



Knowledge of Stroke Risk Factors among Individuals Diagnosed with Hypertension and Diabetes: A Hospital-based Survey

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Authors' contributions

This work was carried out collaboratively by the authors. Authors GVO conceived and designed the study, carried out statistical analyses and drafted the manuscript. Author JYM collected and analysed data and provided material support. Authors UA, RWM, HNA, FKG, MUA and MAM drafted and reviewed the manuscript for intellectual content. All authors read and approved the final manuscript.

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ABSTRACT

Background: Stroke is a major cause of mortality and morbidity worldwide and primary prevention, through adequate knowledge of its risk factors and attendant risk factor control/modification, remains the best solution. This study assessed knowledge of stroke risk factors among individuals diagnosed with two of the most common modifiable risk factors of stroke namely hypertension and diabetes.

Methods: A consecutive sample of 200 clients diagnosed with hypertension and/or diabetes was recruited into this cross-sectional survey from a university teaching hospital in northern Nigeria between January and March 2011. Clinical, socio-demographic, and knowledge of stroke risk factors data were obtained through face-to-face interview using researcher-developed

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questionnaire. Descriptive and inferential statistics were utilized to identify level of knowledge and its associations with socio-demographic and clinical characteristics of the participants.

Results: Mean (SD) age of the participants was 49.69 (16.27) years, with more female participants (55.5%) and those diagnosed with hypertension (40.5%). Majority (85%) of the participants knew at least one risk factor and the most commonly known risk factor was hypertension (80%) while family history of stroke (0.5%) and transient ischaemic attack (0.5%) were the least known risk factors. Only diagnosis ($P<0.01$) and level of educational attainment ($P<0.05$) had significant associations with knowledge of stroke risk factors with those diagnosed with diabetes (96.3%) and those who had tertiary education (93.1%) being more knowledgeable. Regarding specific risk factors, 64.3% of those with hypertension and 56.8% of those with diabetes respectively identified their conditions as risk factors of stroke.

Conclusion: Although a substantial majority of participants in the study knew at least one stroke risk factor, knowledge of some specific risk factors was poor while a little above half of the participants identified their conditions as risk factors for stroke. Effective stroke risk factor awareness and educational strategies are therefore required.

Keywords: Diabetes; hypertension; knowledge, risk factor; stroke.

1. INTRODUCTION

Stroke is a major cause of morbidity and mortality the world over [1,2]. Although the rate of mortality from stroke has been on the decline due to recent advances in healthcare [2], the often long term disabilities that accompany the disease are known to have far-reaching consequences on the well-being and quality of life of stroke survivors and their caregivers [3-4].

In Nigeria, stroke has been reported to account for the majority of medical admissions [5], with 30-day case fatality rates ranging from 28 to 37% [6] and functional disability rates as high as 60.9% [7]. Although most of the stroke data in the country are hospital-based due to identified challenges in conducting community-based studies, the burden of stroke in the Nigerian population, as with populations in other developing countries, has been widely acknowledged. It is also worthy of mention that recent reports have consistently alluded to the growing incidence of stroke in developing countries compared to developed ones [2].

With the debilitation that often characterizes the stroke aftermath and its attendant impact on virtually every facet of life, the best option, like in many other disease conditions, remains prevention of the disease. The prevention of stroke has not only proven to be practicable, it has also been shown to be effective [8]. There is however evidence that knowledge of stroke risk factors, especially identification of one's personal risk, plays a pivotal role in the prevention of stroke [9-10]. It is projected that 80% of strokes can be prevented when necessary precautions

and actions, derivable from knowledge of the disease's risk factors, are taken [11]. It therefore follows that knowledge of stroke risk factors constitutes an important first step in stroke prevention; hence information on the level of knowledge of stroke risk factors across populations becomes crucial. Insight into the knowledge base of persons with identifiable risk factors of stroke will be especially important since their level of knowledge will likely impact on the seriousness with which they take steps required to mitigate the risk factors. Such steps would often include seeking and complying with required medical care and actively engaging in necessary lifestyle modifications.

Hypertension has consistently been identified as the most important modifiable risk factor for stroke [8]. The disease is highly prevalent in Nigeria as in other African countries, and constitutes the major risk factor for stroke in the country [12-15]. However, the fact that hypertension falls under the category of modifiable stroke risk factors, being amenable to anti-hypertensive drug therapy and lifestyle modifications is cheering. Diabetes is another common modifiable risk factor for stroke [16-17] with persons with diabetes believed to have a 1.5 to 3 fold risk of stroke compared to the general population [17-18]. The prevalence of the diabetes has been on the increase in many developing countries including Nigeria in recent times owing in part to growing preference for diet comprising fatty and refined carbohydrates, and obesity [14].

With the alarming increase in number of cases of hypertension and diabetes in Nigeria as in other

African countries [14], and the attendant likelihood of increase in stroke incidence, this study aimed to examine what individuals diagnosed with either or both of these diseases know about risk factors for stroke. Information such as this will assist in addressing knowledge shortfalls, and in planning educational and enlightenment strategies on stroke risk factors with the overall goal of achieving primary stroke prevention especially among those at increased risk of stroke.

2. METHODS

2.1 Research Design

A cross-sectional survey.

2.2 Participants

Two hundred individuals diagnosed with hypertension and/or diabetes were consecutively recruited from medical clinics at a university teaching hospital in north-eastern Nigeria during their routine medical appointments. The sample size was arrived at based on the available number of clients with hypertension and/or diabetes attending the medical clinics at the study site, and who were willing to participate in the study.

2.2.1 Inclusion criteria

Residence in the community, comprehension of English and/or Hausa languages, and willingness to participate in the study by provision of informed consent.

2.2.2 Exclusion criteria

Previous history of stroke or transient ischaemic attack.

2.3 Instruments

A researcher-designed questionnaire was utilized in obtaining data on the participants' socio-demographic and clinical characteristics, family history of stroke, and knowledge of stroke risk factors. The socio-demographic and clinical data section of the questionnaire contained closed-ended questions while the section on stroke risk factors was open-ended with participants asked if they knew risk factors of stroke and were requested to state those risk factors they knew. The instrument was pre-tested on a sample of

individuals with the same characteristics as those of the prospective participants in the study to check its comprehensibility. The questionnaire was administered through face-to-face interview in English or Hausa language based on each participant's language ability. The number of risk factors mentioned by each participant as well the specific risk factors were noted and in line with previous studies [9], ability to mention a correct risk factor was considered as being knowledgeable about stroke risk factors.

2.4 Procedure

Ethical approval for the study was obtained from Research and Ethics committee of the participating institution. Cases with hypertension or diabetes mellitus were identified through the assistance of physicians in charge of the medical clinics and the medical notes of each case. Each identified case was approached and a brief introduction was made regarding the study and its objectives as contained in the cover letter following which the consent was sought. The questionnaires were then administered. Data collection was carried out by the second author from January to March 2011.

2.5 Data Analyses

Age was presented as mean, standard deviation and range while all other data were summarized using descriptive statistics of frequency and percentage. Associations between knowledge of stroke risk factors and socio-demographic (age, sex, educational attainments, and employment status) and clinical (diagnosis namely hypertension, diabetes or both) characteristics of the participants, and their family history of stroke, were assessed using Pearson's chi-square test or Fisher's exact test where number of observations per cell of the data table was less than 5. Level of statistical significance was set at alpha equals 0.05.

3. RESULTS

3.1 Characteristics of Study Participants

Two hundred persons diagnosed with hypertension, diabetes mellitus or both diseases participated in this study; however most participants were hypertensive (40.5%). There were also more females (55.5%), as well as those without a family history of stroke (87%). Mean (SD) age of participants was 49.69 (16.27)

years. Table 1 details the socio-demographic and clinical characteristics of the participants.

3.2 Knowledge of Stroke Risk Factors

Majority (85%) of the participants were knowledgeable about risk factors for stroke that is, they knew one or more stroke risk factors (Table 2).

Table 1. Characteristics of the study participants (n = 200)

Variable	Frequency	%
Age (years)		
Mean (SD)	49.69	(16.27)
Range	16 – 98	
Sex		
Male	89	44.5
Female	111	55.5
Diagnosis		
Hypertension	81	40.5
Diabetes	70	35.0
Hypertension and diabetes	49	24.5
Educational attainment		
Primary	44	22.0
Secondary	20	10.0
Tertiary	72	36.0
Quranic	53	26.5
Adult education	2	1.0
None	9	4.5
Employment status		
Civil servant	54	27.0
Self-employed	44	22.0
Student	14	7.0
Retiree	26	13.0
Housewife	62	31.0
Family history of stroke		
Yes	26	13.0
No	174	87.0

Table 2. Frequency distribution of participants based on number of risk factors identified (n= 200)

Number of risk factors	Frequency	%
None	30	15.0
1	63	31.5
2	40	20.0
3	38	19.0
4	18	9.0
5	3	1.5
6	5	2.5
7	3	1.5

Fig. 1 shows that hypertension was identified as a risk factor of stroke by majority (80%) of the participants followed by diabetes (61.5%) while atrial fibrillation (1.0%), family history of stroke (0.5%), previous transient ischaemic attack (0.5%) were the least known risk factors.

3.3 Associations between Knowledge of Stroke Risk Factor and Socio-demographic and Clinical Characteristics of Participants

Statistically significant associations were observed only between stroke risk factors and diagnosis, and educational attainment of the participants at $P < 0.01$ and $P < 0.05$ respectively (Table 3). A larger proportion of those with diabetes (95.1%) were knowledgeable compared to those with hypertension (74.3%) and those with both hypertension and diabetes (83.7%). In terms of educational attainment, most participants (93.1%) with tertiary education were knowledgeable followed closely by a large proportion (90%) of those with secondary education.

A further analysis was carried out to identify the association between participants' specific diagnosis and their identification of the respective diagnosis as a risk factor for stroke. Among participants with hypertension, 64.3% identified hypertension as a stroke risk, while 56.8% of those diagnosed with diabetes recognized diabetes as a risk factor. For those participants with a combined hypertension and diabetes diagnosis, 81.6% and 40.8% respectively identified hypertension and diabetes as risk factors for stroke.

4. DISCUSSION

Knowledge of stroke risk factors is known to drastically reduce the incidence of stroke through the mediating role of adoption of preventive behaviour that stems from such knowledge. This study assessed the level of knowledge of stroke risk factors among a group of individuals that can be said to be at increased risk of stroke— persons diagnosed with hypertension and/or diabetes.

Using an open-ended face-to-face interview format, the majority (85%) of the participants in this study were able to mention a minimum of one stroke risk factor. A review of previous studies on knowledge of stroke risk factors that also utilized open-ended questionnaire formats however showed rates that ranged from 18 to

94% in terms of ability of participants to mention at least one stroke risk factor [19]. The diversity of the populations in those studies may be responsible for the reported variations.

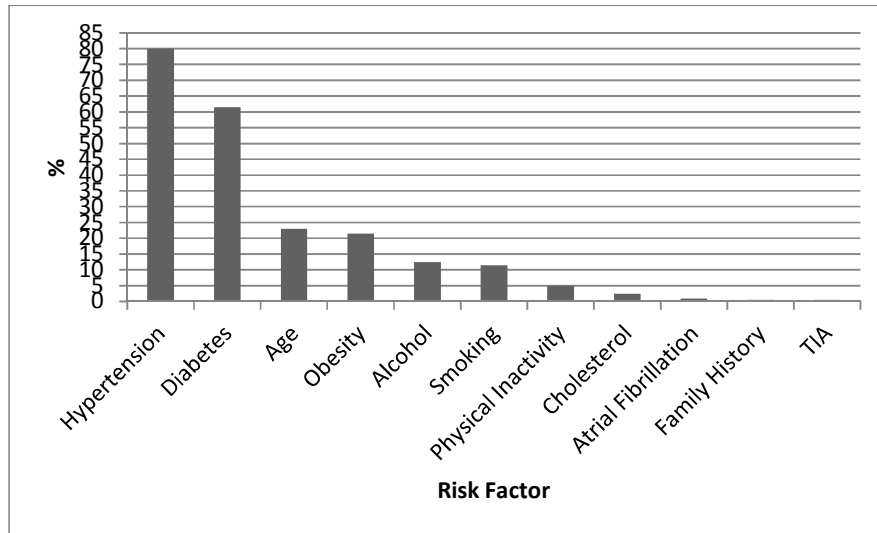


Fig. 1. Frequency of specific risk factors identified by participants

Table 3. Influence of personal characteristics on knowledge of stroke risk factors (n= 200)

Characteristic	% Knowledgeable	% Not Knowledgeable	Statistic ^a
Diagnosis			13.34*
Hypertension	74.3	25.7	
Diabetes	95.1	4.9	
Both ^b	83.7	16.3	
Education			12.12 ^l
Primary	75	25	
Secondary	90	10	
Tertiary	93.1	6.9	
Quranic	84.9	15.1	
Adult Education	50	50	
None	66.7	33.3	
Employment			4.77
Civil servant	88.9	11.1	
Self-employed	81.8	18.2	
Student	100	0	
Retiree	76.9	23.1	
Housewife	83.9	16.1	
Sex			0.29
Male	86.5	13.5	
Female	83.8	16.2	
Age group (years)			6.68
< 30	91.3	8.7	
>30-50	86.4	13.6	
51-64	84.6	15.4	
65-80	86.2	13.8	
>80	50	50	
Family history			0.003
Positive	84.6	15.4	
Negative	85.1	14.9	

^aStatistic: Pearson's chi-square for sex and fisher's exact test for other variables; ^bBoth: individuals with both hypertension and diabetes; *Significant at P <0.01; ^l Significant at P < 0.05

Hypertension was the most commonly identified risk factor in this present study. This finding is apt as hypertension remains the most common cause of stroke worldwide [8] with studies conducted among Nigerian stroke survivors corroborating this assertion [12-13]. It is also worthy of note that hypertension is an equally important risk factor for pure sensory stroke which is a rare condition [20]. An interesting finding in our study was however the fact that about a third of those diagnosed with hypertension did not identify the disease as a stroke risk factor and the implication of this finding could be dire. The lack of realization of a personal risk for stroke will likely result in under-appreciation of the gravity of the risk and affect the seriousness with which affected individuals will respond to the diagnosis. Lack of motivation to take appropriate actions may ensue and this could adversely affect adherence and compliance with treatment regimen, medical checkup and general lifestyle interventions, which in turn may further increase level of stroke risk. Similarly, the level of attention that should be given to any manifestation of stroke symptoms might be reduced due to poor knowledge of stroke risk and prevention and the consequences of non-adoption of necessary stroke preventive strategies.

Although the second most identified stroke risk factor among participants in this study was diabetes, only a little above half (56.8%) of those with a diagnosis of diabetes knew that the disease was a risk factor of stroke. This trend, similar to what obtained among individuals diagnosed with hypertension, also portends grave danger especially as diabetes not only increases the risk of a stroke event but also worsens stroke outcomes [16]. It is therefore pertinent that patient education be incorporated into the care provided to persons diagnosed with hypertension and/or diabetes. The educational approach is especially likely to be feasible and effective in known high risk individuals as risk awareness education can be incorporated into routine medical consultations and care.

The low level of awareness of stroke risk factors such as obesity, physical inactivity, smoking and excessive alcohol intake among the participants in this study is worrisome and demands appropriate actions especially as many of these factors are common habits in this environment [14]. Furthermore, modifying these behavioral/lifestyle stroke risk factors can contribute to 80% reduction in the risk of stroke [21].

Associations between the socio-demographic characteristics of the participants and their knowledge of at least one stroke risk factor were found to be limited and lack statistical significance except for educational attainment with persons who had tertiary education possessing significantly better knowledge of risk factors. This effect of higher education on knowledge of stroke risk factors has been reported in previous studies [9] and suggests that better educational exposure tends to play a key role in health literacy and public health awareness. A demographic characteristic that surprisingly was not significantly associated with knowledge of stroke risk factors was age. This contradicts many previous studies that showed that being elderly was significantly associated with poor knowledge of stroke risk factors [9,22].

The specific diagnosis of the participants was significantly associated with level of knowledge with a greater proportion of persons diagnosed with diabetes being more knowledgeable compared with those with hypertension or those with both hypertension and diabetes. Although there appears to be no existing study that compared level of knowledge of stroke risk among different high stroke risk groups, there is evidence that persons with high risk of stroke are better informed about stroke risk factors than the general population [9]. An implication of this finding is the need to identify means by which this category of persons became knowledgeable about stroke risk factors with a view of replicating such means as interventions in the general population. It is however important to restate the earlier mentioned finding regarding the level of awareness of hypertension and diabetes as risk factors among participants with these diagnoses, and submit that knowledge of at least any one risk factor was found to be better than knowledge of hypertension and/or diabetes among persons with the respective risk factors.

This study has some limitations. The fact that the center in which the study was conducted had a special clinic for persons with diabetes may have influenced the significantly higher level of knowledge observed among these individuals while those with hypertension attend general medical clinics that cater for all other medical conditions. This presupposition is however only applicable for general knowledge of stroke risk factors and not for the participants' ability to identify their respective diagnosis as stroke risk factors. The open-ended questionnaire utilised in this study also possibly restricted the number of

stroke risk factors identified by the participants especially as the ability to identify stroke risk factors has been adjudged poor when open-ended questions are utilized [19]. A close-ended questionnaire would however have presented the participants with options from which they can choose and this could have provided information on how knowledgeable the participants were of less commonly known risk factors such as sleep-related breathing disorders, drug abuse, and oral contraceptive use [23]. Also, the hospital-based design of this study may limit the generalizability of findings and its applicability to persons with hypertension and/or diabetes who are receiving non-medical or no care as is common in our environment. Worthy of mention is the lack of assessment of the duration of the respective diagnosis and medical care prior to the study which prevented more insight into the effect of specific diagnosis on knowledge.

5. CONCLUSION

One of the means of achieving primary stroke prevention is for high risk individuals to be knowledgeable about their stroke risk profile. Although the majority of persons diagnosed with hypertension and/or diabetes in this study knew at least one risk factor, the comparatively lower level of knowledge in terms of identification of their specific diagnoses as stroke risk factors speaks to the need for more emphasis on effective patient education and stroke prevention strategies during medical consultations.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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