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Knowledge and Awareness of Stroke Symptoms and Warning Signs in A Tertiary Health Centre In Abuja, Nigeria

* Onwuegbuzie GA, Ani-Osheku I, Alabi P.
Department of Medicine, University of Abuja Teaching Hospital, Abuja, Nigeria
Corresponding Author: Dr. Gerald A Onwuegbuzie,
Department of Medicine, University of Abuja Teaching Hospital, Abuja, Nigeria.

Abstract
In managing stroke, appropriate knowledge and awareness of stroke symptom and warning signs would lead to early interventions since time of presentation to the hospital is critical to the outcome of the patient. In developing countries like Nigeria the inability of patients to access medical care remains a major barrier to acute stroke therapy with the longest phase of delay coming from the time stroke warning symptom and sign occur, and the subsequent decision to seek medical attention and final arrival to the hospital.
This study was designed to assess the level of knowledge and awareness among patient and patient caregiver for those with stroke in a tertiary Health care facility in Abuja. It is a descriptive cross sectional study of 182 patients with a structured questionnaire administered to consecutive patient admitted into the medical wards and their relatives. Statistical analysis was done using Analyse-it v4.5 statistical software.
Majority of the respondents considered High blood pressure (93%) as the risk factor for stroke. Weakness of face/arm/leg (84%) is most known warning sign for stroke by respondents. When respondents were asked why people do not recognize and respond to symptom; lack of knowledge/Ignorant of symptom accounted for 71% of the respondents.The study showed that predictors of good knowledge of risk factors among respondents found on multivariate analysis were educational level and past history of stroke. In conclusion, the key highlight of our study is the need to increasing public awareness and patient education about stroke warning symptoms/signs as well as need to reduce pre-hospital delay and early referral for stroke care.
Keywords *Stroke, Risk factors, Knowledge, Awareness.*

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I. Background

Stroke is the rapidly developing loss of brain functions due to a disturbance in the cerebral blood vessels. In Nigeria study, Stroke constituted about 2.4% of all emergency admissions with cerebral infarction making 49% of all cases. [1] Despite information on the risk factors, stroke still remains a neglected disease in Nigeria, specific diagnosis and treatment in the hospitals, as well as secondary prevention are still not optimal. There is a reasonably reliable evidence to suggest that 60-80% of all ischemic strokes can be attributed to these risk factors.[2]There are well established risk factors for stroke, such as increased blood pressure, increased blood cholesterol, cigarette smoking, carotid stenosis, diabetes mellitus, atrial fibrillation and valvular heart disease.

Appropriate knowledge and awareness about stroke symptom and warning signs would lead to early interventions and effective treatment and secondary prevention. [3-9]

The challenges patients encounter to access medical care remains a major barrier to acute stroke therapy. Some of the previous studies showed that knowledge of at least one stroke risk factor was between 57% - 76%[10,11]while that knowledge of at least one stroke warning sign was between 39% - 61%.[10, 11, 12, 13]

In studies done in the United States, [14-17]Australia, [18] South Korea, [10] and Canada, [11] there is a recognized lack of knowledge and awareness in the community about stroke related risk factors, warning signs and also recent advances like thrombolytic therapy in stroke management.

Studies have shown that among Africans, lack of information and poor control of stroke risk factors contribute to the rising incidence of stroke.[19, 20, 21]

The success of primary preventive measures and timely medical attention following a stroke is influenced by the public's knowledge and perception of stroke and its risk factors.[22, 23, 24]

Although a number of factors contribute to delays in seeking treatment for stroke, however lack of public knowledge regarding stroke symptoms and the need for a rapid response remains an important factor.[10, 18]

Therefore this study was designed to assess the level of knowledge and awareness of stroke symptoms and warning signs among patient and patient caregivers visiting a tertiary health care facility with a view to

improving the public awareness about the early warning signs of stroke, modifiable risk factors, and factors militating prompt medical care.

II. Methodology

Study location and data collection

The study was carried out at the University of Abuja Teaching Hospital, a tertiary health centre, from January 2016 and February 2019. It is a descriptive cross sectional study. A total of one hundred and eighty two patient structured questionnaire were administered to consecutive patient admitted into the medical wards who met the inclusion criteria and their caregivers in the Neurology Unit, Department of Medicine, University of Abuja Teaching Hospital, Gwagawalada.

Stroke patient who were confirmed clinically using WHO criteria and radiologically by cranial computed tomography scan or MRI were included in this study. All patients had full clinical assessment and investigations.

The questionnaire presented had questions about: (1) demographic aspects (gender, age, income and educational level) (2) Risk factors of a stroke (3) Warning signs for stroke (4) Why people do not recognize and respond to symptoms.

Inclusion Criteria

All patients who were admitted into the medical ward with confirmed stroke. All patients had full clinical assessment for stroke was screened clinically by WHO criteria and verified radiologically by cranial computer tomography scan from January 2017 to February 2019 were included in the study.

Exclusion Criteria

Patients who had space occupying lesion with neurological deficits or metastatic brain disease and those with Human Immunodeficiency Virus with neurological deficits were excluded from this study. Also exclude from the study were those who were unconscious and those who had motor and/or expressive aphasia.

Data analysis

Statistical analysis of data collected was performed using Analyse-it v4.5 statistical software for Microsoft Excel. Data collected was analysed by frequency, mean, standard deviation and chi-square test. For all statistical tests, the threshold of significance is fixed at 5%. P-value>0.05 indicates none significant results. P-value<0.05 indicates significant results.

III. Results

We interviewed 182 patients and their relatives. The characteristics of study sample have been depicted in Table-1. The largest proportion of the study population was the 41-50 years age (44%). In the study 58% were patients and 42% was patient caregiver, with male accounting for 56%, while the female 44%. Fifty percent of the participants had tertiary education, while 25% secondary education.

Table 2 revealed that overall, majority of the respondents considered High blood pressure (93%) as the risk factor for stroke. A further breakdown showed that 89% of the patient respondent and 99% of the caregivers' contribution to the overall knowledge of high blood pressure as a risk factor. Other risk factors such as diabetes, high cholesterol and heart problems as a risk factor scored less than 50% with the least considered being oral contraceptive pill (5%). Comparative average responses of knowledge on risk factors for stroke between patient (21%) and caregivers (12%) was found to be statistically significant (T-test, $p = 0.0287$), in other words patients are more knowledgeable than caregivers. Furthermore educational level was strongly associated with knowledge of risk factors for stroke ($p = 0.0048$), however when the patient caregivers were separated from the patient there was no statistical significance. ($p=0.0718$). Those who had a previous stroke was statistically significant ($p=0.0204$) meaning that they had better knowledge of stroke risk factors than those without similar history.

Table 3 which represents the stroke warning signs shows that weakness of face/arm/leg (84%) is most known warning sign for stroke by respondents. Difficulty with speech was 69% and numbness of the body/face was 64%. There was no statistically significant difference between stroke warning sign and educational qualification (Table 5), however when there was statistical significance when the patient were separated from thecaregivers. ($p=0.0116$).

Table 4 shows the responses with respect to the question of 'why people do not recognize and respond to symptom?' Results revealed that 'Lack of knowledge/Ignorant of symptom' (71%) was the most preponderance of the reasons, followed by the 'Unaware of dangers of delay in treatment' (61%). In addition 54% were in 'self denial' and 53% were 'worried about cost of treatment.' On average, more patient (38%) than caregivers (15%), have recognition and response to symptoms with significant t-test ($p = 0.0003$).

Table 1: Demographic features of respondents (n=182)

Characteristics Number (%)	Patient 106(58)	Caregiver 76(42)	Total 182(100)
Age (years)			
<21	4(2)	4(2)	8(4)
21-30	14(8)	1(1)	15(8)
31-40	14(8)	25(14)	39(21)
41-50	20(11)	24(13)	44(24)
51-60	24(13)	14(8)	38(21)
60>	30(16)	8(4)	38(21)
Gender			
Female	47(26)	33(18)	80(44)
Male	59(32)	43(24)	102(56)
Stroke History			
Had previous stroke	23(13)	26(14)	49(27)
Know someone with stroke	50(27)	34(19)	84(46)
Education			
None	5(3)	2(1)	7(4)
Informal	6(3)	4(2)	10(5)
Primary	17(9)	12(7)	29(16)
Secondary	26(14)	19(10)	45(25)
Tertiary	52(29)	39(21)	91(50)
Occupation			
Civil Servant	30(16)	10(5)	40(22)
Private Sector	7(4)	14(8)	21(12)
Self Employed	37(20)	16(9)	53(29)
Schooling	8(4)	9(5)	17(9)
House Wife	12(7)	10(5)	22(12)
Unemployed	12(7)	17(9)	29(16)
Marital Status			
Single	16(9)	8(4)	24(13)
Married	84(46)	46(25)	130(71)
Separated	(0)	10(5)	10(5)
Divorced	(0)	6(3)	6(3)
Widow(er)	6(3)	6(3)	12(7)

Table 2: Knowledge of risk factors for stroke

Knowledge of risk factor for stroke Number (%)	Patient 106(58)	Caregiver 76(42)	Total 182(100)
High blood pressure	94(52)	75(41)	169(93)
High cholesterol	43(24)	30(16)	73(40)
Diabetes	47(26)	21(12)	68(37)
Heart problem	57(31)	21(12)	78(43)
Family History of Stroke	51(28)	33(18)	84(46)
Smoking	30(16)	25(14)	55(30)
Alcohol	40(22)	28(15)	68(37)
Increased age	46(25)	33(18)	79(43)
Excessive salt intake	39(21)	9(5)	48(26)
Excessive caffeine intake	20(11)	7(4)	27(15)
Oral contraceptive pill	5(3)	4(2)	9(5)
Male gender	18(10)	14(8)	32(18)
Lack of Exercise	55(30)	10(5)	65(36)
Sickle cell disease	6(3)	12(7)	18(10)
HIV infection	10(5)	7(4)	17(9)
Overweight	44(24)	11(6)	55(30)

Table 3: Warning signs for stroke

Warning Signs Number (%)	Patient 106(58)	Caregiver 76(42)	Total 182(100)
Weakness of Face/arm/leg	85(47)	68(37)	153(84)
Difficulty in speech	75(41)	50(27)	125(69)
Numbness of body/face	70(38)	47(26)	117(64)
Breathing difficulty	29(16)	8(4)	37(20)
Headache	58(32)	21(12)	79(43)
Dizziness	44(24)	7(4)	51(28)
Loss of memory	46(25)	9(5)	55(30)
Fainting	48(26)	9(5)	57(31)
Backache	8(4)	4(2)	12(7)
Visual problem	36(20)	7(4)	43(24)
Restlessness	42(23)	10(5)	52(29)
Irrational talking	42(23)	18(10)	60(33)

Table 4: Recognition and response to symptoms

Symptoms Number (%)	Patient 106(58)	Caregiver 76(42)	Total 182(100)
Lack of knowledge/Ignorance of symptom	92(51)	38(21)	130(71)
Self-denial (it can't happen to me)	73(40)	26(14)	99(54)
Think nothing can be done	41(23)	20(11)	61(34)
Worried about cost of treatment	72(40)	24(13)	96(53)
Unaware of dangers of delay in treatment	71(39)	40(22)	111(61)
Waiting to see if symptom will disappear	64(35)	19(10)	83(46)

Table 5: Knowledge of Stroke Risk factors and Warning signs for Stroke

Knowledge of Stroke Risk factors	Term-Overall p-value	Term-Patient p-value	Term-Caregiver p-value	Warning signs for Stroke	Term-Overall p-value	Term-Patient p-value	Term-Caregiver p-value
Age	0.1496	0.5065	0.7337	**Age**	0.1208	**0.0264**	0.2338
Gender	0.1197	0.1232	0.7642	**Gender**	0.4299	0.5812	0.0800
Had previous stroke	0.0529	**0.0204**	0.2192	**Had previous stroke**	0.7690	0.3188	0.4270
Know someone with stroke	0.1442	0.0826	0.3538	**Know someone with stroke**	0.4983	0.3084	0.1819
Educational Level	**0.0484**	**0.0011**	0.0718	**Educational Level**	0.1066	**0.0116**	0.8678
Occupation	0.9095	0.9215	0.0969	**Occupation**	0.5553	0.2726	0.4131
Marital Status	0.4684	0.9486	0.7249	**Marital Status**	0.1647	0.1475	0.4650

IV. Discussion

This study assessed the level of knowledge and awareness of stroke symptoms and signs among patients with stroke and caregiver of patients with stroke.

Our study shows a preponderance of males among the study population thus reflecting an overall male sex predisposition to stroke. The total males among the patients with stroke and caregivers under study were 56% while the females under study were 44%. The prevalence of stroke was more in age group greater than 40 years. The educational characteristics shows 50% of the patient and caregivers had tertiary education and 25% had secondary education.

Although educational level and age has been reported to be associated with knowledge of stroke risk factors.[25, 26, 27] It is important to note that among the social demographic characteristics none was found to be significant except an increased level of education, which was a predictor of stroke knowledge. Previous works done showed that education was a significant predictor of stroke knowledge, [13, 22, 28] this is however in contrast to a study done in Cincinnati which found no significant influence of educational level on knowledge of stroke.[11]

Male sex was found to be significant predictor of stroke knowledge and awareness in our study, the reason for this is not clear, but may be related to the overall male sex predisposition. Some other studies have shown no effects of gender [13, 15, 29]while others done show that female gender was found to be more predictive of stroke knowledge. [13, 22, 28] In terms of occupational status, our study did not show any increase in the prediction of stroke knowledge and awareness, this is in contrast to other studies which found increasing income as a predictor of stroke knowledge and awareness.[13, 22, 28]

High blood pressure was the most frequently identified risk factor in our study as in other publications.[13, 16] There seem to be a significant knowledge gap among other risk factors with most of the patients and their caregivers scoring less than 50%, this is worrisome especially as all the participants were actively undergoing stroke care or caring for their relatives with a stroke when the study was carried out. Interestingly when we compared the high blood pressure as an identifiable risk factor among patient and caregivers we got 89% and 99% respectively. The major stroke education/preventive measures are usually stressed as patient sensorium improves and at the time of discharge in our hospital certain which may in part explain the lower score. The work done by Rodgers et al also suggested that either content of information given may not be appropriate or too complicated or even too generalized, which is further compounded by the ability to retain information give to patient which vary for different reason. [30]

Our study found diabetes mellitus had the fifth identification rate and when we compared between patient and caregivers we got 45% and 28% respectively. This finding in our study may be explained in part by the works done by Sloma et al which showed that patients with these disease condition such as atrial fibrillation and diabetes demonstrated significantly better knowledge which they attributed to more frequent medical access.[31] Kraywinkel et al reported better knowledge of a specific risk factor among those affected by disease itself. [32] Also the focus in diabetic education is more often on the feet, eyes and cardiovascular complications with less attention cerebrovascular events. In contrast a study by Dak et al in India, found the same level of knowledge among the stroke risk factor as hypertension, diabetes , smoking and excessive intake of alcohol.[33]

The warning signs of stroke is thought to be critical in the referral of patients with acute stroke to enable them have an effective time bound emergency care including the use thrombolytic of therapy.

The most common warning sign identified for stroke in our study was one sided weakness of face or arm or leg which showed 84%, followed by difficulty in speech which was 69% and numbness of one side of the face or arm or leg at 64%. Interestingly when we compared the a patient and caregivers we got 81% and 90%, 71% and 66% and 67% and 62% respectively. All other warning sign were less than 45%. Our study population may account for the results obtained in this study as focus was on patient with stroke who had recovered and their caregivers taking care of them. Furthermore similar works done by Alkadry et al among rural residents in West Virginia had 92% of respondents with one sided weakness of face or arm or leg and difficulty in speech 88% [34] and Segura et al in Spain also had 88% and 80% respectively. [35] This however is in contrast to the work done in Ghana by Donkor et al which showed that numbness(44%) and paralysis(38%) as the commonest stroke warning sign. [36] The finding by Wahab et al done in Irrua, Nigeria showed that weakness of one side was 24.4%, [37] while the work done by Komolafe et al in Osun state, Nigeria found weakness (51.9%) as the most commonly identified warning sign of stroke among the adolescent students. [38] Overall one sided weakness of the body was the most common identifiable warning sign for stroke. Nevertheless other less common warning sign are important as that will enhance the critically needed referral of patients for effective time bound emergency care.

Hacke et al in their work found therapeutic window of less than four and half hours, and even suggested that better results can be achieved with administration within 90 minutes. [39] This also gives credence to the phrase "time is brain" emphasizes the urgency need for therapeutic interventions. [40]

Our study therefore sought to reviewed reasons why patients and relatives did not seek immediate care. Interestingly seventy one percent were ignorant of the symptoms, 61% were unaware of the dangers of delayed treatment and 54% believed it could not happen to them. This in contrast to work done by Memis et al which had lower figures with 35.5% of them waiting for symptoms to go away, while 32.3% did not realizing the urgency of seeking medical help.[41] It is important to note that factors associated with prolonged delay in hospital presentation may vary due to our different healthcare system, socioeconomic status and cultural believes.

Other studies have shown that a number of these factors influence the presentation of stroke patients to the hospital which include referral pattern, living alone, nocturnal onset, history of stroke or cardiovascular disease, transportation to the hospital, and clinical status.[42, 43, 44, 45]

We acknowledge the limitations in our study being single-centered hospital based study. However it still highlight the knowledge gap in stroke risk factors and warning signs as well as issues surrounding pre-hospital delay in our developing society. Our study did not consider distance to the healthcare facility, delayed referral pattern, severity of symptoms/sign and use of ambulance call as a reason for delayed pre-hospital presentation, even though in Nigeria, emergency ambulance services are not readily available and, even when available cost limits its use hence patients has to depend on other modes of transport to reach the hospital. Based on some of these factors we are currently carrying out further studies on delay in pre-hospital presentation.

In conclusion, one of the key highlight of our results is the need to increasing public awareness about stroke warning symptoms/signs as well as the need to reduce pre-hospital delay for stroke patients. Thus, education should focus the early identification of stroke symptoms/signs, the importance of seeking urgent care following a stroke, and the improvement of referral for stroke care.

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