

Stroke Awareness Among University Students in Saudi Arabia



Mazen A. Basheikh¹, Sumayyah A. Kobeisy², Salem Bajammal³, Mohammad Joharji³, Reem A. Alyoubi^{2,4}

¹Department of Internal Medicine, Faculty of Medicine, University of Jeddah, Jeddah, Kingdom of Saudi Arabia, ²Pediatric Department, Dr. Soliman Fakeeh Hospital, Jeddah, Saudi Arabia ³University of Jeddah, Jeddah Saudi Arabia, ⁴Pediatric Department, King Abdulaziz University Hospital, Jeddah Saudi Arabia

Abstract— Introduction: Stroke is one of the leading causes of morbidity and mortality worldwide. Hypertension, diabetes, dyslipidemia, obesity, smoking and lack of physical activity are all modifiable risk factors that can prevent stroke. BE-FAST, an acronym for balance, eyes, face, arm, speech and time, can be used to recognize more than 95% of ischemic strokes. **Objective:** This study aims to assess the general knowledge of university students in Saudi Arabia regarding the common symptoms of stroke as well as their awareness of when to present to a medical facility. **Methodology:** A cross-sectional study conducted as an online survey distributed amongst university students from King Abdulaziz University in Jeddah, Saudi Arabia from September-October 2020. Ethical approval was obtained from the Research Ethics Committee of the Faculty of Medicine at King Abdulaziz University in Jeddah, Saudi Arabia. Statistical analysis was done using IBM SPSS Statistics Version 20. **Results:** A total of 321 volunteers participated in the study. Facial asymmetry and hemibody weakness were the least symptoms to be recognized among the studied sample (29% and 40.8% respectively). The awareness of the urgency to seek medical help was very high as 90.7% said that they need to seek medical help as soon as symptoms appear and 92% said that they would go to the Emergency Room rather than outpatient clinics. **Conclusion:** Awareness of stroke symptoms is associated with better prognosis however current knowledge of university students is still suboptimal especially regarding some of the common early symptoms/signs like facial and hemibody weakness. More awareness campaigns in Saudi Arabia and possible implementation of stroke signs and symptoms in school system would probably increase the public awareness and reduce the morbidity resulting from strokes.

Keyword: Stroke, early symptoms, University students, awareness, medical facility, morbidity

Introduction:

Stroke is one of the leading causes of morbidity and mortality worldwide and accounts for approximately 140,000 deaths annually in the United States alone¹. The prevalence of stroke has increased among adults aged 20-64 years of age over the past few years². Hypertension, diabetes, dyslipidemia, obesity, smoking and lack of physical activity are all modifiable risk factors that can prevent stroke³. Cases of acute stroke require urgent medical attention and neuroimaging in a timely manner, therefore; patient outcomes may be vastly improved by better public education and awareness regarding common stroke symptoms⁴. BE-FAST, an acronym for balance, eyes, face, arm, speech and time, can be used to recognize more than 95% of ischemic strokes⁵.

Studies in Saudi Arabia regarding the awareness of stroke are limited. One study was conducted in the southwestern region of the country revealed poor general knowledge regarding stroke and the common symptoms and risk factors of the disease⁶.

This study aims to assess the general knowledge of university students in Saudi Arabia regarding the common symptoms of stroke as well as their awareness of when to present to a medical facility.

Methodology:

This is a cross-sectional study conducted as an online survey distributed amongst university students from King Abdulaziz University in Jeddah, Saudi Arabia from September-October 2020.

Ethical approval was obtained from the Research Ethics Committee of the Faculty of Medicine at King Abdulaziz University in Jeddah, Saudi Arabia and the guidelines outlined in the Declaration of Helsinki were followed.

The questionnaire comprised of two sections, one about respondent demographics and the other regarding stroke awareness. Demographics included information about sex, age group, nationality, university faculty, smoking status and whether there are any chronic conditions. Stroke awareness questions included whether respondents have ever heard of stroke, identifying early symptoms of stroke, when a patient with symptoms should present to a medical facility and whether to present to the emergency department or the outpatient clinics.

The survey data used to support the findings of this study are available upon request from the corresponding author. Statistical analysis was done using IBM SPSS Statistics Version 20. ANOVA and independent samples t-test were used to compare the means of the sample. The level of significance, (*P*-value), was taken at < 0.05 with a confidence interval (CI) of 95%.

Results:

A total of 321 volunteers participated in the study. The great majority of those included were between 21-24 years of age and the number of male and female respondents were very close (153 and 168 out of 321 respectively). More than three quarters (75.7%) of those studied claimed to be non- smokers and 91.3% did not have any chronic illnesses. Detailed demographic information is displayed in table 1.

Table 1: Participant Demographic Information

Demographics	
Sex	<i>n</i> (%)
Male	153/321 (47.7)
Female	168/321 (52.3)
Age Group	<i>n</i> (%)
<18	3/321 (0.9)
18-20	110/321 (34.3)
21-24	199/321 (62)
>24	9/321 (2.8)
Nationality	<i>n</i> (%)
Saudi	309/321 (96.3)
Non- Saudi	12/321 (3.7)

University Faculty	<i>n</i> (%)
Preparatory year	21/321 (6.5)
Engineering	49/321 (15.3)
English	1/321 (0.3)
Arts and Humanities	37/321 (11.5)
Medicine	32/321 (10)
Economics	33/321 (10.3)
Pharmacy	2/321 (0.6)
Applied Medical Sciences	10/321 (3.1)
Sciences	35/321 (10.9)
Infrastructure	2/321 (0.6)
Law	76/321 (23.7)
Dentistry	15/321 (4.7)
Tourism	8/321 (2.5)
Smoking Status	<i>n</i> (%)
Smoker	78/321 (24.3)
Non-smoker	243/321 (75.7)
Do you have chronic illnesses?	<i>n</i> (%)
Yes:	
-diabetes	5/321 (1.6)
-asthma	7/321 (2.2)
-thyroid disease	2/321 (0.6)
-psychiatric disorder	1/321 (0.3)
-cardiac/ vascular disorder	2/321 (0.6)
-hypercholesterolemia	2/321 (0.6)
-G6PD	1/321 (0.3)
-hypertension	1/321 (0.3)
-eczema	1/321 (0.3)
-diabetes and eczema	1/321 (0.3)
-anemia	1/321 (0.3)
-asthma and G6PD	2/321(0.6)
-migraine	1/321 (0.3)
-obesity	1/321 (0.3)
No	293/321 (91.3)

Out of the 321 university students included, 294 (91.6%) have heard of the term “stroke”. The most commonly recognized early symptom of stroke was difficulty in speaking or understanding (80.7%) followed by imbalance (66.7%) and visual problems (54.8%). Less than half recognized that unilateral body weakness (40.8%) and facial asymmetry (29%) could be early signs of stroke as well. Most of those studied (90.7%) acknowledge that persons experiencing symptoms of stroke should seek medical attention and 92.2% thought the most appropriate place to present to was the emergency room. Further information regarding respondent’s answers regarding stroke awareness can be found in table 2.

Table 2: Stroke Awareness

Stroke Awareness	
Have you ever heard of “stroke”?	<i>n</i> (%)
Yes	294/511 (91.6)
No	27/511 (8.4)
Which of the following are symptoms of stroke?	<i>n</i> (%)
Imbalance	214/321 (66.7)
Facial asymmetry	93/321 (29)
Visual problems	176/321 (54.8)
Difficulty speaking or understanding	259/321 (80.7)
Hemibody weakness	131/321 (40.8)
When should a patient experiencing a stroke go to the hospital?	<i>n</i> (%)
No need to go to the hospital	4/321 (1.2)
As soon as symptoms appear	291/321 (90.7)
Within 4 hours	8/321 (2.5)
Within 24 hours	11/321 (3.4)
Within one week	7/321 (2.2)
A person experiencing stroke symptoms should go to the:	<i>n</i> (%)
Emergency room	296/321 (92.2)
Outpatient clinics	24/321 (7.5)
No need for medical attention	1/321 (0.3)

All participants recognized at least one symptom of stroke, however; only 13.1% of respondents recognized all five symptoms, 12.5% recognized four, most respondents (31.8%) recognized three symptoms, 19.3% recognized two symptoms and 23% recognized only one symptom.

There was no significant difference between the sex of respondents and the number of stroke symptoms recognized (conditions $t(319)=1.366, p=0.173$), however; there was a statistical difference in the smoking status of the respondents and the number of stroke symptoms recognized (conditions $t(319)=-2.962, p=0.003$) as well as previous awareness of stroke and the number of symptoms recognized (conditions $t(319)=2.105, p=0.036$) and having a chronic condition and recognition of stroke symptoms (conditions $t(319)=2.105, p=0.036$). Smokers recognized a mean of 3.09 ± 1.4 SD symptoms while non-smokers recognized 2.61 ± 1.2 SD symptoms with a mean difference of 0.481 between the groups and a 95% CI between 0.150- 0.811 for smokers than non-smokers. Those with previous knowledge of stroke were familiar with 2.77 ± 1.3 SD symptoms while those without stroke knowledge recognized 2.22 ± 1.4 SD symptoms with a mean difference of 0.550 between the two groups and 95% CI of 0.036-1.064 for those with previous knowledge. Respondents with chronic conditions were less familiar than those without chronic conditions with a mean difference of -0.756 with a 95% CI of -1.258 to -0.254.

There was statistically significant association between the number of stroke symptoms recognized and the proposed timing of presenting to a medical facility (conditions, $F(4,316)=3.192, p=0.014$). Post-hoc testing using the Games-Howell method showed the mean difference was significant for ‘as soon as symptoms appear’ compared to presenting ‘within one week’ ($p=0.022, CI [0.15-2.85]$) and for ‘within

24 hours' compared to presenting 'within one week' ($p= 0.007$, CI [0.38-2.69]). The number of stroke symptoms recognized was also significant for where the patient should present (conditions, $F(2,318)= 7.918$, $p<0.0001$).

Discussion:

Although the disease burden of stroke in terms of disability adjusted life years is increasing worldwide, awareness of stroke and its symptoms across many countries and communities seems to be deficient⁷⁻¹². Awareness of stroke symptoms and signs is associated with shorter prehospital delay which in turn is associated with higher chances of reperfusion and overall better prognosis^{8-9,13-14}.

The awareness of stroke symptoms is still suboptimal which was also seen in other studies done in Saudi Arabia in the past^{6,15}. In our study, despite being common early signs of stroke, facial asymmetry and hemibody weakness were the least symptoms to be recognized among the studied sample (29% and 40.8% respectively).

There was no difference in stroke awareness between males and females. However, smokers were more aware than non-smokers of stroke symptoms. There is clear evidence of a dose related relationship between smoking and stroke risk¹⁶. A Chinese study found that only 27.2% of the general population were aware that smoking is a cause of stroke¹⁷. This suggests that stroke awareness amongst the general population is inadequate, not only in Saudi Arabia, but in other countries as well.

Those with prior knowledge of stroke were significantly more aware of stroke symptoms than those that have not heard of stroke and those who were more aware of stroke symptoms were more likely to choose earlier presentations to a medical facility.

The awareness of the urgency to seek medical help was very high as 90.7% said that they need to seek medical help as soon as symptoms appear and 92% said that they would go to the Emergency Room rather than outpatient clinics. This is similar to another large study that assessed the awareness of stroke signs and symptoms among US adults where more than 90% of the studied sample reported the need to call 9-1-1 as soon as they see the symptoms/signs of stroke¹⁴.

Stroke awareness campaigns can increase public knowledge regarding the disease and when to seek medical attention by not only targeting high risk individuals, but the community at large¹⁸. A recent study in Hungary revealed better outcomes and increase in thrombolytic therapy 1 month after performing stroke awareness campaigns¹⁹.

Another way to increase awareness is to implement information about early signs and symptoms of stroke in the school system which was shown to be effective in increasing knowledge and awareness in previous reports⁹. A Pooled Analysis of Three Community-Based Studies revealed that there was no statistical difference between teacher-led lessons and information taught by medical staff when educating children and parents²⁰.

This study was limited to university students and did not assess awareness among the older population, therefore; the actual awareness of stroke in Saudi Arabia may be misrepresented.

Conclusion:

Awareness of stroke symptoms is associated with better prognosis however current knowledge of university students is still suboptimal especially regarding some of the common early symptoms/signs

like facial and hemibody weakness. More awareness campaigns in Saudi Arabia and possible implementation of stroke signs and symptoms in school system would probably increase the public awareness and reduce the morbidity resulting from strokes.

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