

Research Article

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Prevalence and nature of psychiatric morbidity in stroke outpatients in Kenyatta national hospital, Kenya

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Abstract

Keywords

psychiatric morbidity,
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socio demographic
questionnaire,
SPSS.

Cerebrovascular accidents or strokes are a major cause of morbidity in the world. The burden of psychiatric morbidity in Stroke patients is not well documented in developing countries including Kenya and therefore this study determined the prevalence of psychiatric morbidity amongst cerebro vascular accident patients. The study design adopted was cross sectional study. The setting of the study was the Neurological outpatient clinic at the Kenyatta National Teaching and Referral hospital, Nairobi County. The sampling technique used was systematic random sampling. A total number of 210 cases of stroke patients were taken up in the study. The stroke populations were identified at the neurological clinic using the outpatient files and the investigator liaised with the clinic staff to refer all patients who meet the inclusion criteria for the study. Informed consent was obtained. 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 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.

Introduction

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.

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 stake holders 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.

Materials and Methods

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). The study area was Kenyatta National Hospital in Nairobi County. KNH has a capacity of 1800 beds and has over 6000 staff members. 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. All stroke patients attending KNH neurology clinic was the study population. From records, the average annual patient attendance in clinic is 3384. Well documented stroke (typical clinical picture supplemented by brain CT scan) and those clients with Ability and willingness to give informed consent to participate in the study. Inability to communicate both verbally and non-verbally, Severe cognitive impairment and Impaired consciousness that will make psychiatric assessment either impossible or unreliable clients were not selected to participate in the study. Fisher formula was used to determine the sample size.

$$n = \frac{z_{1-\alpha/2}^2 \times p(1-p)}{d^2} \text{ (Mugenda \& Mugenda, 1999)}$$

N=Minimum sample size.

=Level of significance (0.05).

Z_{1- α /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**.

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 2nd 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.

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 2nd patient with a stroke to participate in the study. 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 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.

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 coefficient 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.

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.

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.

Quantitative data from the Mini plus was checked daily for completeness and coded for appropriate computer entry. Equivalent responses were pooled to arrange the response in different categories. The Quantitative data was managed by IBM Statistical Package for Social Sciences (SPSS) 22.0. 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 was used to test the significance of the association between the dependent and independent variables. The thresh hold for statistical significance was set at $P < 0.05$. The results will then presented using tables, graphs, pie chart and figures. 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.

Results

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.

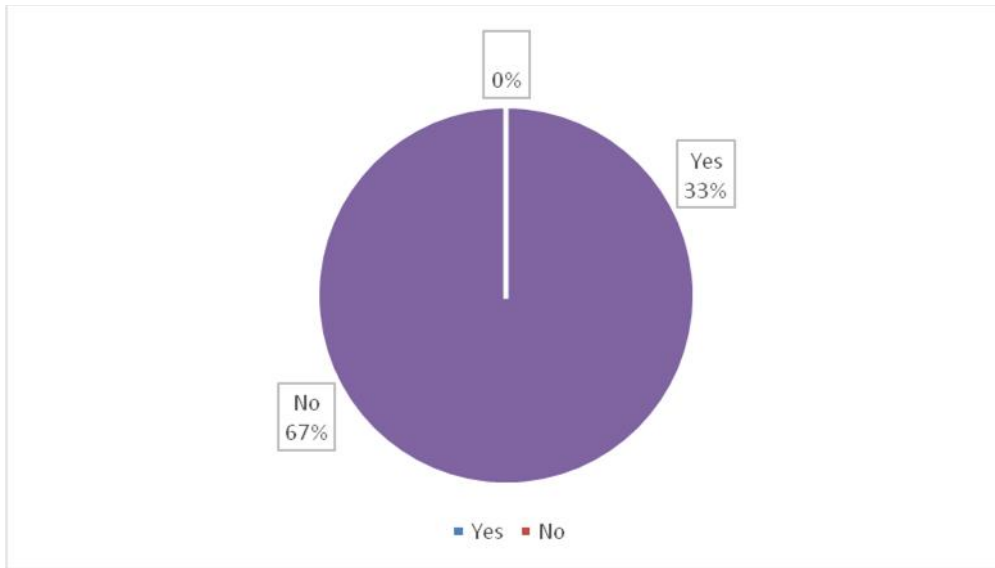


Figure 1. Shows prevalence of psychiatric morbidity

Psychiatric Morbidity Table 1

Overall Psychiatric Morbidity	Depression	General Anxiety Disorder /GAD	Bulimia Nervosa	Alcohol dependence	Nil Psychiatric Morbidity
32.85%	(19%)	(9.5%)	(1.95%)	(2.4%)	(67.15%)

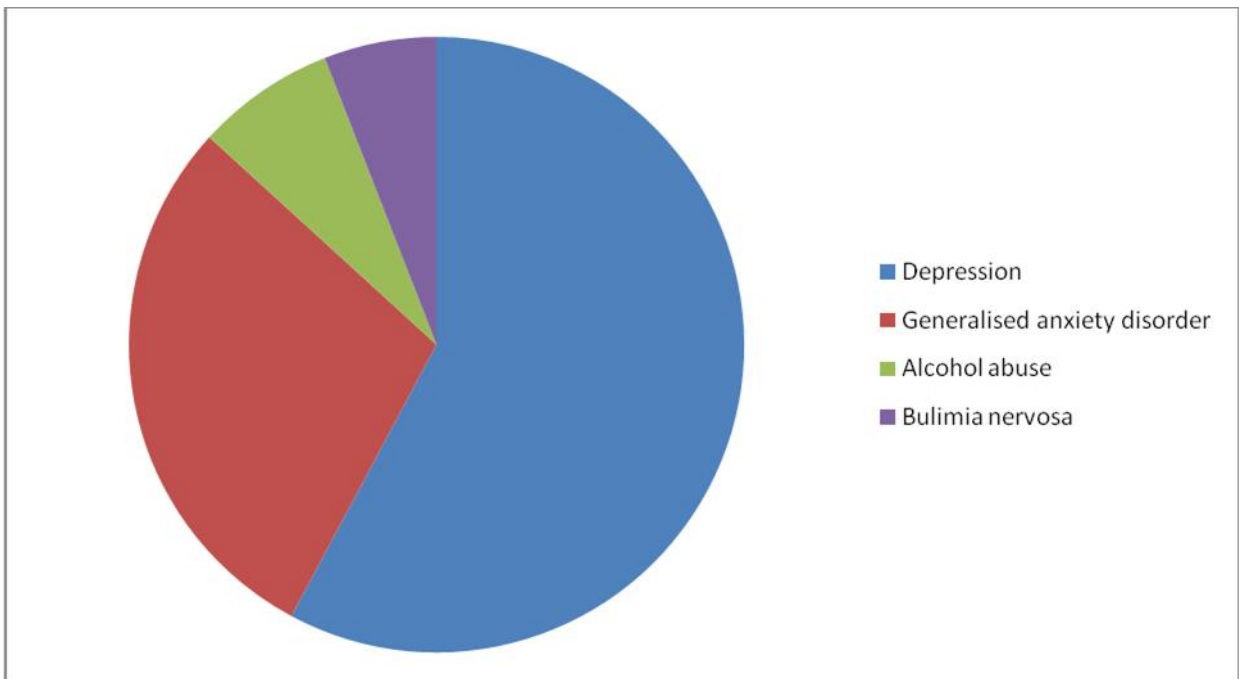


Figure 2 Shows the psychiatric morbidity

Table 2 shows the psychiatric morbidity in association with socio demographic variable

Variable	Number Studied	Depression	General Anxiety disorder	Alcohol abuse	Bulimia nervosa	Psychiatric Morbidity	Statistics
Gender	Female 86	30	14	0	4	69	P=0.75
	Male 126	10	6	5	0		
Marital status	Married 126	20	11	4	1	69	P=0.621
	Single 26	10	7	1	2		
	Separated 2	5	1	0	1		
	Others 56	5	2	0	0		
Occupation	Employed 162	23	10	3	2	141	P=0.471
	Unemployed 22	14	5	2	2		
		3	5	0	0		
	Others 26						

The nature of psychiatric morbidity in stroke patients

Table 3 showed that 19 % of the study participants had major depressive disorder.

Table 3 Major Depressive Episode

	Frequency	Percentage
No	170	81
Yes	40	19
Total	210	100

Table 4 indicated that 9.5 % of the study participants with major depression had suicidal risk.

Table 4 Suicidality

	Frequency	Percentage
No	210	90.5
Yes	20	9.5
Total	210	100

Table 5, indicates that there was no manic disorder in the study participants.

Table 5 Manic Episode

	Frequency	Percentage
No	210	100
Yes	0	0
Total	210	100

Table 6, shows that there was no panic disorder found in the study participants

Table 6 Panic Disorder

	Frequency	Percentage
No	210	100
Yes	0	0
Total	210	100

Table 7, indicates that there is no social phobia in the study participants.

Table 7 Social Phobia

	Frequency	Percentage
No	210	100
Yes	0	0
Total	210	100

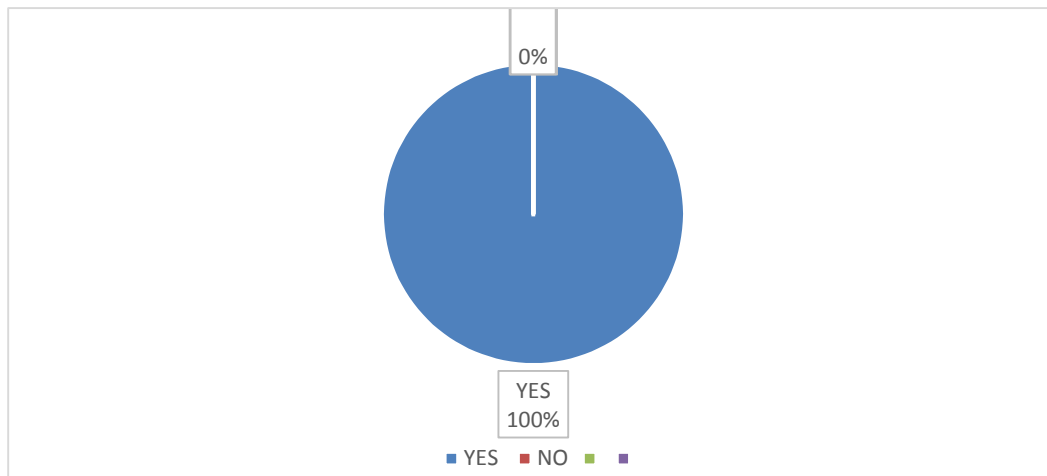


Figure 3 Obsessive compulsive disorder in stroke patients

Figure 3 shows that there was no obsessive compulsive disorder in the study participants.

Table 8 shows that none of the study participants had post traumatic stress disorder.

Table 8 Posttraumatic Stress Disorder

	Frequency	Percentage
No	210	100
Yes	0	0
Total	210	100

Table 9 indicates that 2.3 % of the study participants were diagnosed with alcohol dependence.

Table 9 alcohol dependence

	Frequency	Percentage
No	205	97.7
Yes	5	2.3
Total	210	100

Table 10 indicates that 2.3 % of the study participants were diagnosed with alcohol abuse.

Table 10. Alcohol Abuse

	Frequency	Percentage
No	205	97.7
Yes	5	2.3
Total	210	100

Table 11 indicates that none of the study participants were diagnosed with substance dependence.

Table 11 Substance dependence

	Frequency	Percentage
No	210	100
Yes	0	0
Total	210	100

Table 12 shows that none of the study participants were found to have substance abuse.

Table 12 Substance Abuse

	Frequency	Percentage
No	210	100
Yes	0	0
Total	210	100

Data on table 13 shows that none of the study participants were diagnosed with a mood disorder with psychotic features.

Table 13 Mood Disorder with Psychotic features

	Frequency	Percentage
No	210	100
Yes	0	0
Total	210	100

Table 14 shows that none of the study participants were diagnosed with a mood disorder with psychotic features and a current psychotic disorder.

Table 14 Mood disorder with psychotic features and current psychotic disorder

	Frequency	Percentage
No	210	100
Yes	0	0
Total	210	100

Table 15 indicates that none of the study participants were diagnosed with a psychotic disorder.

Table 15 Psychotic Disorder

	Frequency	Percentage
No	210	100
Yes	0	0
Total	210	100

Table 16 shows that none of the study participants were diagnosed with anorexia nervosa.

Table 16 Anorexia Nervosa

	Frequency	Percentage
No	210	100
Yes	0	0
Total	210	100

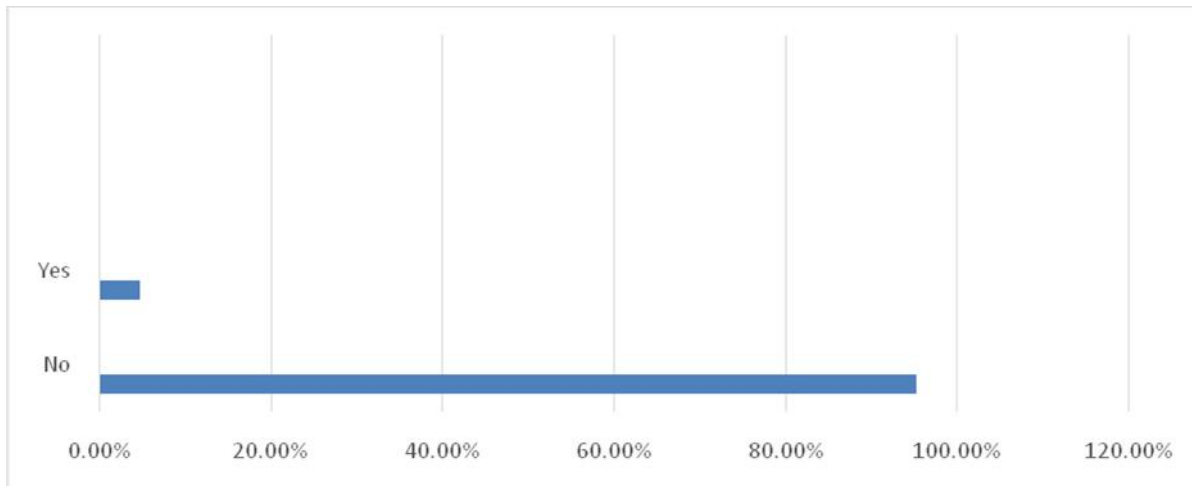


Figure 4 Showing study participants with bulimia nervosa

Figure 4 shows that 1.9 % of the study participants were found to have bulimia nervosa out of the 210 participants.

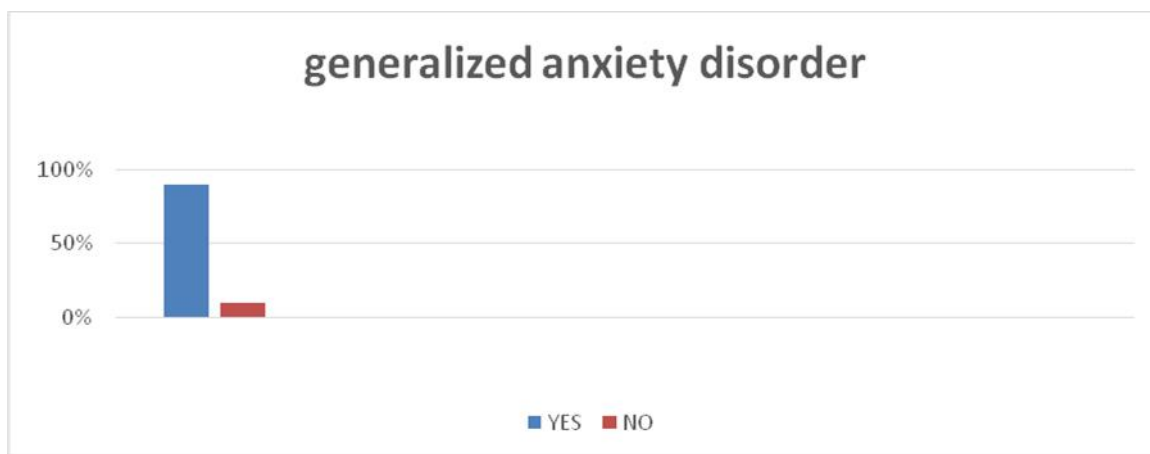


Figure 5 Showing study participants with generalised anxiety disorder

Table 17 Generalized Anxiety Disorder

	Frequency	Percentage
No	190	90.5
Yes	20	9.5
Total	210	100

Data on table 18 indicates that none of the study participants were found to have anti social personality disorder.

Table 18 Antisocial Personality Disorder

	Frequency	Percentage
No	210	0
Yes	0	0
Total	210	100

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 19.

Table 19 Contingency of stroke and nature of psychiatric morbidity

		Diagnosed	Not diagnosed	Total
Nature of morbidity	High	21	2	23
	Low	3	15	18
		24	17	21

Table 20: Chi-square

Cell	$O_i \lambda_i$	λ_i	$O_i - \lambda_i$	$(O_i - \lambda_i)^2$	$\frac{(O_i - \lambda_i)^2}{\lambda_i}$
1, 1	21	13.5	7.5	56.25	4.17
1, 2	02	9.5	- 7.5	56.25	5.92
2, 1	03	10.5	- 7.5	56.25	5.35
2, 2	15	7.5	7.5	56.25	7.5

Chi-square computed

The sum of the last column gives $\chi^2 = 22.94$. At the 95% confidence level and a degree of freedom of $(2-1)(2-1) = 1$, $\chi^2_{0.05, 1} = 3.841$. Since χ^2 is more than $\chi^2_{0.05, 1}$,

we reject the null hypothesis H_0 and accept the alternate hypothesis and conclude that there is sufficient evidence to suggest that stroke have a relationship/influences psychiatric morbidity table 4.20.

Table 21 Multiple Regressions

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.772 ^a	.595	.485	.466	.595	5.398	6	22	.001

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 three 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 4.35 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 22: ANOVA

Model	Sum of Squares	d.f
Regression	7.023	6
Residual	4.770	22
Total	11.793	28

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

Discussion

The main objective of this study was to determine the prevalence of psychiatric morbidity in cerebrovascular accident patients attending the neurology outpatient 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 psychiatric 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 cerebro vascular 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. It is thus important that at all out patient neurology clinics screening should be done for depression with self rating scales such as 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.

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 men's and women's drinking behaviour 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 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 incorporate 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.

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. The duration of the stroke vis a vis 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.

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References

1. Adeloye D (2014) An Estimate of the Incidence and Prevalence of Stroke in Africa: A Systematic Review and Meta-Analysis. PLoS ONE 9(6): e100724. <https://doi.org/10.1371/journal.pone.0100724>
2. Ajiboye PO 1, Abiodun OA 1, Tunde-Ayinmode MF 1, Buhari OIN1, Sanya EO 2, Wahab KW 2, (2013) *Psychiatric morbidity in stroke patients attending a neurology clinic in Nigeria*. African Health Sciences ; 13(3): 624 - 631 <http://dx.doi.org/10.4314/ahs.v13i3.15>
3. Ajzen, I., & Fishbein, M. (1980). *The theory of reasoned action. Adopted from understanding attitudes and predicting human behavior*. Prentice Hall, Englewood, New Jersey.
4. Almeida OP, Xiao J.(2007), *Morbidity associated with incident mental health disorders after stroke*. Australian and New Zealand Journal of Psychiatry;41: 274-281. 39.
5. Beghi M, Cornaggia CM, Di Giacomo E, Primati C, Clerici M. (2009) *Stroke and psychiatric disorders*. Riv Psichiatri; 44 (1): 55-63. 40.
6. Hackett, M. L., Köhler, S., O'Brien, J. T., & Mead, G. E. (2014). Neuropsychiatric outcomes of stroke. *The Lancet Neurology*,13(5), 525-534. doi:10.1016/s1474-4422(14)70016-x
7. Horne, M. (2010). 27. Parkinsons disease. *Journal of Clinical Neuroscience*,17(12), 1618. doi:10.1016/j.jocn.2010.07.028
8. Kanner MK (2005), *Depression in Neurological Disorders*. Wilingham: Cambridge Medical Communication Ltd.
9. Lyketos GC, Kozauer N, Rabins VP (2007). *Psychiatric manifestations of neurological disease: where are we headed?* Dialogues Clin Neurosci ; 9:111-124.
10. Maree L. Hackett, Chaturangi Yapa, Varsha Parag, Craig S. Anderson, *Frequency of Depression After Stroke A Systematic Review of Observational Studies* , Stroke, Journal of the American Heart association, 2005 Jersey.
11. Mugenda, O., & Mugenda, A. (1999). *Research methods/ quantitative and qualitative approaches*. Nairobi: Africa centre for technology studies.
12. Paolucci, S. (2008). Epidemiology and treatment of post-stroke depression. *NDT Neuropsychiatric Disease and Treatment*, 145. doi:10.2147/ndt.s2017
13. Robinson, R. G. (2010). Psychiatric Management of Stroke. *Psychiatric Annals*,32(2), 121-127. doi:10.3928/0048-5713-20020201-09

14. Robottom, B., & Weiner, W. (2009). Parkinsons Disease Dementia. *Current Psychiatry Reviews CPSR*,5(3), 218-225. doi:10.2174/157340009788971128
15. Vataja, R., & Kaste, M. (2013). Anxiety Disturbances in Stroke Patients. *Neuropsychiatric Symptoms of Neurological Disease Neuropsychiatric Symptoms of Cerebrovascular Diseases*, 81-107. doi:10.1007/978-1-4471-2428-3_5
16. Wang X, Chung MC, Hyland ME, Bahkeit M.(2011). *Posttraumatic stress disorder and psychiatric comorbidity following stroke: The role of alexithymia*. *Psychiatric Research*; 188: 51-57
17. WHO, <http://www.who.int/mediacentre/factsheets/fs310/en/>, accessed on 24th April 2017
18. Williams LS, Ghose SS, Swindle RW, (2014). *Depression and other mental health diagnoses increase mortality risk after ischemic stroke*. *Am J Psychiatry* ; 161 (6): 1090-1095.
19. World health federation,<http://www.world-heart-federation.org/cardiovascular-health/stroke/> accessed on 24th april 2017
20. Government of Kenya, Kenya Mental health policy 2015 – 2030
21. Paul R. Albert, *Why is depression more prevalent in women ?*, *J Psychiatry Neurosciences*: 2015 July;40 (4): 219 -221
22. Kendler KS, Gardner CO, *Sexdifferenced in the pathways to major depression : a study of opposite-sex twin pairs*, *Am J Psychiatry*, 2014 April; 171 (4):426 – 35
23. Cummings TB, Blomstrand C, skoog, Linden T, the high prevalence of anxiety disorders after a stroke, *Am J Geriatric Psychiatry*, 2016 Feb 24 (2):154-60
24. HudHudson JI, Hiripi E, Pope HG, Jr, Kessler RC. *The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication*. *Biol Psychiatry*. 2007;61:348–58
25. Pratap Sharan, A Shymam Sundar, *Eating disorders in women*, *Indian J psychiatry* 2015 Jul ;57(suppl 2):5286-5295
26. Tang WK, Ungyaru GS, Chius HF, Sze, *Psychiatric morbidity in firs time stroke patients in Hong Kong: A pilot study in a rehabilitation unit*, *Sage Journal*, August 2002
27. Rana Ravi Kumar, Lamba Ratandeep, Gupta Sanjay, *Neuropsychiatric complications in post stroke patients according to site of lesion* , *Indian Journa l of Psychosocial Sciences*, October 2013
28. Angelelli P, Paoulucci S, Bivona U, Piccardi L, Ciurli P, Cantagallo A, et al, *Developments of neuropsychiatric symptoms in poststroke patients; a cross-sectional study*, *Acta Psychiatry,Scand* 2004; 110:55-63.

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