4.13

<table>
<thead>
<tr>
<th>Overall Psychiatric Morbidity</th>
<th>Depression</th>
<th>General Anxiety Disorder /GAD</th>
<th>Bulimia Nervosa</th>
<th>Alcohol dependence</th>
<th>Nil Psychiatric Morbidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>32.85% (19%)</td>
<td>(9.5%)</td>
<td>(1.95%)</td>
<td>(2.4%)</td>
<td>(67.15%)</td>
<td></td>
</tr>
</tbody>
</table>

Pie chart 2.0 Shows the psychiatric morbidity

**Psychiatry diagnosis detected**

- Depression
- Generalised anxiety disorder
- Alcohol abuse
- Bulimia nervosa
Table 4.14 shows the psychiatric morbidity in association with socio demographic variable

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number Studied</th>
<th>Depression</th>
<th>General Anxiety disorder</th>
<th>Alcohol abuse</th>
<th>Bulimia nervosa</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female 86</td>
<td>30</td>
<td>14</td>
<td>0</td>
<td>4</td>
<td></td>
<td>P=0.751</td>
</tr>
<tr>
<td>Male 126</td>
<td>10</td>
<td>6</td>
<td>5</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married 126</td>
<td>20</td>
<td>11</td>
<td>4</td>
<td>1</td>
<td></td>
<td>P=0.621</td>
</tr>
<tr>
<td>Single 26</td>
<td>10</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Separated 2</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others 56</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed 162</td>
<td>23</td>
<td>10</td>
<td>3</td>
<td>2</td>
<td></td>
<td>P=0.471</td>
</tr>
<tr>
<td>Unemployed 22</td>
<td>14</td>
<td>5</td>
<td>2</td>
<td>2</td>
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<td></td>
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<tr>
<td>Others 26</td>
<td>3</td>
<td>5</td>
<td>0</td>
<td>0</td>
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<td></td>
</tr>
</tbody>
</table>
4.5 The nature of psychiatric morbidity in stroke patients

### 4.17 Major Depressive Episode

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>170</td>
<td>81</td>
</tr>
<tr>
<td>Yes</td>
<td>40</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.17 showed that 19% of the study participants had major depressive disorder.

### Table 4.18 Suicidality

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>210</td>
<td>90.5</td>
</tr>
<tr>
<td>Yes</td>
<td>20</td>
<td>9.5</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.18 indicated that 9.5% of the study participants with major depression had suicidal risk.
### Table 4.19 Manic Episode

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>210</td>
<td>100</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.19, indicates that there was no manic disorder in the study participants.

### Table 4.20 Panic Disorder

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage S</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>210</td>
<td>100</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.20, shows that there was no panic disorder found in the study participants.

### Table 4.21 Social Phobia

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>210</td>
<td>100</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.21, indicates that there is no social phobia in the study participants.
Pie chart 3.0  Obsessive compulsive disorder in stroke patients

Pie chart 3.0 shows that there was no obsessive compulsive disorder in the study participants

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>210</td>
<td>100</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.22 shows that none of the study participants had post traumatic stress disorder
### Table 4.23 Alcohol Dependence

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>205</td>
<td>97.7</td>
</tr>
<tr>
<td>Yes</td>
<td>5</td>
<td>2.3</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.23 indicates that 2.3% of the study participants were diagnosed with alcohol dependence.

### Table 4.24 Alcohol Abuse

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>205</td>
<td>97.7</td>
</tr>
<tr>
<td>Yes</td>
<td>5</td>
<td>2.3</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.24 indicates that 2.3% of the study participants were diagnosed with alcohol abuse.

### Table 4.25 Substance Dependence

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>210</td>
<td>100</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.25 indicates that none of the study participants were diagnosed with substance dependence.
Table 4.26 Substance Abuse

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
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<td>210</td>
<td>100</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.26 shows that none of the study participants were found to have substance abuse.

Table 4.27 Mood Disorder with Psychotic features

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>210</td>
<td>100</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

Data on table 4.27 shows that none of the study participants were diagnosed with a mood disorder with psychotic features.

Table 4.28 Mood disorder with psychotic features and current psychotic disorder

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>210</td>
<td>100</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.28 shows that none of the study participants were diagnosed with a mood disorder with psychotic features and a current psychotic disorder.
Table 4.29 Psychotic Disorder

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>210</td>
<td>100</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.29 indicates that none of the study participants were diagnosed with a psychotic disorder.

Table 4.30 Anorexia Nervosa

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>210</td>
<td>100</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.30 shows that none of the study participants were diagnosed with anorexia nervosa.

Bar graph 5.0 shows the status of bulimia nervosa.
Bar graph 5.0 shows that 1.9% of the study participants were found to have bulimia nervosa out of the 210 participants.

**Bar Graph 5.1 Showing study participants with generalised anxiety disorder**

Bar Graph 5.1 and Table 4.31 show that 9.5% of the study participants were diagnosed with generalised anxiety disorder.

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>190</td>
<td>90.5</td>
</tr>
<tr>
<td>Yes</td>
<td>20</td>
<td>9.5</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

Bar Graph 5.1 and Table 4.31 show that 9.5% of the study participants were diagnosed with generalised anxiety disorder.
Table 4.32 Antisocial Personality Disorder

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>210</td>
<td>0</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

Data on table 4.32 indicates that none of the study participants were found to have anti social personality disorder.

4.6 Testing of hypothesis

The null hypothesis stated that there is no relationship between stroke and psychiatric morbidity. To test this hypothesis, Chi-Square, regression and Analysis of variance (ANOVA) analysis were used to analyze the magnitude and direction of the relationship. The data was presented in table 4.33.
### Table 4.33 Test Statistics Chi-square, contingency of stroke and nature of psychiatric morbidity

<table>
<thead>
<tr>
<th>Nature of Psychiatric Morbidity</th>
<th>Diagnosed</th>
<th>Not diagnosed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>21</td>
<td>2</td>
<td>23</td>
</tr>
<tr>
<td>Low</td>
<td>3</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>24</td>
<td>17</td>
<td>31</td>
</tr>
</tbody>
</table>

### Table 4.34: Chi-square

<table>
<thead>
<tr>
<th>Cell</th>
<th>$O_i$</th>
<th>$\lambda_i$</th>
<th>$O_i - \lambda_i$</th>
<th>$(O_i - \lambda_i)^2$</th>
<th>$(O_i - \lambda_i)^2 / \lambda_i$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>21</td>
<td>13.5</td>
<td>7.5</td>
<td>56.25</td>
<td>4.17</td>
</tr>
<tr>
<td>1.2</td>
<td>02</td>
<td>9.5</td>
<td>-7.5</td>
<td>56.25</td>
<td>5.92</td>
</tr>
<tr>
<td>2.1</td>
<td>03</td>
<td>10.5</td>
<td>-7.5</td>
<td>56.25</td>
<td>5.35</td>
</tr>
<tr>
<td>2.2</td>
<td>15</td>
<td>7.5</td>
<td>7.5</td>
<td>56.25</td>
<td>7.5</td>
</tr>
</tbody>
</table>
**Chi-square computed**

The sum of the last column gives $(\chi^2_c) = 22.94$ At the 95% confidence level and a degree of freedom of $=(2-1)(2-1)=1$, $\chi^2_a=3.841$. Since $\chi^2_c$ is more than $\chi^2_a$, we reject the null hypothesis $H_0$ and accept the alternate hypothesis and conclude that there is sufficient evidence to suggest that stroke has a relationship/influences psychiatric morbidity.

**Table 4.35 Multiple Regressions**

<table>
<thead>
<tr>
<th>Mode</th>
<th>Adjusted R</th>
<th>R Square</th>
<th>R Std. Error of the Estimate</th>
<th>R Square Change</th>
<th>F</th>
<th>df1</th>
<th>df2</th>
<th>Sig. F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.772</td>
<td>.595</td>
<td>.485</td>
<td>.466</td>
<td>.595</td>
<td>5.398</td>
<td>6</td>
<td>22</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), prevalence, diagnosis of the psychiatric morbidity & diagnosis of the psychiatric morbidity

b. Dependent Variable: Psychiatric morbidity-depression, psychosis, mania, anxiety disorders, substance abuse, personality disorder etc

Multiple regression indicates that there is a strong correlation between independent variable and dependent variable (adjusted $R=0.772$, $p=0.001$) which is statistically significance at 5%. In addition, the influence of six explanatory indicators of predators which explains the variation by 48.5% (adjusted $R^2=48.5\%$) implying that prevalence, diagnosis of the psychiatric morbidity &
diagnosis of the psychiatric morbidity influence Psychiatric morbidity-depression, psychosis, mania, anxiety disorders, substance abuse, personality disorder etc.

Table 4.36 shows the output of the ANOVA analysis and whether there is a relationship between prevalence, diagnosis of the psychiatric morbidity & diagnosis of the psychiatric morbidity and Psychiatric morbidity-depression, psychosis, mania, anxiety disorders, substance abuse, personality disorder etc. We can see that the significance level is 0.001 ($p = .001$), which is below 0.05 and, therefore, there is a statistically significant difference in the relationship between prevalence, diagnosis of the psychiatric morbidity & diagnosis of the psychiatric morbidity and dependent variable.
Table 4.36 : ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>d.f</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>7.023</td>
<td>6</td>
<td>1.170</td>
<td>5.398</td>
<td>.001a</td>
</tr>
<tr>
<td>Residual</td>
<td>4.770</td>
<td>22</td>
<td>.217</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>11.793</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), prevalence, diagnosis of the psychiatric morbidity & diagnosis of the psychiatric morbidity

b. Dependent Variable: Psychiatric morbidity-depression, psychosis, mania, anxiety disorders, substance abuse, personality disorder etc
CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

The main objective of this study was to determine the prevalence of psychiatric morbidity in cerebrovascular accident patients attending the neurology out patient clinic at Kenyatta National Hospital, Nairobi County. The researcher used a researcher designed socio demographic questionnaire and Mini plus 6 tool to identify psychiatric morbidity. The tool and the questionnaire were administered to the 210 study participants. The Overall prevalence of psychiatric morbidity was 32.85% among 210 patients who constituted the study population. Specific diagnoses recorded were depression (19%), generalized anxiety disorder (9.5 %), alcohol dependence (2.3%) and bulimia nervosa (1.9 %). The study findings were similar to 2 studies done in Africa which demonstrated a psychiatric morbidity in stroke outpatients of 36 %(Ajiboye et al, 2012) and 37. 8 % (Obiora et al, 2013). The study results were different from a study done by Tang Wk et al, 2002, which showed a psychological morbidity of 17.8 % in Hong Kong. The difference is because the Hong kong study was done in a developed country which whose population has better access to health care unlike in developing countries. A study done in a middle income country India by Rana Ravi Kumar et al, 2013, indicated a prevalence of 49 % of psychiatric morbidity in post stroke patients. This can be explained that India has a bigger population than the study done by the researcher and as thus the number of patients with stroke is higher.
The study thus indicated that there was a significant morbidity of 32.85% amongst cerebrovascular accident patients who were attending an out patient medical clinic. None of the patients were on any follow up or treatment by a psychiatrist or allied workers. 19% of the study participants were noted to have major depression with 75% being women. This finding is supported by Paul R Albert, 2015, noted that prevalence of major depressions is higher in women than men, in 2010 the global annual prevalence of depressions was 5.5% in women and 3.2% in men. Kendler KS et al 2014, conducted a study of dizygotic twins, and noted that women displayed more sensitivity to interpersonal relationships and men displayed more sensitivity to external career and goal oriented factors. Women are also noted to experience specific forms of depression related ailments such as pre menstrual dysphoric disorder, post partum depression, and post menopausal depression and anxiety. These conditions are associated with changes in ovarian hormones and could contribute to the increased prevalence of depression in women. However, the underlying mechanisms remain unclear hence no treatments specific to women have been developed. It is important to note that increased prevalence of depression correlates with hormonal changes in women, particularly during puberty, prior to menstruation, following pregnancy and at perimenopause, this suggests that hormonal fluctuations might be a trigger for depression. Its thus important that at all out patient neurology clinics screening should be done for depression with self rating scales such as the The Zung self rating depression scale. The clinical staff will then review the rating scale and then assess the patients with positive results on the self rating scale with a more sensitive clinician based scale such as Montgomery – Asberg Depression Rating Scale (MADRS), Hamilton Depression Rating Scale (HAM-D) and Beck’s Depression Inventory (BDI).
The study also diagnosed that 9.5% of the participants had generalized anxiety disorder. Studies indicate that post stroke anxiety is common and persistent. Cumming TB et al, 2016, demonstrated that the point prevalence of anxiety disorders is markedly higher after stroke than in the general population, and this cannot be attributed to higher rates of comorbid depression. Cumming TB et al, 2016, demonstrated that the point prevalence of anxiety disorders is markedly higher after stroke than in the general population, and this cannot be attributed to higher rates of comorbid depression. Astrom 1996, conducted a 3 year longitudinal study of generalized anxiety disorder after stroke and he found out that generalized anxiety disorder is a common and long lasting ailments that interferes with social life and functional recovery.

The study demonstrated that 2.3% of the participants had alcohol dependence which began prior to the stroke. All of the study participants with alcohol dependence were of the male gender. Patterns from the Genacis project, where a large population of mens’ and womens’ drinking behaviour of 900 participants, in 35 countries from 1997 – 2007 were sampled using a standardized questionnaire in 35 countries and, indicated that men still exceed women in drinking and high volume drinking although gender ratios vary. Thus men have been found to consume more alcohol than women as is shown by a study by United states Substance abuse and Mental health services administration, 2008, showed that adult males consume more alcohol and have more alcohol related problems than females. It is thus important to in cooperate screening tools for the adult male patients who attend the neurology outpatient clinic. Simple tools like CAGE criteria and AUDIT can help to screen for alcohol dependence by the clinical team to capture patients with alcohol dependence.

The study also demonstrated that 1.9% of the female participants were diagnosed with bulimia nervosa. The global prevalence of bulimia nervosa in women is 1.5% according to the National comorbidity survey replication by Hudson JI et al, 2007. Pratap Sharan et al 2015, noted that eating disorders had a multifactorial aetiology. There was a role of genetic factors, and
premorbid personality Screening tools for eating disorders which such as eating attitudes test (Eat) and SCOFF (Sick, Control, One stone, Fat, Food) questionnaire are all self rated and help clinician pick eating disorders even in non psychiatric specialist settings like the neurology clinic. Similar studies on the prevalence of psychiatric morbidity in stroke populations had not demonstrated any eating disorder, Ajiboye et al 2012 and Obiora et al 2012 and Tang Wk 2002. This can be attributed to the mini plus tool which has modules for bulimia nervosa and anorexia nervosa. It thus captured the study participants with an eating disorder.

During the duration of the study period, no diagnosis of post traumatic stress disorder, psychotic disorders, obsessive compulsive disorder were encountered. This is similar to an Italian study by Angelelli P et al 2004 which did not diagnose any post traumatic stress disorder, psychotic disorders and obsessive compulsive disorder.

The study limitations were noted to be that no in patients admitted in the ward were included in the study. This is because in-patients were deemed to be debilitated to answer questions. It would have been ideal to follow up the stroke patients after 6 months but there are time constraints. This can be determined in future studies.

Further research needs to be done in stroke patients with psychiatric morbidity with an emphasis on the type of lesion that a patient has on computed tomography brain scan. Studies also need to be done looking at the duration of the stroke verses the psychiatric morbidity encountered. A multi centre study with a larger sample size should be carried out which will help clarify psychiatric morbidity in post stroke patients.
5.2 Conclusion

The study has shown that psychiatric morbidity occurs in stroke population. The psychiatric morbidity encountered in the study were major depressive disorder, alcohol dependence disorder, generalised anxiety disorder, and bulimia nervosa. No cases of post traumatic stress disorder, mania, psychosis, social phobia, and panic disorder were encountered during the study duration. Socio demographic variables were not significantly associated with psychiatric morbidity. It is thus important to incorporate psychiatric care in the neurology and general outpatient medical clinics to manage the psychiatric morbidity as this will aid to improve quality of life and treat these patients. The number of studies done in developing countries on stroke patients have been few and this study will add some invaluable knowledge in this special population. In addition, further research needs to be done in Kenya and other developing countries in order to allow for cross cultural comparison of rates of disorders and associated factors and also for development of preventive strategies.

5.3 Recommendations

The KNH medical and psychiatry department should liaise and deploy a permanent psychiatrist in the outpatient neurology clinic so as to assist the patients with psychiatry morbidity. Psychiatry department should now facilitate a rotation through the neurology clinic by psychiatric registrars. The neurologists and neurologist registrars should learn psychiatric assessment of patients. Clinical psychologist should be deployed to the neurology clinic to assist
in management of patients with psychiatric morbidity. Self rated screening tools for depression, alcohol dependence, eating disorders should be incorporated in the out patient medical clinics. Reference point to other medical personnel and will aid in training and education. It will assist the hospital management in planning purposes on staffing the neurology clinic. More awareness should be created amongst stroke patients on psychiatric morbidity. This will enable the patients to be empowered with knowledge and thus be able to make informed decision concerning their own health. The Ministry of health and county governments should deploy psychiatrists to all areas in Kenya to manage the significant psychiatric morbidity. KNH Should be used as a center of excellence so that the county hospitals can run similar well staffed out patient neurology clinics
REFERENCES


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APPENDICES

Appendix I: Consent Form

This Informed Consent form will be administered to stroke patients attending KNH Neurology outpatient clinic who will participate in this study. The title of the research project is “prevalence of psychiatric morbidity in outpatient cerebrovascular accident patients in KNH, Nairobi County, Kenya”.

Name of researcher: David Eliud Kagwi Wairoto.

Name of Organization: UNIVERSITY OF NAIROBI

Title of Proposal: Prevalence of psychiatric morbidity in cerebrovascular accident patients attending outpatient neurology clinic KNH.

This Informed Consent Form has two parts:

- Information Sheet (to share information about the research with you),
- Certificate of Consent (for signatures if you agree to take part).

You will be given a copy of the full Informed Consent Form

PART I: Information Sheet

Introduction

My name is David Eliud Kagwi Wairoto. I am a post graduate student undertaking a Master’s of medicine in Psychiatry University of Nairobi. As a requirement by the university, for the completion and award of my degree, I am conducting a study on prevalence of psychiatric morbidity in outpatient neurology clinic cerebrovascular accident patients at KNH, Nairobi County, Kenya

I am going to extensively explain about this research and invite you to voluntarily participate. I am going to give you time to decide on whether you will participate in the research. You are free to consult before making any decision.

I am going to use the language that you understand either spoken or written. You are free to ask any question or clarification about the research during, and after data collection using the contact address provided at the end of this document.
**Purpose of the research**
Understanding psychiatric morbidity in neurologic patients is important for timely recognition and management of such conditions.

**Benefits**
There are no direct benefits for you as an individual but your involvement will help in finding the response to the research question stated in the research proposal. There are no benefits to the community at this stage of the research, but future generations can benefit from the published document. Information obtained from the study will be published.

**Risks**
There are no risks involved in taking part in this research.

**Voluntary Participation**
Your involvement in this research is completely voluntary. It is your choice whether to take part or not. Whether you choose to take part or not will not affect you in any way. You may change your mind later and discontinue taking part even if you had agreed earlier.

**Confidentiality**
The identity of those taking part in the research will not be disclosed or shared with anyone. Informed consent will be obtained from you in order to participate in the study. To ensure confidentiality the data collection forms will not bear your name or ethnicity. You will be identified by the study code number. Only the researchers will recognize what your number is and the collected data kept under lock and key. All the data and the information obtained during the study will be used for the sole purpose of meeting the objective of the study.

**Duration**
The data collection will only take a period of 45 minutes -1 hour. During this time, you will only be expected to answer the questions asked as outlined.

**Contacts**
Questions are welcome at the moment or later, even when the study is in progress. If later use the contacts below.
1. DAVID ELIUD KAGWI WAIROTO  
P.O.BOX 60681-00200  
NAIROBI, KENYA.  
MOBILE NUMBER 0722841292  
Email address davidkagwi@gmail.com

2. KENYATTA NATIONAL HOSPITAL – UNIVERSITY OF NAIROBI ETHICS REVIEW COMMITTEE (KNH-UON ERC)  
P.O.BOX 20723 – 00202  
NAIROBI, KENYA  
Email address uonknh_erc@uonbi.ac.ke  
Website: http://www.erc.uonbi.ac.ke  
Facebook: https://www.facebook.com/uonknh.erc

Appendix II: Mini International Neuropsychiatric Interview plus 6.

Informed Consent
I have read and understood the information sheet. Having been assured of confidentiality and anonymity I accept to take part in this study voluntarily to help facilitate the accuracy and validity of this study.

Signature_________________________ Date_____/_____/________

Witness Signature__________________ Date____/_____/________

Signature of Interviewer_______________ Date____/______/________

Instructions
1. Do not write your name on the Mini Plus tool
2. Tick in the boxes provided where applicable
3. For open ended questions write the answers in the space provided
4. Answer all questions
5. All information obtained will remain confidential
Appendix III Socio Demographic Questionnaire

The following researcher designed socio demographic questionnaire will be used to capture data from the study participants:

1. What is your age?
2. What is your gender?
   Female
   Male
3. What is your primary language?
4. What is your total household income in Kshs.?
5. What religion do you belong to?
6. What is your occupation?
7. What is your Marital status?
8. Did you have a psychiatric illness prior to the stroke?
   Yes …….(please specify)
   No
Appendix IV: Map of Nairobi County