Knowledge of Stroke in a Sub-urban Slum Community in Plateau State, North Central Nigeria

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Abstract

Background: Despite stroke being a prominent cause of morbidity and mortality in north central Nigeria, there is no information on community perception and knowledge of stroke symptoms. This study was designed to assess the knowledge of stroke in a suburban community.

Methods: This was community-based cross sectional observational study conducted at Kabong in Tudun Wada/Kabong ward of Jos North Local Government Area of Plateau State in north central Nigeria. A multi-stage sampling technique was used to select Kabong Community and all adults 18 years and above in the community were invited to participate in the study. The knowledge of stroke symptoms was assessed using an interviewer-administered questionnaire. The main outcome measure was the ability to identify stroke symptoms.

Results: There were 196 respondents with a mean age (± standard deviation) of 46.4 (± 16.7) years; their ages ranging from 18 – 84 years. Fifty-four percent could identify only one stroke symptom and this was "sudden weakness or numbness of face, arm or leg especially on one side of the body." On multivariate logistic regression analysis, previous stroke education (Odds Ratio = 0.034, 95% CI = 0.008 – 0.147, p < 0.001) emerged as the independent predictor of ability to identify this stroke symptom.

Conclusion: Knowledge of stroke was poor among participants. Efforts should be made to improve stroke knowledge through deliberate health education of stroke patients, their relatives and the community by health care providers.

Keywords: Knowledge; Stroke symptoms; North central Nigeria

Introduction

Stroke knowledge improves public behaviour in terms of prevention, symptom recognition, and timely response following stroke occurrence.[1] Studies on the knowledge of stroke and the identification of its symptoms in the populations of north-central Nigeria are scarce,[2] inspite of the fact that stroke has attracted public health concern globally as a preventable cause of untimely death and disability.[3]

Globally, over 13 million cases of stroke occur annually with attendant high Disability-Adjusted Life Years (DALYs), and economic impact.[4,5] Eighty percent of all incident stroke, 77% of all stroke survivors, 87% of all stroke related deaths and 89% of all stroke-related DALYs in 2017 occurred in Low and Middle Income Countries (LMICs).[6] However, the precise incidence and prevalence rates of stroke in Nigeria are difficult to establish because most studies on stroke are hospital-based and do not reflect the true burden of stroke in the community although several reports indicate increasing incidence and mortality of stroke as in other African communities.[7,8]

People`s attitudes, knowledge and perception have an influence on stroke prevention including risk factor identification, management as well as community and individual`s speed of response to stroke symptoms when they occur. Thus, the success of primary preventive measures and timely medical attention immediately following a stroke is influenced by the individual and public's knowledge and perception of stroke and its risk factors.[9] Early recognition of stroke symptoms with consequent early presentation in a health care facility improves cardiovascular outcomes and reduce mortality and morbidity of stroke.[10]

The longest phase of delay continues to be the time from symptom recognition to the decision to seek care and much improvement could be achieved in this phase.[11] A few studies have been conducted on primary preventive measures, timely medical attention or individual and public's knowledge and perception on this subject matter in southern Nigeria and the West African sub-region among high risk populations using different methodologies.[11,12] However, none of such studies has been conducted in communities in north central Nigeria, despite the rising incidence of stroke in Nigeria.[7,8] The objective of this study was therefore to assess the knowledge and perceptions of stroke among urban slum dwellers of Kabong in Plateau State, north central Nigeria.

Methods

Study area and population

This study was conducted in Kabong community of Tudun Wada/Kabong ward, of Jos North Local Government Area (LGA) of Plateau State with an estimated population of 61,245.[13] Kabong community is a densely populated cosmopolitan sub-urban community within the Jos Metropolis. The community has access roads, a Primary Health Care (PHC) centre, a government owned primary and a secondary school.[14] However, they use hand dug wells as a source of drinking water and are mostly petty traders with common health challenges of malaria and water borne diseases.

This was a community-based cross sectional observational study and the study population consisted of adults aged 18 years and older. The sample size for the study was determined using the appropriate sample size estimation formula for a cross sectional study,[15] where

n is the minimum sample size, Z is the standard normal deviate at 95% confidence interval (1.96), q is the complementary probability (1 – p), d is the precision of the study set at 0.05 and p is the proportion of respondents with awareness of a combination of dizziness, loss of balance and coordination as symptoms of stroke from a previous similar study; 14.4% (0.144). [16] This gave a minimum sample size of 195 after 10% addition to cater for incomplete responses.

A multi-stage sampling technique was used to select the study participants. From the list of the 17 LGAs in Plateau State, Jos North LGA was selected using simple random sampling technique by balloting following which Tudun Wada/ Kabong ward was selected from the list of 14 wards in the LGA using balloting. Furthermore, Kabong community was selected from the list of 12 communities in the ward using simple random sampling technique by balloting.

Advocacy visits were paid to the community leader to solicit his support and elicit community participation. House listing and households census was conducted, from where a total of 305 households were obtained. A household was defined as a group of people living together under the same roof and sharing meals and mealtimes. Households were sampled starting from the chief's house contiguously until all households were exhausted. Eligible adults were given identifiers and directed to converge in a designated location within the community (primary school) for the administration of the questionnaire. The designated location was used because many classrooms were provided to allow for confidentiality in data collection in an organized manner and adequate furniture were available to make the participants comfortable.

Twenty resident doctors of Jos University Teaching Hospital took part in the study as interviewers. All the interviewers were trained for 10 days by a neurologist at the Jos University Teaching Hospital on the administration of the study questionnaire which was followed by a pilot study in a similar community in Jos North LGA. Necessary corrections were made to it after the pilot study and it was the final version of the questionnaire that was used in the study.

Data collection, handling and analysis
The adapted semi–structured interviewer administered questionnaire[11] had sections on socio-demographics (age, sex, marital status, occupation, level of education, monthly income), history of stroke in a first degree relative, organ affected in stroke and symptoms of stroke and a section on the participant's opinion on whether they thought stroke was preventable or not. Afterwards they were expected to tick preventive measures from a given list of options as well as volunteer preventive measures that were not on the list. The knowledge of stroke symptoms, as done in previous similar studies,[11,17,18] was assessed as; a) sudden severe headache with no known cause b) sudden difficulty in walking, dizziness, or loss of balance or coordination, c) sudden visual impairment in one or both eyes d) sudden confusion or difficulty in speaking or comprehending speech e) sudden weakness or numbness of the face, arm, or leg especially on one side of the body. The outcome measure of interest was ability to identify stroke symptoms. Furthermore, an assessment of the understanding of stroke preventive strategies was based on the ability of the participants to identify the following as stroke preventive strategies; seeking treatment for hypertension, taking alcohol in moderation, avoiding or quitting smoking, controlling one's blood sugar if

diabetic, engaging in regular physical exercise, watching ones blood fat, managing ones heart disease, losing weight if obese, regular hospital visit, compliance with prescribed medications, prayers/spiritual means, use of traditional medicine.

Data analysis was done using Epi info™ statistical software package version 7.0 developed by the Center for Disease Control in the United States of America.[19] Frequency tables were generated for variables such as formal education, history of hypertension and diabetes and number of stroke symptoms identified. Means and standard deviations were determined and compared while Chi-square test was used to establish association between knowledge of stroke symptoms and parameters such as formal education and previous history of stroke. A multivariate logistic regression analysis was done to determine independent predictors of ability to identify stroke symptoms from among the variables; formal education, previous stroke education and family history of stroke. A 95% confidence level was used for the study and a p value ≤ 0.05 was considered statistically significant.

The knowledge of stroke symptoms was categorized, based on the number of symptoms participants were able to identify from among the list of 5 symptoms, as poor if ≤2 were identified, fair if 3 were identified, and good if ≥ 4 were identified. Incorrect symptom or inability to mention any symptom was reported as "do not know"

Similarly, individuals who mentioned between 7-10 stroke preventive measures correctly were adjudged to have good knowledge, while those who got 4-6 correctly had fair knowledge otherwise they were adjudged to have poor knowledge.

Ethical consideration

The study protocol was approved by the Human Research and Ethics Committee of the Jos University Teaching Hospital (REF;JUTH/DCS/ADM/127/XXVII/835)

The interviewers gave a detailed explanation of the purpose of the study to all participants. Verbal as well as written informed consent was obtained before the administration of the questionnaire. Anonymity and confidentiality of the information obtained was assured and maintained by anonymizing the data and coding information obtained and subsequently storing them in password protected files. The questionnaire was administered in the English and Hausa languages since Hausa language is a general language spoken in many parts of northern Nigeria including the north central region. The questionnaire was translated by a fluent Hausa language speaker from English to Hausa and then back translated to English language to confirm its consistency before the commencement of data collection. The study was conducted in July 2017.

Results

Two hundred and thirty adults were eligible but only 196 took part in the study giving a response rate of 85.2%. Thirty four participants were dropped either because we could not obtain consent or they gave incomplete responses. Participants comprised of 78 (39.8%) males and 118 (60.2%) females giving a male female ratio of 1:1.5. The mean age of the participants was 46.4 16.7 years with ages ranging from 18 – 84 years. The males were, on average, older than the females although this difference was not statistically significant (49.23 17.9 vs. 44.53 15.26 years, p = 0.81). Forty one respondents (20.9%) never attended

formal education. When male and female were compared for educational status, a higher percentage of the male were educated compared to the female (88.5% vs. 72.9%). Primary education was the highest level of educational attainment in 65 (33%) of the respondents while secondary education was the highest educational attainment in another 65 (33%) of the participants and tertiary education in 25 (13 %) of the study population. Table 1.

In Table 2, sudden weakness or numbness of the face, arm, or leg especially on one side of the body was identified by 105 (53.6%) of the respondents and 64 (32.7%) of the study population identified sudden difficulty with walking, dizziness or loss of coordination or balance as a symptom of stroke. One Hundred and forty one (71.9%) of the participants had poor knowledge, while 16 (8.2%) had fair knowledge and 39 (19.9%) had good knowledge of stroke symptoms respectively. Table 2.

Sixteen (8%) of the respondents were able to identify the brain as the organ affected in stroke as shown in Figure 1. Although 105 (53.3%) of the respondents believed that stroke was preventable (Figure 2), only 46 (23.4%) were able to identify the correct preventive measures (Figure 3). Previous stroke education (Odds = 0.034, 95% confidence interval = 0.008 - 0.147, p < 0.001) emerged as an independent predictor of ability to identify a warning sign of stroke on multiple logistic regression analysis (Table 3).

Table 1: Demographic and Clinical Characteristics of Respondents

Variable	Overall n (%) n =196	Male n (%) n =78	Female n (%) n =118	P value
Age years: mean (±SD)	46.4 ±16.7	49.2±17.9	44.5±15.3	0.81
Education category				
Nil	41(20.9)	9(22.0%)	32(78.0)	
Primary	65 (33.2)	26 (40.0)	39 (60.0)	0.19
Secondary	65 (33.2)	28 (43.1)	37 (56.9)	
Tertiary	25 (12.8)	15 (60.0)	10 (40.0)	
Family history of Stroke	21 (10.7)	5(23.8)	16(76.2)	0.11
History of Hypertension	62 (31.6)	21(33.9)	41(66.1)	0.25
History of diabetes	22 (11.2)	10(45.5)	12(54.5)	0.57
History of hypertension and diabetes	15 (7.7)	8(53.3)	7(46.7)	0.25
Hypertensive + diabetic	11 (5.6)	5 (45.5)	6 (54.5)	0.70
Stroke Education	23 (11.7)	5(21.7)	18(78.3)	0.60

Table 2: Stroke symptoms identified by respondents

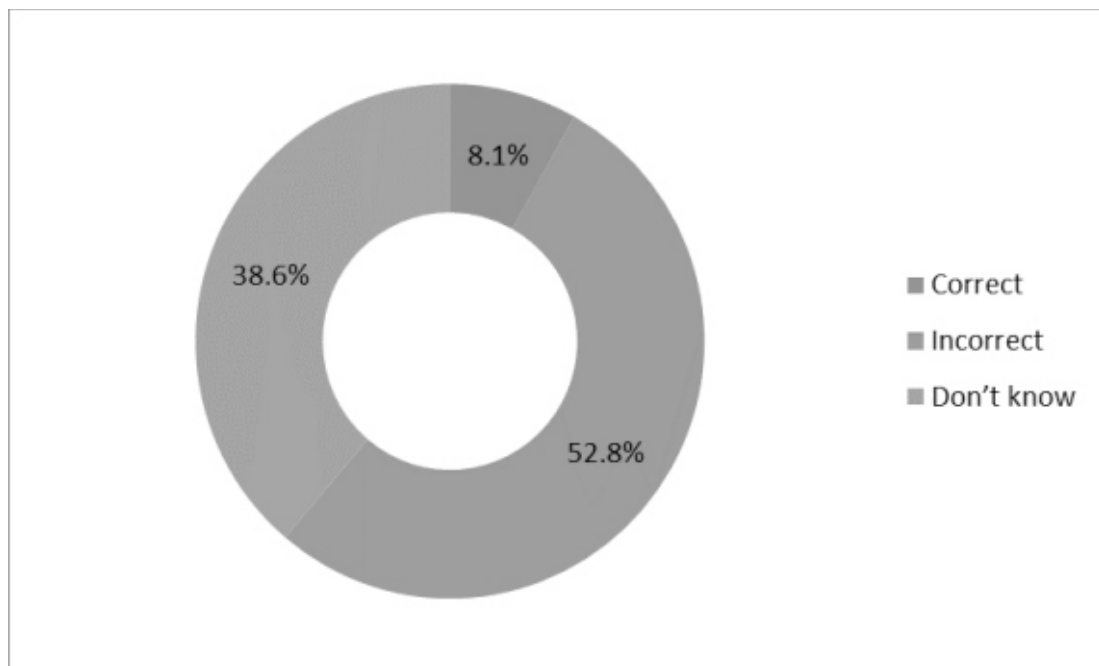| Warning symptoms	n %
Sudden weakness or numbness of face, arm or leg especially on one side of the body	105 (53.6)
Sudden confusion or difficulty speaking or understanding speech	54 (27.6)
Sudden visual loss in one or both eyes	36 (18.4)
Sudden difficulty walking, dizziness or loss of coordination or balance	64 (32.7)
Sudden headache with no known cause	43 (21.9)
Number of symptoms identified	
Nil	81(41.3)
1	36(18.4)
2	24(12.2)
3	16(8.2)
4	24(12.2)
5	15(7.7)

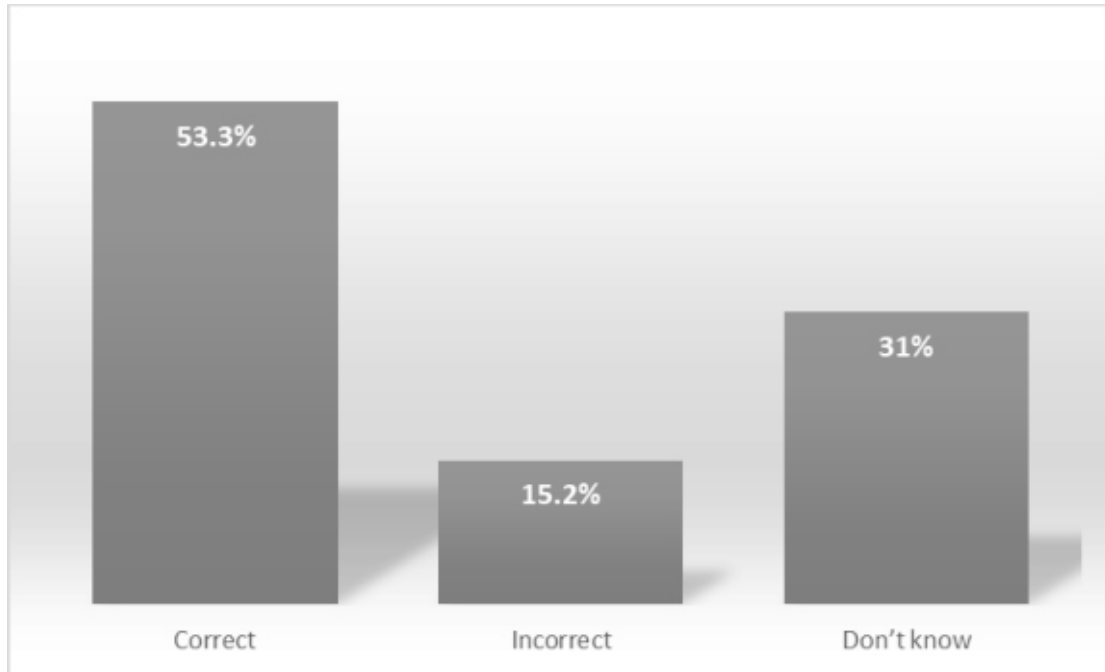**Figure 1: Knowledge of Body part affected in Stroke**

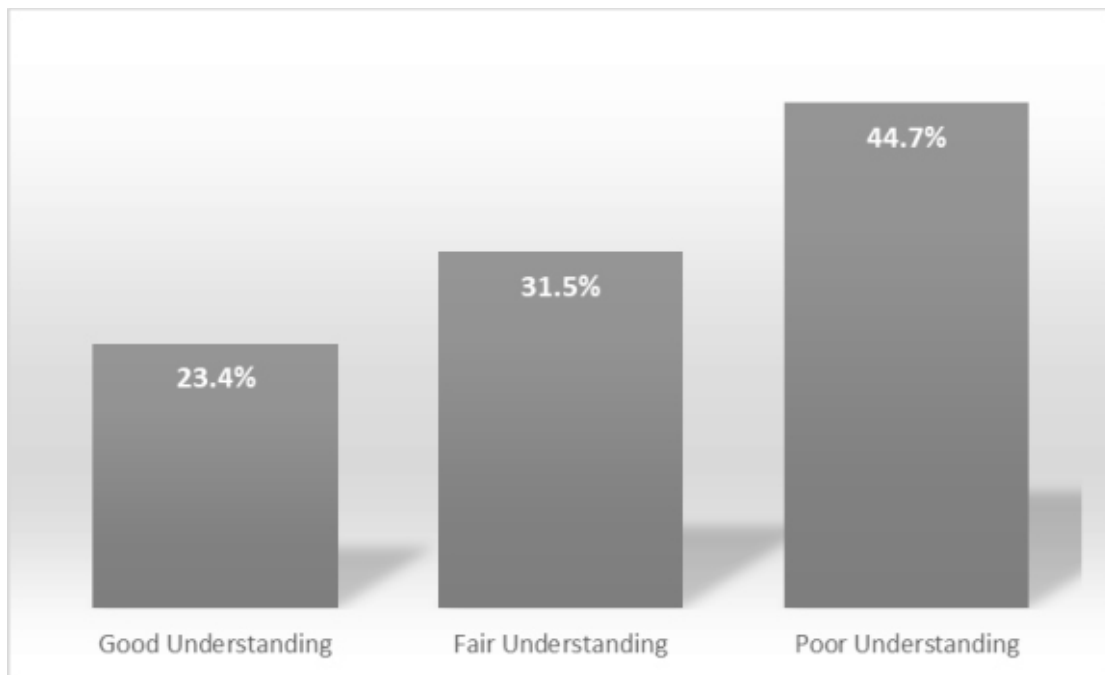**Figure 2: Knowledge of stroke as a preventable event.**

Figure 3: knowledge of measures of stroke prevention

Table 3; Multivariate Logistic Regression Analyses: Predictors of ability to identify stroke symptoms

Variable	AOR*	95% CI	p value
Age			
= 45yrs.	0.714	0.781 – 3.764	0.18
= 46 yrs.	1	-	-
Gender			
Female	1.629	0.811 – 3.274	0.17
Male	1	-	-
Formal education			
No	0.436	0.175 – 1.086	0.08
Yes	1	-	-
Family history of stroke			
No	0.548	0.164 – 1.832	0.33
Yes	1	-	-
Previous stroke education			
No	0.034	0.008 – 0.147	0.00
Yes	1	-	-
Hypertension			
No	0.917	0.394 – 2.135	0.84
Yes	1	-	-
Diabetes			
No	0.699	0.193 – 2.534	0.59
Yes	1	-	-
Hypertension & diabetes			
No	1.354	0.283 – 6.473	0.70
Yes	1	-	-

*AOR= Adjusted odds ratio, CI = Confidence interval

Discussion

This study showed a poor knowledge of stroke. Despite the fact that three quarters of the study population had formal education, the overall knowledge of stroke was quite poor as approximately a tenth were aware of 2 stroke symptoms and less than a tenth were able to identify the brain as the organ affected in stroke. Furthermore, although over a half of the respondents believed that stroke was preventable only about a quarter knew the correct preventive measures.

The ability to identify one stroke symptom in our study was higher than what was reported in Beirut,[20] southern Nigeria,[11] and in a high risk Canadian population.[18] It was, however, lower than those reported in korea,[21] Norway,[22] and the United States of America (USA).[23] These differences could be attributed to the different populations studied, the different methodologies adopted as well as differences in literacy rate and the variation in health information available to the different populations studied.

In this study, previous stroke education was seen as an independent predictor of ability to identify at least one stroke symptom. Although an association between education and awareness of stroke symptoms have been documented in several studies, [24-28] having some form of formal education was not an independent predictor of ability to identify at least a stroke symptom in our study contrary to a report in southern Nigeria.[11] Furthermore, in contrast to what was reported in southern Nigeria but similar to what was reported in Rhodes Island[29] and from a systematic review [30] women were more likely to identify stroke symptom compared to men. The reason women were more able to identify a stroke symptom could be because there were more women in the study population, as this could have conferred on them an advantage by their sheer number, better health seeking behaviour in women, as well as the fact that women had more previous stroke education than men . Although the difference in stroke education was not statistically significant, it was clinically significant as more females were able to identify stroke symptoms compared to males, even though the source of stroke education was not ascertained. There was no significant relationship between age-group, being hypertensive or diabetic and the ability to identify–stroke symptoms contrary to findings in some studies which were conducted in high risk groups and in older populations contrary to our community based study.[18,21,31,32]

The poor knowledge of stroke despite a sizeable number of literate participants and previous stroke education in some participants leaves much to be desired. Furthermore, one would have expected that the semi urban study location which is accessible to various sources of health information should have contributed to a better knowledge of stroke,[33, 34] as there have been an increase in public health enlightenment programmes in the mass media in many states in Nigeria, Plateau state inclusive.[35] There are eleven radio and four television stations in Jos and these stations air programmes in which specialists in various fields of medicine including neurology are invited to give talks on topical public health issues including stroke but the effects of these activities is not reflecting in our finding for reasons that need to be investigated further. Sudden weakness or numbness of the face, arm, or leg especially on one side of the body was the commonest symptom identified by over half of the participants. This is higher than the findings in southern Nigeria[11] and Luxemburg.[36] Our finding was also higher than what was reported in Ghana,[37] and Ireland,[38] where less than half of the study population were able to identify sudden unilateral weakness as a sign of stroke. However, our finding was lower than those reported in Ile Ife,[39] Italy,[1] Toronoto, Canada, [18] and India.[40] The reason for these differences could be from the fact that these latter studies were either hospital based studies, telephone surveys or were conducted in more literate populations.

A third of our participants were able to identify sudden difficulty walking, dizziness or loss of coordination and balance as a stroke symptom, which was higher than the finding in Luxemburg.[36] Furthermore, less than a third of the participants were able to identify sudden confusion or difficulty speaking or understanding speech as a stroke symptom. This is higher than the finding in southern Nigeria[11] and Thailand.[32] Our finding was lower than those reported from India, [40] Cotonou, [12] Toronto, Canada, [18] Melbourne, Australia, [41] Korea, [42] Ireland[38] and the USA.[23] The reason for the

differences in the knowledge of these symptoms could be from the differences in literacy level, variation in the extent of previous stroke education, differences in the methodologies and populations in which these studies were conducted.

There was a poor awareness of stroke symptoms generally; less than a tenth of the participants correctly identified the brain as the organ afflicted in stroke. This was poorer than the findings from studies in Cotonou, [12] among urban dwelling Ugandans, [43] in Ghana[37] and in Italy.[1] The study revealed that just over a half of our respondents knew that stroke was preventable which was lower than the finding in Sri Lankan[44] study and a Ghanaian studies.[37] Less than a quarter of the respondents knew the correct preventive measures against the occurrence of stroke.

The poor knowledge of stroke symptoms, lack of understanding of the import of brain injury and the low level of understanding of stroke preventive measures are among the reasons for late presentation of stroke victims to treatment facilities,[45] the rising prevalence of stroke in LMICs like Nigeria[46] and subsequent high morbidity and mortality from stroke. The limitations of this study is the fact that variables were self-reported, so recall bias may have been present. A larger community based study would be needed to ascertain the generalizability of our findings.

Conclusion

The knowledge of stroke is poor in sub-urban setting of Kabong, north central Nigeria as approximately half of the participants were able to identify only sudden weakness or numbness of face, arm or leg especially on one side of the body as a symptom of stroke and this is attributable

to previous stroke education. It is therefore recommended that stroke education to patients and caregivers by neurologists and other healthcare personnel should be prioritized especially in men who are more at risk of stroke. More effort at community stroke education in the mass media using local languages should be encouraged.

Competing interest

No competing interest

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