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Awareness of Stroke among Diabetic and Hypertensive Patients at King Fahad Hospital in Al-Madinah, KSA, 2016

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ABSTRACT

Introduction: Strokes are the second leading cause of death worldwide. It is assumed that patients' survival rate can be improved if they have better knowledge about strokes.

Objectives: To assess the level of awareness of the warning signs and determinants of having a stroke among high-risk individuals in Al-Madinah, Saudi Arabia.

Methods: This cross-sectional study was conducted at King Fahad hospital in Al-Madinah, KSA, from September to December 2016. A total of 166 patients, diagnosed with hypertension and/or diabetes mellitus, aged ≥ 18 years were consecutively recruited from the hospital. The data were collected using an interview questionnaire, which included sociodemographic characteristics and questions about the warning signs and risk factors of strokes.

Results: Sixty-two percent of the respondents are unaware about strokes risk factors and 51.8% are unaware of the warning signs. The most common risk factor identified by the participants was diabetes mellitus (99 [59.6%]), and the most common warning sign identified was hemi-paralysis (72 [43.4%]). Awareness about risk factors and warning signs of strokes was significantly associated with educational level (p=.001), (p=.002) while awareness about the warning signs was significantly associated with income (p=.019). Age,

gender, and occupation were not significantly associated with stroke awareness.

Conclusions: A large proportion of high-risk patients have poor awareness of the risk factors and warning signs of strokes. The patients' awareness was affected by their educational level. Health awareness programs addressing the warning signs of strokes should target high-risk patients in healthcare settings.

Key Words: Stroke Awareness, High Risk Patients, Diabetes Mellitus, Hypertension, Saudi Arabia.

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INTRODUCTION

A stroke is the sudden death of brain cells due to an interrupted or reduced supply of blood to a part of the brain.[1] The risk factors for having a stroke are arterial hypertension, diabetes mellitus, smoking, micro-vascular rupture, hyperlipidemia, age, sickle cell disease, human immunodeficiency virus infection, and cerebral malaria.[2] Many studies have shown that the most common causes of strokes in Saudi Arabia are hypertension (56%), diabetes mellitus (42%), and cardiomyopathy (33%).[3] Strokes are the second leading cause of death worldwide and a significant cause of serious, long-term morbidity and functional disability.[4]

The World Health Organization (WHO) reported that around 15 million people worldwide suffer from a stroke each year, 30% of them die and another 30% are permanently disabled.[5] The incidence of strokes in Arab nations varies from 27.5 to 63 per

100,000 people annually, and the prevalence is 42 to 68 per 100,000.[6]

Strokes are observed to be a common and rapidly increasing cause of illness and death in Saudi Arabia, where their prevalence was estimated at 43.8 per 100,000 per year in Riyadh and 40 per 100,000 in the Eastern Province.[7]

Therefore, strokes are considered a serious medical problem in the Kingdom.[2] Thrombolytic therapy has been proven an effective therapy for ischemic strokes if administered within minutes of the onset of symptoms.[8,9] Thus, early detection and treatment are critical for reducing the risk of morbidity and mortality.[10] Despite the recent advances in treatment, a large percentage of stroke patients do not seek immediate medical attention, which makes therapy ineffective.[11] There is lack of information about strokes

both worldwide and in the KSA. The predicted number of deaths from strokes will increase each year if nothing continues to be done.[2] It is assumed that patients' survival rates could be higher if they had better public knowledge of the signs and symptoms of strokes.[12] In 2015, a study conducted in Nigeria on diabetic and hypertensive patients to assess their knowledge about strokes reported that only 5.5% could identify five or more risk factors.[13]

However, to our knowledge, there is no study to assess stroke awareness among the high-risk population in Saudi Arabia. We carried out this study to assess the awareness of the risk factors and warning signs of strokes among high-risk patients, namely diabetic and hypertensive patients in King Fahad hospital in Al-Madinah. This study also aims to identify the determinants of stroke awareness.

METHODS

Study Design, Study Setting and Study Period
This is a cross-sectional analytic study that was conducted at King Fahad Hospital (diabetic center, cardiac center, internal medicine department and general surgery department) during the period from September to December 2016.

Sampling
The statistical website OpenEpi[14] was used to determine the sample size in an infinite population, assuming a level of awareness of the warning signs of strokes of 50%, at 5% precision and at a statistical power of 80%. These inputs yielded a sample size of at least 165 participants.

Sample size n = [DEFF*Np(1-p)]/ [(d2/Z21-α/2*(N-1)+p*(1-p)]

Participants were consecutively recruited from the inpatients admitted to the cardiac center, internal medicine department, general surgery department, outpatient clinic of internal medicine, and diabetic center at King Fahd Hospital. Inclusion criteria included being diagnosed with hypertension and/or diabetes mellitus and being aged ≥ 18 years. Exclusion criteria included non-Arabic speakers, patients aged less than 18 years, and patients with a previous history of having a stroke.

Data Collection
The data were collected using an interview questionnaire in the Arabic language. The survey questionnaire consisted of three parts. The first dealt with socio-demographic data including age, gender, nationality, level of education, occupation, and income. The second part concerned the health status of the patients: whether they have diabetes mellitus, hypertension or both. The third part covered their knowledge of the definition, risk factors, warning signs, prevention, and treatment of strokes. The questions in this section were in a list format, including an "others" option. The questionnaire was prepared by the authors, its validity was verified by a review of three consultants of neurology and community medicine, and then it was pre-tested for both comprehension and readability on 15 subjects who were not included in the study.

Statistical Analysis
Data were entered using Microsoft Excel 2013 and analyzed using the Statistical Package for Social Scientists (SPSS) software version 21. Descriptive statistics were performed for categorical variables using frequencies and percentages and for continuous variables using the mean ± standard deviation (SD), as continuous data were normally distributed. Univariate analysis was performed using the Chi-squared test and an independent samples T-test. The scoring system was adopted from a study done in Spain by Montaner et al. in 2001[15] and was defined as follows: a good knowledge of the risk factors for having a stroke meant the ability to name ≥ 5 risk factors with ≤ 1 error; a good knowledge of the warning signs of having a stroke meant the ability to correctly recognize ≥ 3 symptoms from the list with ≤ 1 error. Multivariate analysis was performed using a logistic regression analysis to identify independent factors associated with stroke awareness. Only factors statistically significant by univariate analysis were included, and statistical significance was set at a P value of ≤ 0.05.

Ethical Consideration
Ethical approval was obtained from the scientific research ethics committee at Taibah University. Informed consent was obtained voluntarily from all participants after explaining the aim and nature of the study. Privacy and confidentiality were assured as the questionnaire was filed anonymously.

RESULTS
Of the 166 respondents in the survey, 32.5% were aged 45 years and younger and 67.5% were aged > 45 years. As Table 1 shows, 70 (42.2%) of the respondents were men and 96 (57.8%) were women. Three-quarters of them have diabetes mellitus, 56% have hypertension and 31% have both. Knowledge of the correct definition of a stroke varied among patients; the answer of hemi-paralysis was given by 44.6% of the respondents; 43.4% claimed that a stroke is a disease that affects the brain vessels and 38.6% were aware that a stroke can be a complication of diabetes mellitus. Collectively, 45.8% thought that a stroke can affect other organs such as extremities (56%), the digestive system (9%) or the reproductive system (5.4%). Family members represent the main source of knowledge among the patients who had previously heard about strokes (Figure 1).

Awareness about the Risk Factors of Having a Stroke
Regarding awareness of the risk factors; participants mentioned hypertension (96 [57.8%]) diabetes mellitus (99 [59.6%]), smoking (87 [52.4%]), unhealthy lifestyle (47 [28.3%]), old age (62 [37.3%]), cardiovascular diseases (56 [33.7%]), male gender (36 [21.7%]), psychic trauma (63 [38.0%]), stress (60 [36.1%]), and family history (25 [15.1%]). Only thirty-six (38.0%) of the respondents have adequate knowledge of the risk factors. There was a significant association between knowledge and level of education (p=.001). However, there was no significant association between knowledge and age (p=.81), gender (P=.26), nationality (p=.31), occupation (p=.24), marital status (p=.84), or income (p=.13).

Awareness of the Warning Signs of Having a Stroke
The most common warning sign identified by the participants was hemi-paralysis (72 [43.4%]), followed by speech problems (61 [36.7%]), numbness (59 [35.5%]), weakness in the periphery (57 [34.3%]), imbalance (55 [33.1%]), facial paralysis (49 [29.5%]), complete paralysis (48 [28.9%]), chest pain (38 [22.9%]), sight changes (38 [22.9%]) and severe headache (38 [22.9%]). Good knowledge of the warning signs was displayed by 80 (48.2%) of the participants. There was a significant association between adequate knowledge and level of education (p=.002) and income (p=.019) while age (p=.22), gender (p=.49), nationality (p=.53),

occupation (p=.13), and marital status (p=.76) of the participant were not significantly associated.

**Awareness about the Treatment of Strokes**

When asked about treatment of strokes, 40 (24.1%) believed that strokes can be treated, compared to 28 (16.9%) who thought that the results of a stroke are irreversible damage. A majority, 98 (59%), stated that they did not know if strokes can be treated or not. Eighty-nine (53.9%) believed that stroke can be prevented, and 102 (61.4%) chose the prevention of chronic diseases as a major factor for prevention. A majority of participants, 110 (66.3%) believed that early treatment ensures the best outcome. A majority also 124 (74.7%) have not received any information about strokes from their physicians.

Table 1: Socio-demographic characteristics of the participants

Socio-demographic variables		Frequency (N=166)	Percent (100%)
Age:	45 years and lower	54	32.5%
	Higher than 45 years	112	67.5%
Gender:	Male	70	42.2%
	Female	96	57.8%
Nationality:	Saudi	138	83.1%
	Non-Saudi	28	16.9%
Educational level:	Illiterate	43	25.9%
	Did not complete high school	48	28.9%
	Completed high school	43	25.9%
	University	29	17.5%
	Higher than university	3	1.8%
Occupation:	In the heath field	8	4.8%
	Not in the heath field	59	35.5%
	Not employed	99	59.6%
Monthly income:	< 2000 SR	46	27.7%
	2000 - 4999 SR	51	30.7%
	5000 - 7999 SR	42	25.3%
	≥ 8000 SR	27	16.3%
Department:	Medicine Department (In-patient)	51	30.7%
	Medicine Department (Out-patient)	11	6.6%
	Cardiac Center	12	7.2%
	Diabetic Center	36	21.7%
	Surgery Department (In-patient)	43	25.9%
	Other departments	13	7.8%

Figure 1: Patient's source of information about strokes.
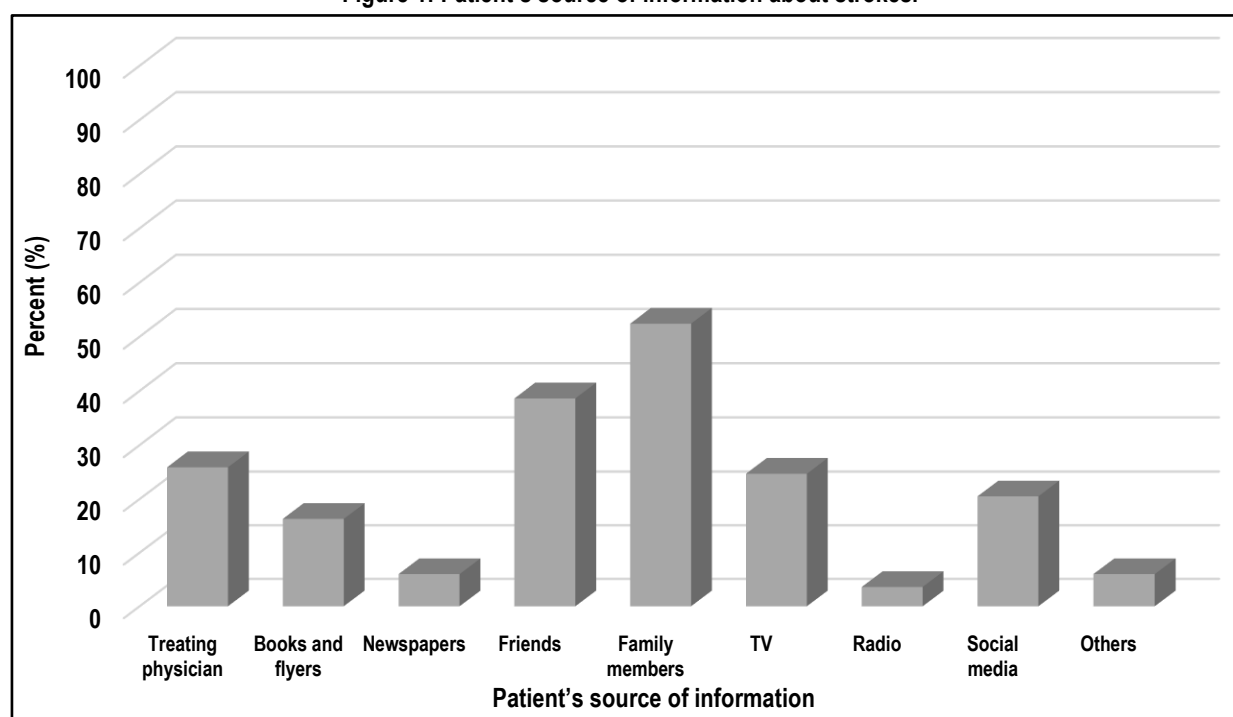
Table 2: Knowledge of the risk factors for having a stroke with respect to level of education, occupation and income

Demographic variables	Distribution	Name 5 or more risk factors making less than 1 error	P value
Educational level	Illiterate	7 (16.3%)	.001
	Did not complete high school	23 (47.9%)	.092
	Completed high school	15 (34.9%)	.630
	University or higher	18 (56.3%)	.018
Occupation	Employed	29 (43.3%)	.244
	Unemployed	34 (34.3%)	
Income	< 2000 SR	13 (28.3%)	.138
	2000 - 4999 SR	20 (39.2%)	
	5000 - 7999 SR	15 (35.7%)	
	≥ 8000 SR	15 (55.6%)	

Table 3: Knowledge of the warning signs of having stroke with respect to level of education, occupation and income

Demographic variables	Distribution	Name 3 or more warning signs making less than 1 error	P value
Educational level	Illiterate	12 (27.9%)	.002
	Did not complete high school	23 (47.9%)	.964
	Completed high school	22 (51.2%)	.651
	University or higher	23 (71.9%)	.003
Occupation	Employed	37 (55.2%)	.136
	Unemployed	43 (43.4%)	
Income	< 2000 SR	14 (30.4%)	.019
	2000 - 4999 SR	26 (51.0%)	
	5000 - 7999 SR	22 (54.4%)	
	≥ 8000 SR	18 (66.7%)	

DISCUSSION

Adequate knowledge of the risk factors and warning signs of strokes is known to greatly reduce the incidence of strokes through controlling the risk factors and recognizing the signs of a stroke quickly. To our knowledge, this is the first study to assess the awareness of stroke risk factors and warning signs among the high-risk population in Saudi Arabia.

The targeted population was diabetic and hypertensive patients, because these are the most common two risk factors for strokes both worldwide and in Saudi Arabia. We have used both close-ended and open-ended questions in the questionnaire to allow the participants to enumerate the risk factors and warning signs from their points of view.

Most of the participants of the present study were diabetics (75.9%) contrasting with a similar study in Nigeria, most of the participants of which were hypertensives (40.5%).[13] In the Nigerian study, 36% of the participants had a high educational level. A study done in Riyadh, Saudi Arabia in 2011 involved 63.5% of participants with higher education, while in our study, only 19.3% were enrolled in university or had completed a higher education.[3] The outcome of the study reveals that only 38% of the participants were knowledgeable about the risk factors for having a stroke. A review of previous studies on the knowledge of such risk factors also showed that knowledge was poor. In 2002, a study done in Michigan, USA on 2500 adults to assess their knowledge of the warning signs and risk factors for having a stroke concluded that 80% reported at least one risk factor and only 28% reported three.[16]

Similarly, a study was conducted in Northwest India on stroke patients and their relatives to assess their knowledge about strokes. Of the 147 subjects interviewed, the majority (73%) of subjects did not realize that the symptoms were due to a stroke. Only 37% of the subjects could identify one risk factor correctly, and only 13% knew 3 or more risk factors.[11] Another study from Australia assessing the public's awareness of strokes showed that among 822 respondents, 76.2% correctly listed ≥ 1 established risk factor, 50.2% listed 2 risk factors and 24.1% listed ≥ 3 risk factors for having a stroke.[17]

Moreover, a study which was performed In Riyadh on locals canvased in 10 shopping centers, 10 large supermarkets, 4 hospitals, and 2 universities found that only a small proportion was able to identify the risk factors for having a stroke; 10% of the respondents indicated that they did not know any risk factor.[3]

Diabetes was the most commonly identified risk factor in the current study which was recognized by 59.6% of the participants. This contrasts with previous studies, which showed that heart disease (40.6%) and hypertension (80%) were most commonly identified in Riyadh and Nigeria, respectively.[3,13] An interesting finding in our study is that about one-third of the diabetic patients and 41.9% of the hypertensive patients could not identify their conditions as risk factors for having a stroke. This is very similar to the Nigerian study, which had the same result for 35.7% of diabetic patients and 58.1% of hypertensive patients. The least identified risk factor was family history (15.1%) which is slightly higher when compared to 8.6% in the study in Riyadh and 0.5% in the Nigerian study.[3,13]

Our study demonstrates an overall lack of knowledge of the warning signs of a stroke. A substantial proportion of the participants scored low, as 51.8% had poor knowledge. Our findings are consistent with the study done in Riyadh [3] and

another study in New Zealand[10] confirming poor stroke awareness among lay people. The New Zealand study was done in 2016 on the urban New Zealand population to assess their knowledge about strokes, and showed that 6.1% and 5.2% inappropriately defined seizure and chest pain as a stroke symptom, respectively.[10]

However, the previous two studies evaluated the level of knowledge among the general population, not high-risk patients in particular. We attribute this poor awareness to the fact that the vast majority of the participants have a low level of education (80.7%), which we have found to be significantly associated with poor awareness (p=.001), (p=.002) for risk factors and warning signs respectively. The warning sign most identified by the participants was hemi-paralysis (43.4%), slightly lower than the results of the study in Riyadh (45.5%).[3] The least identified sign was a severe headache (22.9%), this is in contrast to the study in Riyadh, where confusion was the least identified sign.[3]

We found a positive relationship between stroke awareness and higher education (p=.001), (p=.002). The probable explanation is that a majority (88%) of our patients were from urban areas which offer better educational opportunities than rural areas. Most studies on public awareness of strokes have found that knowledge about strokes also correlates with education.

We acknowledge the limitations of our study. The study setting involved only one hospital in Al-Madinah which may limit the generalizability of the results. However, it is the largest hospital in the city and we distributed our interviewers to a variety of its departments.

CONCLUSIONS
A large proportion of high-risk patients have poor awareness about the risk factors and warning signs of having a stroke. The patients' awareness of strokes was affected by their educational level. The results of this study suggest a need for the implementation of health awareness programs addressing the risk factors and warning signs of having a stroke. Healthcare professionals are urged to give adequate information about strokes and their symptoms to the people of Al-Madinah, especially high-risk patients. We suggest other studies target the general population and compare their knowledge with that of high-risk groups.

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