Original Article

Awareness of Stroke among University Employees in Kigali, Rwanda: A Cross Sectional Study

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Abstract

Background
Awareness of stroke is important for appropriate and timely stroke prevention and management.
Objective
To assess the level of awareness about the risk factors, signs, and appropriate responses for stroke among university employees in Rwanda.
Methods
We employed a quantitative descriptive cross-sectional approach. We involved 92 participants, and a self-administered questionnaire to collect data. We computed descriptive statistics and used the Chi-Square test to assess any differences in stroke awareness.
Results
We found that 12% and 15.2% of the participants were not aware of any risk factor and warning sign of stroke respectively. Regarding the reaction in case a warning sign of stroke was noticed, 9.8% of the participants indicated that they would do nothing or advise the victim to take rest at home. The limited awareness was significantly higher in the administrative than academic employees for both risk factors (p=0.002) and warning signs (p=0.006), but not for the appropriate responses to stroke (p=0.426).
Conclusion
A significant proportion of the participants were not aware of any stroke risk factor, warning sign and appropriate responses. It is important to conduct further similar studies and implement stroke education interventions in university communities.
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Keywords: Awareness, Stroke, Risk Factor, Warning Sign, University Employees, Rwanda

Introduction

Globally, stroke is the second leading cause of death and the third leading cause of disability-adjusted life-years (DALYs) lost. [1] In 2019, 6.6 million deaths in the world were due to stroke.[2] In recent years, stroke mortality and DALYs lost rates decreased in high-income countries (HICs), but increased in low-income countries (LICs).[1] In 2019, the LICs had a 3.6 (3.5-3.8) higher age-standardized stroke-related mortality rate and 3.7 (3.5-3.9) higher age-standardized stroke-related DALY rate than the HICs. [1] Many LICs are facing uncontrolled industrialization and lifestyle leading to several risk factors for vascular diseases.[3]

In Rwanda like other LICs, non-communicable diseases (NCDs) are increasing due to unhealthy lifestyles and an emerging old population.[4] Stroke is among the top two causes of all deaths in Rwanda,[5] constitutes about 26% of in-hospital mortality and, within a year after stroke, 75% of stroke patients are dead or left with severe or moderate disability.[6] The knowledge about stroke is important for appropriate and timely stroke prevention and management to prevent death and disability due to stroke.[7] However, information about the awareness of stroke among the Rwandan population is limited. We aimed to investigate the level of awareness about stroke among urban university employees in Rwanda. We hope that the study findings will be useful for the Ministry of Health of Rwanda and the universities among other stakeholders in planning appropriate strategies to control the incidence and effects of stroke.

Methods

Study design

We employed a quantitative descriptive cross-sectional approach.

Study setting

We conducted our study at a campus of one of the universities in the City of Kigali in Rwanda

Study population

The study population consisted of 441 employees of the selected university campus.

Inclusion and exclusion criteria

Full time staff members who were working at the university which was selected as the study setting, and provided written consent, were eligible for this study. Part-time staff members and those who did not give written consent were excluded from this study.

Sample size

We used a convenience sampling method to recruit all the employees who were available and accepted to be involved in the study. In fact, some employees were not on campus during the data collection period which was limited to one week and others were too busy to complete the questionnaire. We were able to recruit 92 participants.

Research Instruments

Based on similar previous studies [8-11] and the local context, we developed a self-administered questionnaire that comprised close ended questions. The first version was pilot tested on ten employees who were later not involved in the main study. The purpose of the pilot study was to determine if the questionnaire's items were clear and to determine the adequacy of the research process for possible changes. No modification was required after the pilot study. The final version of the questionnaire consisted of four sections, namely i) participant's socio-demographic data; ii) risk factors for stroke; iii) warning signs of stroke; and iv) preferred responses to warning signs of stroke.

Data collection procedure

Potential participants were invited to take part in the study, and those who consented to participate were asked to fill the questionnaire. The researchers were present during the questionnaire completion to clarify any doubt or misunderstanding. Once all items were answered, the questionnaires were collected from the participants.

Data analysis

Statistical Package for the Social Sciences (SPSS) software, version 26, was used to analyse the data.

First, we calculated the descriptive statistics including frequency and percentage of the participants' distribution by their demographic characteristics and awareness of stroke risk factors, warning signs and preferred responses. Second, we performed analytical statistical tests to explore the relationship between the stroke awareness and participants' employment categories using two-sided Pearson Chi-Square (x^2) test. The level of significance (p-value) was set at 0.05.

Ethical considerations

Ethical clearance to conduct the study was obtained from the Institutional Review Board of the College of Medicine and Health Sciences (Ref. No. CMHS/IRB/291/2020). The permission to collect the data was granted by the head of the study setting. Before collecting the data, each potential participant who met inclusion criteria received the study information sheet. Participants were assured about confidentiality, as well as the right to withdraw from the study at any time without giving a reason. Furthermore, they were given time to ask questions about the study and their participation. Additionally, the questionnaire was anonymous.

Results

All 92 questionnaires that were administered were completed and returned. This corresponds to the response rate of 100%. Most of the participants were aged between 25 and 45 years (71.7%) and were males (58.7%). Regarding the educational levels, 54.3% of the participants had undergraduate. We found no significant difference ($p>0.05$) between academic and administrative employees regarding age, sex, and educational level distribution. Table 1 shows the socio-demographic characteristics of the participants by employment categories.

Table 1. Distribution of the study participants by age, sex, educational level, and employment category

Variable		Employment Category			P-value
		Overall n (%)	Academic n (%)	Administrative n (%)	
Age category (years)	25-45	66 (71.7)	44 (71.0)	22 (73.3)	0.813
	46-65	26 (28.3)	18 (29.0)	8 (26.7)	
Sex	Female	38 (41.3)	26 (41.9)	12 (40.0)	0.86
	Male	54 (58.7)	36 (58.1)	18 (60.0)	
Educational level	Undergraduate	50 (54.3)	31(50.0)	19 (63.3)	0.229
	Postgraduate	42 (45.7)	31(50.0)	11 (36.7)	

As indicated in Table 2, we found that only 88% of the participants were aware of at least one risk factor for stroke with a significant difference between academic and administrative employees (p=0.002). More participants were aware of stress (77.2%), hypertension (69.6%), smoking (54.3%) and excessive alcohol consumption (51.1%) as risk factors for stroke. However, the proportions of awareness for eight out of 12 risk factors investigated was less than 50% and varied between 47.8% for high cholesterol and 35.9% for family history of stroke. Except for stress and excessive alcohol consumption, academic staff were more aware of the risk factors for stroke than their administrative counterparts (p>0.05).

Table 2. Distribution of the participants according to their awareness of risk factors for stroke by employment categories

Identified Risk Factor for Stroke	Employment categories			P-value
	Overall n (%)	Academic n (%)	Administrative n (%)	
At least one risk factor	81 (88.0)	59 (95.2)	22 (73.3)	0.002
Stress	71 (77.2)	50 (80.6)	21 (70.0)	0.254
Hypertension	64 (69.6)	48 (77.4)	16 (53.3)	0.019
Smoking	50 (54.3)	40 (64.5)	10 (33.3)	0.005
Excessive alcohol consumption	47 (51.1)	33 (53.2)	14 (46.7)	0.555
High cholesterol	44 (47.8)	35 (56.5)	9 (30.0)	0.017
Previous stroke	41 (44.6)	34 (54.8)	7 (23.3)	0.004
Old age	40 (43.5)	34 (54.8)	6 (20.0)	0.002
Transient ischemic attack	40 (43.5)	34 (54.8)	6 (20.0)	0.002
Blood disorder	38 (41.3)	33 (53.2)	5 (16.7)	0.001
Cardiac diseases	36 (39.1)	29 (46.8)	7 (23.3)	0.031
Obesity	34 (37.0)	28 (45.2)	6 (20.0)	0.019
Family history of stroke	33 (35.9)	30 (48.4)	3 (10.0)	<0.001

Regarding the warning signs of stroke, our results also showed that only 84.8% of the participants were aware of at least one warning sign, and the level of awareness was higher in academic than administrative employees (p=0.006), (Table 3). The participants were more aware of unconsciousness (63.0 %), confusion (60.9%), sudden weakness or numbness (57.6%), impaired vision (55.4), difficulty walking (54.3%) and loss of balance and coordination (52.2%). Only 43.5%, 45.7% and 46.7% of the participants were respectively aware of dizziness, fainting and speech impairment. Academic employees were more aware of the warning signs of stroke compared to the administrative ones, and the difference appeared to be statistically significant for all the signs investigated (p<0.05) except for the speech impairment.

Table 3. Distribution of the participants according to their awareness of warning signs of stroke by employment categories

Identified Warning Sign of Stroke	Employment Categories			P-value
	Overall n (%)	Academic n (%)	Administrative n (%)	
At least one warning sign	78 (84.8)	57 (91.9)	21 (70.0)	0.006
Unconsciousness	58 (63.0)	48 (77.4)	10 (33.3)	<0.001
Confusion	56 (60.9)	43(69.4)	13 (43.3)	0.017
Sudden weakness or numbness	53 (57.6)	42 (67.7)	11 (36.7)	0.005
Impaired vision	51 (55.4)	45 (72.6)	6(20.0)	<0.001
Difficult walking	50 (54.3)	40 (64.5)	10 (33.3)	0.005
Loss of balance and coordination	48 (52.2)	40 (64.5)	8 (26.7)	0.001
Severe headache with no known cause	45 (48.9)	37 (59.7)	8 (26.7)	0.003
Difficult speaking or understanding speech	43 (46.7)	33 (53.2)	10 (33.3)	0.073
Fainting	42 (45.7)	34 (54.8)	8 (26.7)	0.011
Dizziness	40 (43.5)	35 (56.5)	5 (16.7)	<0.001

Table 4 illustrates the participants' preferred responses to warning signs of stroke by employment categories. Most of the study participants (58.7%) revealed that if they noticed any warning sign of stroke, they would direct the victim to a hospital. Surprisingly, 9.8% of the participants indicated that they would do nothing or advise the victim to take rest at home. No significant difference (p=0.426) was found between the academic and administrative employees with respect to preferred responses to warning signs of stroke.

Table 4. Distribution of the participants according to their preferred responses to warning signs of stroke by employment categories

Preferred response to stroke warning sign	Employment categories			
	Overall	Academic	Administrative	P-value
	n (%)	n (%)	n (%)	
Direct the person to a hospital	54 (58.7)	37 (59.7)	17 (56.7)	0.426
Call a doctor	14 (15.2)	11 (17.7)	3 (10.0)	
Call hospital	12 (13.0)	9 (14.5)	3 (10.0)	
Take rest at home	7 (7.6)	3 (4.8)	4 (13.3)	
Call family friends or neighbors	3 (3.3)	1 (1.6)	2 (6.7)	
Do nothing	2 (2.2)	1 (1.6)	1 (3.3)	

Discussion

The purpose of the study was to assess the level of awareness about stroke among urban university employees in Rwanda.We found that 88% of the participants knew at least one risk factor for stroke. The rate we found was lower compared to 98.2% found in Nigeria. [8] This difference could be due to limited stroke related awareness interventions in Rwanda. The ability to identify at least one risk factor was significantly higher in academic than administrative employees (p=0.002). This is probably because, the academic staff had health related education which was reported to be associated with better knowledge of risk factors for stroke. [8]

Stress, hypertension, smoking and excessive alcohol consumption were identified by more than 50% of the participants as risk factors for stroke. A similar Nigerian study [8] reported that the most reported risk factors were hypertension, stress, cholesterol and smoking. The reason for identification of stress on top by 77.2% may be that it is experienced by the participants in their daily work.[9] The recognition of excessive alcohol consumption was high (51.1%) in comparison with the 40.3% reported by Obembe et al.[8] in a study among students and staff of Obafemi Awolowo University, Nigeria. The difference in the results of these two studies may be due to the ways the risk factor was phrased (excessive alcohol consumption in Rwanda vis-a-vis alcohol use in Nigeria).

On the other hand, cardiac diseases, obesity, and family history of stroke were known by less than 40% of our study participants. While obesity was identified by 56.1% of the staff who participated in the study by Obembe et al. ;[8] we found that only 37.0% of our participants identified it as a risk factor for stroke. The difference in the results of these two studies may be that more respondents in the study by Obembe et al. had more exposure and access to information about stroke.[8]

There was a statistically significant difference in the awareness of risk factors for stroke between administrative and academic employees. This was in agreement with a Nigerian study which also showed significant differences in the awareness of some risk factors including hypertension, stress, cholesterol, obesity, diabetes, and diet.[8]

As for the risk factors, our results showed that 84.8% of the participants were aware of at least one warning sign. This rate was higher than the one (39.6%) reported in a study that was conducted in Nigeria in 2008.[10] The authors attributed the low awareness rate to the fact that only 28% of the participants had previous health education on stroke and the failure of other potential sources of information.[10] However, the rate we found was lower than the one (92.3%) found in a similar study conducted in Nigeria.[8] Poor recognition of early warning signs of stroke can result in delays in seeking adequate treatment.[11]

We found that the academic employees were more aware of the warning signs of stroke compared to the administrative ones, and the difference appeared to be statistically significant for all the signs investigated ($p<0.05$) except for the speech impairment. This confirmed the findings from some previous studies.[10] In fact, most of our academic study participants had a health education background while the administrative ones had qualifications in other fields. Most of the study participants (58.7%) revealed that if they noticed any warning sign of stroke, they would direct or take the victim to a hospital. Such an action was also the most preferred by the participants in a similar study conducted in Nigeria,[8] with a higher percentage of 67.9%. This was consistent with the difference in the proportions of participants who indicated doing nothing if they observed a warning sign of stroke (2.2% in Rwanda vis-a-vis 0.4% in Nigeria).[8] Again, this difference may reflect limited stroke related awareness interventions in Rwanda compared to Nigeria.[8]

Contrary to what is reported from other similar studies,[12,13] we did not observe any significant relationship between employment category (p=0.426) and the ability to properly respond to stroke warning signs, maybe because we had a small, underpowered sample size. To the best of our knowledge, this was the first study that assessed the level of awareness of stroke risk factors, warning signs, as well as the appropriate responses among urban university employees in Rwanda. Our study sample involved academic and administrative employees. We used a questionnaire that we developed based on the literature and the local context. However, our study is subject to some limitations. First, our sample size was small, and consequently underpowered to provide data that can be generalized to the whole population. In fact, using a convenience sampling strategy, we recruited only 92 participants.

However, Slovin's formula, which is recommended when nothing is known about the behavior of a population,[13] n = N / (1 + Ne2) where N=441 and e= 0.05, would give a sample size of 210 participants. Additionally, we had a lower number of administrative (n=30) compared to academic (n=62) participants. This could have resulted in the exaggeration of better awareness among the academic staff. Second, our questionnaire was not tested to calculate the validity and reliability coefficients. However, the research instrument was pilot tested to determine if the questions were clear and to determine the adequacy of the research process for possible changes, and no modification was required after the pilot study. Third, we involved participants from one urban university campus and the results cannot be generalized to rural campuses or all university communities in Rwanda. Lastly, diabetes was inadvertently omitted from our questionnaire; although it is known to be among the top risk factors for stroke.

Conclusion

A significant proportion of the participants was not aware of any stroke risk factor, warning sign and appropriate responses. It is important to conduct further similar studies and implement stroke education interventions in university communities.

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Conflict of interest
We declare that we have no conflict of interest.

Authors' contributions
EN, CN, JPS, TR and GU designed the study, collected, analyzed, and interpreted the data; JDR, JMVS, JN, CCN, AN, BS and MH contributed to the data analysis and interpretation. All authors wrote and approved the final manuscript.

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