Demographic and Clinical factors on Depression among Stroke Patients

Mshelia Anthony Ali[1,*], Onyencho Victor Chidi[2], Adebowale O. Timothy[3]

[1]Clinical Services Department, Federal Neuropsychiatric Hospital, Maiduguri, Borno State, Nigeria
[2]Mental Health Department, College of Medical Sciences, University of Maiduguri Borno State, Nigeria
[3]Mental Health Department, Neuropsychiatric Hospital, Aro Abeokuta, Ogun State, Nigeria
*Corresponding author: drtonymshelia@mail.com

Abstract This study assessed the influence of demographic and clinical factors on depression among one hundred and ninety one (191) stroke patients who attended the medical outpatient clinics of the department of medicine, State Specialist Hospital, Maiduguri, Borno State, Nigeria. Stroke patients who were adults (18years and above) and had a stroke at least two months prior with a residual neurological deficits were interviewed with the depression module of the Structured Clinical Interview for DSM-IV axis-I disorders (SCID) and the Hamilton Depression Scale using accidental sampling techniques. The prevalence of depression was 52.9%. Depression among the patients were associated with younger age ($\chi2=12.515$; p=0.002). There is a significant relationship between depression and duration of Cerebro-vascular accidents (CVA) of the participants ($\chi2=22.2$; p=0.000), the highest prevalence of depression was among the most recent stroke victims. The findings revealed the magnitude and correlates of depression among patients with CVA. Therefore, there is need to incorporate post-stroke psychosocial adjustment evaluation, psychiatric and psychological interventions to this vulnerable group to facilitate their rehabilitation and enhance their psychological wellbeing and recovery.

Keywords: age, depression, clinical factor, stroke

1. Introduction

Stroke remains one of the major illnesses world-wide that healthcare organizations will need to address for several decades to come. This condition can affect virtually all human functions and unlike other disabling conditions, the onset of stroke is sudden, leaving the individual and family unprepared to deal with its sequela [1]. Stroke is one of the most common causes of morbidity and mortality in western countries [2]. Every year, about 15million people suffer non-fatal stroke and about one third of them worldwide are disabled following it [3]. It is increasingly becoming a major cause of morbidity and mortality in Nigeria and other developing countries [4]. Stroke admissions accounted for 3.6% of all medical admissions in a Nigeria teaching hospital between 2000 and 2005 [5]. Depression is one of the most common neuropsychiatric disorders occurring after stroke [6]. Depressive symptoms are frequent and are likely to prevail longer at follow-up times. The symptoms were associated with stroke severity and functional outcome as from two months onward [7]. Frequency of depression after stroke has been reported across different studies. The pooled estimate in Australia indicates that depressive symptoms are present in 33 % of cases of all stroke survivors at any time during follow up [8]. Similarly, 32.6% of stroke patients seen in a Nigeria teaching hospital met DSM-III-R criteria for diagnosis of major depression [9]. In another study from south western Nigeria, the prevalence rate of depression in cerebrovascular disease was 33% [10].

Cerebrovacular accident (CVA) could occur in either part of the brain; right or left hemispheres. Damage to the right hemisphere cause problems on the left side of the body because the motor and sensory centers from each half of the brain have their greatest control over the opposite side of the body and vice versa. Systematically reviewed literatures on the lesion location and post-stroke depression (PSD) shows that the direction of association between left hemisphere lesion location and PSD varied depending on whether patients were sampled as inpatients or from the community; and differences in measurement of depression, study design and presentation of results also may have contributed to the heterogeneity of these findings [11].

Investigations on coping strategies in individuals suffering severe traumatic brain injury, cerebrovascular accident or hypoxic brain injury as it relates to apathy, depression and lesion location was conducted; apathy was related to sub-cortical and right hemisphere lesion, depression was unrelated to lesion location [12]. In a similar study, the presence of PSD and post-stroke emotional incontinence was related to the nature, laterality

or size of the lesion, while location of the lesion was a stronger determinant for PSD [13].

Advanced age is the most powerful risk factor for stroke. The incidence of stroke doubles with each decade after the age of 55 years. Age of onset may be considered as a marker for the duration of some risk factors acquired at a younger age (e.g. smoking) while some other risk factors (hypertension and diabetes mellitus) tend to be more evident with advancing age. Among Africans, the peak age of incidence has been found to be 1-2 decades earlier than that in the western population, where it is reported that more than half of the cases occur in people older than 70years [3,14,15]. Men are known to develop strokes at higher rates than women with rates of cerebral infarction higher in blacks than in whites and Hispanics. The higher prevalence of hypertension, diabetes and atherosclerotic occlusive disease in blacks may partly explain the difference [16]. Depressive symptoms were present among stroke patients and those that had marked symptoms had more neurological impairments, and were more likely to be female. There was no relationship between depressive symptoms with age, lesion volume, or side of lesion [17].

Studies have suggested independent contribution of psychiatric symptoms to quality of life among patients with co-existent medical illnesses [17]. This has not been conclusively demonstrated among stroke patients in the north eastern Nigeria. Therefore, this study will generate important information about the prevalence of depression among stroke patients. It will unravel the relationship between depressions, demographic and clinical variables which will be of interest. Lastly, this study will also help to proffer recommendations on ways to enhance clinical recovery of stroke patients.

2. Method

2.1 Setting and Participants

The study was conducted at the Department of Medicine of the State Specialist Hospital, Maiduguri, Borno State, Nigeria. Two hundred and thirty four (234) patients were initially recruited but forty three (43) were excluded for various reasons: Seventeen (17) had complications of HIV infections and could not give coherent history as a result of impaired cognition, ten (10) had a history of a previous transient ischaemic attack (TIA) and sixteen (16) declined to participate in the study. Finally a total of one hundred and ninety one (191) patients were interviewed at the General Out-patients Department (GOPD), Medical Out-patients Department (MOPD) and Female Out-patients Department (FOPD) who had a minimum of two-month history of stroke, with residual motor neurological deficit.

2.2. Inclusion Criteria

All newly diagnosed adults (18 years and above) who were hypertensive with or without diabetes mellitus and had a stroke at least two months prior to the interview and who have residual motor neurological deficits [9].

2.3. Exclusion Criteria

(1) Patients who refused to give consent (2) Patients who had a history of neurological illness before stroke (3) Patients with previous history of stroke (4) Participants who do not understand either English or Hausa languages (5) Those that were very ill and/or aphasic and could not respond to questionnaires were excluded (6) Those with HIV were excluded because their stroke could not be differentiated from being cerebrovascular or a non-cerebrovascular origin, since most of the patients could not have a CTscan investigation to identify the location of the lesion in the brain due to its financial implication.

2.4. Study Design and Sampling Techniques

The study was a cross sectional descriptive study of hypertensive's with or without diabetes out-patients with Cerebro-Vascular disease (CVD) utilizing accidental sampling techniques.

2.5. Procedure

The study was carried out at the clinics. Each consecutive patient with a diagnosis of stroke, who fulfilled the inclusion criteria for the study, and consented verbally and in writing to the interview was seen alone in a private room at the GOPD, MOPD and FOPD, while waiting for consultation or immediately afterwards. The researchers had earlier informed all Nursing heads of the outpatient clinics concerned to solicit their cooperation. Hence the researchers was contacted on phone whenever a patient with stroke reports at any of the clinics because there was no specific clinic for stroke patients. With this arrangement all patients with stroke who attended the clinics and who fulfilled the inclusion criteria were seen within the study period. The questionnaires were self administered if the respondent has sufficient ability for self administration or administered by the researchers, where the patients had writing difficulties. Those respondents, who did not understand English language, had their interview conducted in Hausa. The study lasted for three (3) months, commencing from February through April, 2009. Interviews were strictly conducted during clinic hours from 9:00 am to 2: 00 pm, five times weekly and lasted for thirteen (13) weeks. On the average, three to four (3-4) patients were interviewed per day.

2.6. Sample Size

The minimum sample size was computed using a prevalence of 32.6% of a similar study in Ibadan, South-Western Nigeria among stroke patients [9], 95% confidence interval with a corresponding critical value (Z) of 1.96 and 0.05 degree of precision was used. This yielded a minimum sample size of 338 respondents. However, n = 338 sample size for population >10, 000 but When 'N' (entire population) is less than 10, 000, the required sample size will be smaller [18]. In such case, a final sample estimate (nf) was calculated and based on the computations, a sample size of 187.29 was required. However it was increased by 20% to 234 to allow for possible attrition and drop outs, and to improve on the significance of the study [18].

2.7. Ethical Consideration

Ethical clearance was obtained for this study from the State Specialist Hospital Maiduguri Ethical Committee, and permission was taken from consultants and doctors

managing the patients. The author made introductory visits to the GOPD, MOPD and FOPD on clinic days before the study began, to explain the aims and objectives of the study to the clinic staff members, to enlist their cooperation, with the assurance that privacy and confidentiality of information gathered from respondents will be maintained. Verbal and written informed consent was obtained from each subject prior to interview after explaining the aims and objectives of the study, with assurance of confidentiality

2.8. Instruments

The data was collected using the following instruments; (1) A demographic and clinical variable questionnaire (2) Structured Clinical Interview for Axis-1 DSM-IV Disorders (SCID) (Research version) (3) Hamilton Depression Scale (HDS)

2.9. Demographic Variables Questionnaire

A sociodemographic and clinical variable questionnaire was designed by the researchers to obtain information on: age, gender, marital status as well as duration of cerebrovascular accident and location of the CVA (right or left sided).

2.10. Structured Clinical Interview for Axis-1 DSM-IV Disorders (SCID)

This is an interviewer administered semi-structured interview schedule for making axis-1 diagnosis according to the fourth (4th) edition of the Diagnostic and Statistical Manual (DSM-IV) of the American Psychiatrist Association [19]. It comprises the following modules; Mania, Depression, Psychosis, Substance abuse disorders, Somatization disorders, Eating disorders and Adjustment disorders [20]. Module 8 which focuses on major depressive disorder was used for this study. A test retest reliability were reported for most of the major disorders, with kappa values for current and lifetime diagnosis in the patient samples were above .60 with an overall weighed kappa value of .61 for current and .68 for lifetime diagnosis [21]. In this study, the instrument was translated to Hausa using the iterative back translation method and was used for patients who do not understand English.

2.11. The Hamilton Depression Scale (HDS)

This is an observer rated scale for rating the severity of depression in subjects already diagnosed with depression. In the 17-item version, eight items are defined from 0-2 and nine items are defined from 0-4. HDS has an intra-class correlation co-efficient of 0.86 indicating an adequate inter-observer correlation [22]. Latent structure analysis shows that items 1,2,7,8,10 &13 of the HDS constitute an interval scale for the severity of the depression [23] . When all 17-items are used, the cut-off scores are: 0-7 = no depression, 8-14 = mild depression, 15-18 = moderate depression, ≥19 = severe depression [23]. In Nigeria, HDS has been used to measure the therapeutic response to antidepressant medication [24]. In this index study, the instrument was translated to Hausa using the iterative back translation method and was used for patients who do not understand English.

2.12. Analysis

The data obtained was cleaned and coded where appropriate and entered into the Statistical Package for Social Sciences (SPSS) version 11.0 with the assistance of a biostatistician. Socio-demographic and clinical variables of the subjects were presented in frequency tables with appropriate summary statistics. Chi square was used to examine relationship between Depression and other Clinical and demographic variables. Level of significance for inferential statistics was set at $p < 0.05$, two tailed.

3. Results

3.1. Demographic Characteristics of the Patients and the Prevalence of Depression According to Age group

Table 1 shows demographic characteristics of patients with stroke. Their ages ranged between 18 and 95 years, with a mean age (X) of 50.14 and (SD) of 16.05 years. One hundred and seventeen (61.3%) were males while 74(38.7%) were females. Ten (5.2%) of the patients were single, 146(76.4%) married, 18(9.4%) widowed, 11(5.8%) separated, while 6(3.1%) were divorced. The prevalence of depression among the participants was 52.9% in the study.

Table 1. Showing demographic Characteristics of the Patients

Demographic Characteristics	No of respondents N=191
(Mean age = 50.14±16.05)	
Age (Years)	
<35	42(22.0%)
36 – 65	110(57.6%)
>65	9(20.4%)
Gender	
Male	117(61.3%)
Female	74(38.7%)
Marital Status	
Single	10(5.2%)
Married	146 (76.4%)
Widowed	18(9.4%)
Separated	11(5.8%)
Divorced	6(3.1%)

3.2. Clinical Characteristics

Table 2 shows the clinical characteristics of subjects. One hundred and twenty four (64.9%) of the participants had stroke for a duration of <1year, 30(15.7%) between 1-2years while 37(19.4%) had stroke for greater than 2years. One hundred and one (52.9%) of the participants had a right sided CVA while 90(47.1%) had left sided CVA

Table 2. Showing Clinical Characteristics of the Patients
Clinical Characteristics of the Patients

Clinical Variable	All Subjects N = 191
Duration of CVD (In Years)	
<1	124(64.9%)
1-2	30(15.7%)
>2	37(19.4%)
Side of CVA	
Right	101(52.9%)
Left	90(47.1%)

3.3. Relationship between Depression and Age

Table 3 shows the relationship between age and diagnosis of depression among the participants. Thirty one (73.8%) of the 42 participants aged less than 35 years were depressed. The differences were statistically significant ($\chi2$ =12.515; p=0.002) with highest prevalence among those less than 35years.

Table 3. Distribution of relationship between depression and age of the patients

Age Groups(Years)	No of respondents	Depressed n (%)	Non-Depressed n (%)	Statistic
<35	42	31(73.8%)	11(26.2%)	DF =2
35-65	110	47(42.7%)	63(57.3%)	$\chi2$=12.515
>65	39	23(59.0%)	16(41.0%)	P=0.002
Total	191	101(52.9%)	90(47.1%)	

3.4. Relationship between Depression and Gender

Table 4 shows the gender distribution of the study population. Out of the 117 male patients 58 (49.6%) were depressed, while of the 74 females 43 (58.1%) were depressed. The difference in gender distribution between the depressed and non-depressed was found not to be statistically significant ($\chi2$ =1.325, p=0.250).

Table 4. Distribution of relationship between depression and gender of the patients

Gender	No of respondents	Depressed n (%)	Non-Depressed n (%)	Statistic
Male	117	58(49.6%)	59(50.4%)	DF =1
Female	74	43(58.1%)	31(41.9%)	$\chi2$ =1.325
Total	191	101(52.9%)	90(47.1%)	P =0.250

3.5. Relationship between Depression and Duration of CVA of the Patients

Table 5 shows the relationship between the duration of cerebrovascular accident and depression among the participants. Eighty one (65.3%) of the 92 participants with <1year duration of CVA were depressed, while, 10 (33.3%) of the 30 participants with between one and two years duration of stroke were depressed and 10 (27.0%) of those with stroke durations of above 2years were depressed with a statistically significant relationship between duration of the CVA and depression among the patients with stroke ($\chi2$ =22.230, p =0.000). The highest prevalence of depression was among the most recent stroke victims.

Table 5. Distribution of the relationship between depression and duration of CVA of the patients

Duration of CVA	No of respondents	Depressed n (%)	Non-depressed n (%)	Statistic
<1year	92	81(65.3%)	43(34.7%)	DF =2
1-2years	30	10(33.3%)	20(66.7%)	$\chi2$=22.230
>2years	37	10(27.0%)	27(63.0%)	P=0.000
Total	191	101(52.9%)	90(47.1%)	

3.6. Relationship between Depression and Side of Cerebro-vascular Accident of the Patients

Table 6 shows the distribution of the side of cerebro-vascular accident of patients with stroke in relation to the presence of depression. Fifty three (52.5%) of the 101 patients with right-sided stroke impairment had depression compared with 48 (53.3%) of the 90 whose impairments were left-sided. The difference was not statistically significant. ($\chi2$ =0.014, P =0.906).

Table 6. Distribution of the relationship between depression and Side of CVA of the patients

Side of CVA	No of respondents	Depressed n (%)	Non-depressed n (%)	Statistic
Right	101	53(52.5%)	48(47.5%)	DF = 1
Left	90	48(53.3%)	42(46.7%)	$\chi2$ =0.014
Total	191	101(52.9%)	90(47.1%)	P =0.906

4. Discussion

In this study, 52.9% of the patients with stroke assessed met the DSM-1V diagnostic criteria for depression. This finding was in line with an Australian based study which indicates that depressive symptoms are present in 33 % of cases of all stroke survivors at any time during follow up [8]. However, the prevalence of depression found was higher than 32.6% and 33% found in south western Nigeria [9,10]. The finding of this study is higher than the average prevalence reported by previous studies among patients with stroke [8,9]. The higher prevalence found in this study may be related to patient's pre-existing personal psychosocial difficulties which may have important influence on the development of depression after stroke because of the study location.

Those that were aged <35years had significantly higher prevalence of depression compared to the older age groups. This finding of higher vulnerability to depression among younger patients with stroke disagreed with previous study that there was no relationship between respondent's age and depression [17].

The relationship between sex and depression was not statistically significant; this result is contrary to the finding of previous study; depressive symptoms were present among stroke patients and patients with marked symptoms had more neurological impairment, and were more likely to be female. [17].

This study found significantly higher prevalence of depression among those with duration of stroke ≤ 6months, and a progressive decrease of the prevalence of depression as the duration of the stroke increases. This finding was in tandem with a similar study who reported that the location of the lesion was a stronger determinant for PSD [13].

The present study did not find any relationship between side of stroke and prevalence of depression. This finding concurred with the previous studies that could not establish any relationship between lesion location and depression [11, 12].

5. Conclusion and Recommendations

There was high prevalence of depression among this cohort of patients with stroke especially among the younger age and the recent onset of stroke was also significantly related to depression. These high levels of depression might be as a result of many factors such as shock, denial, grieving, anger, nature of the illness (chronic), financial implications etc. There was no relationship between the lesion location, sex and depression in this index study. Considering the above findings, the following recommendation were made; functional mental health department should be incorporated in the structure of Nigeria health facilities both at the Federal and State level to address mental health challenges that might arise as a result of physical illnesses such as cerebrovascular disease.

A study like this is incomplete without its own limitations; firstly, lesion location was determined by clinical presentation and judgment of the treating consultants. This gross hemispheric lesion localization in the absence of more sophisticated CT scan, MRI and PET will increase the chances of including other non CVA disorders presenting with hemiplegia and thus affecting the results. Secondly, the study was conducted among patients with stroke who have spent some time living with the condition and might have been psychologically adjusted to the illness as time lapsed. This may influence the prevalence rate of depression among them.

Conflict of Interest

None.

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