

# Awareness of Stroke among Subjects with Diabetes Mellitus Attending a Tertiary Diabetes Outpatient Clinic in South-East Nigeria

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## Abstract

**Background:** Diabetes Mellitus (DM) and stroke are common diseases that can occur alongside each other and cause major morbidity and mortality with great disability. Stroke is responsible for approximately 15% of death in people with type 2 DM. Unfortunately the level of awareness and knowledge of this is very low, especially in many African Countries. In Nigeria, there is insufficient/inadequate data regarding knowledge of stroke and the associated risk factors especially among persons with DM.

**Objective:** This study is aimed at analyzing the knowledge and awareness of stroke and its associated risk factors among diabetic patients attending the Endocrinology and diabetes out-patient clinic.

**Methods:** A cross sectional study was performed through a standardized structured open ended questionnaire on medical outpatients attending the endocrine and DM clinic at the Federal Medical Centre (FMC) Owerri.

**Results:** 91 patients were recruited for the study with mean age of 59 years. The mean Body Mass Index (BMI) is 27 kg/m<sup>2</sup>; mean FBG and HbA1C is 154 mg/dl and 8.4% respectively. There were 61 (67%) females and 30 (33%) males, with 90 (90%) having formal education at different levels (primary education, 29 (31%); secondary education 16 (17%); and tertiary education 36 (39%). 73 (80%) knew that DM could cause stroke while 18 (19%) were not aware. In addition, out of the number of people (73) who were aware that DM could cause a stroke, 55 (60%) knew that hypertension can predispose to stroke while 1 (1.1%) knew that both renal failure and smoking can predispose to stroke. Only 11 (12%) knew that stroke in the 1<sup>st</sup> degree relatives can predispose to stroke while 80 (88%) did not know about it.

**Conclusion:** Majority of the patients who participated in the study were aware of stroke as a complication of DM. Apart from hypertension which is a risk factor for stroke, the other risk factors are not recognized by the majority. It is recommended that increasing awareness of stroke among DM patients may likely improve stroke prevention.

**Keywords:** Diabetes mellitus; Stroke; Risks factors

## Introduction

Stroke is a preventable and treatable disease. It is a major global problem and has remained a challenge to physicians worldwide. According to the World Health Organization, 15 million people suffer stroke worldwide each year, an estimated 5 million die and another 5 million are permanently disabled. In 1999, it accounted for over 56,000 deaths in England and Wales which represent 11% of all deaths in that period [1].

WHO (1976) defined a stroke as a clinical syndrome consisting of rapidly developing clinical signs of focal or global disturbance of

cerebral function lasting more than 24 hours or leading to death with no apparent cause other than a vascular origin [2]. According to the publications of the National Audit Office (2005), more than 900,000 people in England live with the effects of stroke with half of these being dependent on other people for help with every day activity. Stroke has a sudden and sometimes devastating impact on the patient and their family in terms of support and care for those severely affected or death it might result to [3].

In Nigeria, some hospital based studies have shown that it accounts for as high as 45% of all neurological admissions and 5-17% of medical deaths [4,5].

Over the last two decades, a growing body of evidence has countered the traditional perception that stroke happens as a consequence of ageing which inevitably results in death or severe disability. Evidence is accumulating for more effective primary and secondary prevention strategies, better recognition of people at highest risk and those mostly in need of active interventions, which should be very effective soon after the onset of symptoms. And in addition an understanding of the processes of care that contribute to a better outcome [6].

Diabetes Mellitus (DM), on the other hand, is a chronic disease caused by inherited or acquired deficiency in the production of insulin by the pancreas or by the ineffectiveness of the insulin produced, resulting in increased concentration of glucose in the blood. Evidence shows that about 150 Million people have DM worldwide and that the number will double by the year 2025 with much of this increase occurring in developing countries due to population growth, ageing, unhealthy diets and sedentary lifestyle [7]. Research has also shown that there are about 12 million people suffering from this condition in sub-Saharan Africa alone and there are projections that this number will reach 18 million by 2030, making the region the one with the fastest growing rates of diabetes mellitus in the world [8,9].

In Nigeria, some Cardiovascular issues including stroke are major health care issues in both developed and developing countries with deleterious effects on individuals, families and society, it is estimated that between 2010-2030 total direct medical cost would escalate from \$273-\$818 billion in the United States alone [10].

A synergy exists between DM and stroke with DM being an established risk factor for stroke. In the US, DM is the 7<sup>th</sup> leading cause of death and 65% of these deaths are attributable to stroke [11]. Data from Greater Cincinnati/Northern Kentucky stroke study shows that risk for stroke is actually higher in the young population with DM [12]. There is also an increase in Ischaemic stroke incidence in all age group of diabetic patients, with African-Americans and the Whites developing it before age 55 years and before age 65 years respectively [12]. DM patients have 1.5 to 3 times high risk of stroke especially cerebral infarction than non-diabetic patients [13].

Ultimately with the knowledge that DM and obesity are important modifiable risk factors for stroke and often time's co exists, and also knowing that patients with DM have a higher incidence of stroke and a poorer prognosis after stroke, risk factor modification is the most important aspect of prevention of stroke in DM and obesity [14]. This includes lifestyle modification and different therapeutic modalities to control hypertension and dyslipidemia that are often seen in diabetic patients [14]. Knowing that the combination of diabetes and stroke is a major cause of morbidity and mortality, evidence from large clinical trials performed in patients with DM support the need for aggressive early intervention to target patient cerebrovascular risk in order to prevent onset, recurrence and progression of acute stroke. Identification of at risk patient with DM and metabolic syndrome has also allowed the delivery of early and effective intervention to reduce stroke risks while active treatment during the acute phase of stroke will reduce long term neurological and functional deficit [15].

It is important to note that strict control of blood sugar has not been shown to reduce the overall incidence of stroke in DM patients, that is why management of the other risk factors particularly dyslipidemia and hypertension are important for the prevention of stroke in DM patient [16]. Stroke occurrence in DM patients bring about poorer clinical outcomes and comprehensive cardiovascular risk factor management to prevent stroke in patients with DM but as previously stated it remains unclear whether intensive in hospital lowering of

blood glucose level improves clinical outcome as such the emphasis on stroke awareness and risk factor management in DM patients. A study carried out to evaluate distinctive feature of DM and non-DM stroke patient and to compare early mortality between the two groups showed that increased risk of stroke in DM is probably related to hypertension and lipid abnormalities [17].

Various hospital based studies in Nigeria have shown that it accounts for as high as 45% of all neurologic admission and 5-17% of medical death 2-4, while a case fatality rate as high as 40% has been documented [5]. In the management of stroke time of presentation to the hospital is important as delays often result in poor outcome.

Late presentation to the hospital which has been observed in Nigeria could be as a result of poor appreciation of stroke warning signs by the patients and relatives [18]. Found that 68% of Omani patients at increased risk of stroke could identify at least one warning sign of stroke while Pancioli AM et al. [19] found that only 57% of their respondent in a community-based study could identify at least one warning sign [20] showing that awareness of stroke signs and symptoms is poor among the population studied.

The identification and understanding, with treatment and prevention of these risk factors such as hypertension, DM, hyperlipidemia and atrial fibrillation directly influence the incidence and indirectly affect the case fatality of stroke especially in DM patient as the natural history of the disease is altered. The aim of this study is to evaluate patients' awareness and knowledge of stroke and its associated risk factors.

## Materials and Methods

A cohort study was conducted on patients attending the medical outpatient clinics of the endocrinology unit in the department of internal medicine, Federal Medical Centre Owerri. A total of 91 patients who gave their consent took part in the study. These patients have been attending the outpatient clinic for approximately years. Each of them completed a structured questionnaire which consisted of two sections. The 1<sup>st</sup> section gathered demographic information of the patients while the 2<sup>nd</sup> section contained a series of question to access the awareness and risk factors of stroke in the patient. Their height and weight were also obtained to calculate their body mass index. At every stage, any patient who was unable to give complete information on the questionnaire was excluded. Data were analyzed using Excel were percentages; standard deviation and mean values were calculated and compared. This study was approved by the Federal Medical Centre Owerri ethics committee.

## Result

Table 1 shows demographic information of the participants. A total of 91 patients participated in the study, 61 (67%) females and 30 (33%) males with mean age 59.34 years. 90 (90%) had formal education at different levels (primary education, 29 (31%); secondary education 16 (17%); and tertiary education 36 (39%). Over 79% of all participants were married with mean BMI 27.20 (SD=4.24).

### Awareness of stroke

Mean duration patients have had DM was 8.37years (SD=6.08) and about 73 (80%) of them were aware that DM causes a stroke. Furthermore, 44 (48.35%) reported a family history of DM while 47 (51%) had no family history of DM. Treatment and control of DM varied among respondents depending on the seriousness of the disease, an overwhelming majority (70.30%) used an Oral Hypoglycemic Agent (OHA), 13.20% used insulin, 13.20% used both OHA and insulin while 3.30% controlled theirs with diet.

**Table 1:** Socio-demographic characteristics of study population

| Variable              | Frequency | Percentage (%) |
|-----------------------|-----------|----------------|
| <b>Gender</b>         |           |                |
| Male                  | 30        | 67             |
| Female                | 61        | 33             |
| <b>Marital Status</b> |           |                |
| Married               | 72        | 79.1           |
| Widow                 | 14        | 15.4           |
| Widower               | 1         | 1.1            |
| Divorce               | 1         | 1.1            |
| Single                | 3         | 3.3            |
| <b>Education</b>      |           |                |
| None                  | 10        | 10.99          |
| Primary               | 29        | 31.87          |
| Secondary             | 16        | 17.58          |
| Tertiary              | 36        | 39.56          |

### Risk factors for stroke

Whilst 10 (10.99%) had a stroke in the past, 81 (89.01%) never had a stroke but 11 (12%) respondents reported stroke in first degree relatives. 58 (63%) respondents recognized that hypertension (55%), renal failure (1%), smoking (1%) and sedentary life style (1%) are other risk factors for stroke while 33 (36.3%) respondents had no knowledge of these risk factors. 50 respondents had hypertension for an average of 9.08 years (SD=7.69) and there was no adequate control of Blood Pressure (BP) as only 27 patients had BP<130/80 mmHg.

### Discussion

Stroke continues to be a leading cause of death and disability in adults worldwide; with rising incidence especially in the developed world, this has been attributed to the increase in the trends of hypertension smoking and stress especially among DM patients. This study found that majority 80% of the study population are aware that DM cause's stroke and that the level of education correlates positively to this knowledge with the educated subjects with different level of education summing up to 87%. This finding is similar to the observation made by Pancoili AM et al., Monaliza et al. and Sug Yoon S et al. [19-21] in which they found that knowledge about stroke varied positively with education.

In this study, patients had varied knowledge of other established risk factors for stroke apart from DM. Hypertension (60%) is recognized as the most common risk factor for stroke in this study which is similar to the observation made by Panichpial K et al. [22] (60%) and Vincent-Onabajo G et al. [23] (39.1%), about subjects' level of awareness of hypertension as a risk factor for stroke.

Awareness of the other risk factors was very poor amongst the subject this included smoking (1.1%), renal failure (1.1%) sedentary life style (1.1%) with no knowledge of other factors like dyslipidemia and obesity as a causative risk factor for stroke. This is similar to a study done by Sharavani K et al [24] which found that subjects had less than (4%) knowledge of this risk factor as a causal factor for stroke including hypertension which as a single factor contrasts with this very study as this found subjects awareness for hypertension (60%) as started earlier. This finding suggests poor health care system and poor education program.

The study also found out that (72%) of the subject has dyslipidaemia which is a risk factor none of the subjects were aware of and also 11% occurrence of stroke in first-degree relative which was not identified as a risk factor by subjects. In addition, 89% of the study population has not had a stroke before. This highlights the importance of creating the awareness about the risk factors for stroke and educating patients with DM about risk factor management to avert the occurrence of stroke as much as possible.

### Limitation

This study was limited to patients who attended the Endocrinology and diabetes out-patient clinic at the Federal Medical Centre Owerri and at such may have more knowledge of the subject than the general population.

### Conclusion

The findings in this study have shown that even though most DM patients claimed to have knowledge of Stroke, they were not aware of the associated risk factors of stroke which is believed to be an outcome of DM. Patient education becomes a central component in the prevention and control of this disease. It could also enable early detection and treatment of complications as well as enhanced early referrals of cases to specialized centres for management and follow-up.

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