

Awareness of stroke among patients attending primary healthcare services in Abha, Southwestern Saudi Arabia

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ABSTRACT

الأهداف: دراسة الوعي حول الأعراض الرئيسية وعوامل الخطر، والاستجابة للسكتة الدماغية بين السكان في أبها جنوب غرب المملكة العربية السعودية.

الطريقة: أجرينا دراسة مستعرضة بين عينة ممثلة للمرضى البالغين في مراكز الرعاية الصحية الأولية خلال الفتره من يناير وحتى مايو 2016م واستخدمنا استبياناً عربياً مثبت صحته لتقييم وعي المشاركين بالسكتة الدماغية.

النتائج: شملت الدراسة 1472 بالغاً. فقط 63.6% و 43.7% من المشاركين اعترفوا بشكل صحيح بالتخثر والنزف كنوع من السكتة. أغلب عوامل الخطر التي تم تحديدها كانت ارتفاع ضغط الدم (55.8%)، اضطراب الدهون في الدم (45.8%)، والتدخين (41.9%). كان الصداع الحاد المفاجئ (54.1%) والدوار (51%) وصعوبة التحدث (44.3%) هي الأعراض الأكثر شيوعاً. كانت أكثر ردود الفعل الصحيحة للسكتة الدماغية التي تسجلها هي الاتصال بالطبيب (73.0%)، والذهاب إلى المستشفى (67.2%)، واستدعاء سيارة إسعاف (52.4%). ولوحظت استجابة غير ملائمة للسكتة الدماغية (التجاهل/أو تعاطي وصفة طبية ذاتية) في 18.8% من المشاركين. وكشف الانحدار اللوجستي أن النساء، والأشخاص فوق سن الأربعين، والمتزوجين كانوا أكثر عرضة بدرجة كبيرة لعدم وجود معرفة كافية عن الاستجابة المناسبة للسكتة الدماغية.

الخاتمة: أظهرت دراستنا وجود نقص ملحوظ في المعرفة حول الأعراض التحذيرية وعوامل الخطر، والاستجابة المناسبة للسكتة الدماغية. مطلوب وضع استراتيجيات للتثقيف الصحي لتحسين الوعي بالسكتة الدماغية، والتي بدورها يمكن أن تحسن مخرجات السكتة الدماغية.

Objectives: To examine the awareness about major symptoms, risk factors, and response to stroke among the population in Abha, Southwestern Kingdom of Saudi Arabia. Improving stroke-related knowledge may advance stroke prevention and reduce pretreatment delay and disabilities.

Methods: We conducted a cross-sectional study among a representative sample of primary healthcare adult patients between January-May 2016 and used

a validated Arabic questionnaire to evaluate the participants' awareness about stroke.

Results: The study involved 1472 adults. Only 63.6% and 43.7% of participants correctly recognized thrombosis and hemorrhage as types of stroke. Commonly identified risk factors were hypertension (55.8%), dyslipidemia (45.8%), and smoking (41.9%). Sudden severe headache (54.1%), dizziness (51.0%), and difficulty in speaking (44.3%) were the most frequently recognized symptoms. The most frequently reported correct responses to stroke were contacting a doctor (73.0%), going to the hospital (67.2%), and calling an ambulance (52.4%). Improper responses to stroke (ignoring the condition or self-prescription) were noted in 18.8% of participants. Logistic regression revealed that physicians, nurses, friends and relatives as a source of knowledge were significantly associated with a lower insufficient knowledge of stroke symptoms and risk factors. On the other hand, women, persons above 40 years old, and married persons were significantly more prone to have insufficient knowledge about a proper response to stroke.

Conclusion: Our study revealed a notable deficit of knowledge about warning symptoms, risk factors, and proper response to stroke. Health education strategies to improve stroke awareness are required and could potentially prevent and improve the outcome of stroke.

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Stroke is a significant public health issue globally.¹ The incidence of stroke is increasing in Asia, particularly in the Middle Eastern region. This region faces a high burden of stroke due to the growing rates of non-communicable diseases.² In the Kingdom of Saudi Arabia, stroke is a rapidly growing problem and a major cause of illness and death.³ This increasing incidence is due to the changing lifestyle in the country and high prevalence of diabetes mellitus, obesity, dyslipidemia, and hypertension, which are considered to be important risk factors for stroke.⁴

Several reports have shown that the incidence of stroke and its outcome are notably affected by the level of stroke awareness in the community.^{5,6} Generally, the awareness of stroke is poor as reported in various studies across countries such as United States of America, Australia, South Korea, Iran, and Egypt.⁷⁻¹¹ A Gulf Cooperation Council study reported that majority of the respondents in urban and semi-urban areas had not heard of the term 'stroke' and that stroke knowledge was found to be poorest among groups that were at the highest risk.⁵ Studies from Kingdom of Saudi Arabia also concluded that there is a notable deficit in the level of stroke awareness in the Saudi population.^{12,13}

Empirical evidence regarding stroke shows that improving stroke-related knowledge may advance its prevention and reduce pretreatment delay and disabilities.^{14,15} Therefore, it is crucial to evaluate the awareness of the public regarding stroke risk factors, warning signs, and timely seeking of medical care in order to identify the knowledge gaps for proper planning of educational campaigns.

The present study aimed to assess the knowledge of stroke among those who visited primary health care centers (PHCCs) in Abha, Southwestern Kingdom of Saudi Arabia.

Methods. A cross-sectional study was conducted in Abha city, the capital of Aseer region, which is located in the southwestern part of the Kingdom of Saudi Arabia during January-May 2016. The study targeted all urban PHCCs (namely, Al-Kabel, Al-Numais, Al-Manhal, Al-Azizia, Wasat Abha, Zera, and Al-Areen). Inclusion criteria was all patients attending the PHCCs for any

reason and agreed to participate in the study. Those aged less than 18 years old were excluded.

Using the World Health Organization (WHO) manual for sample size determination in health studies, at a 95% confidence interval with a conservative estimate of the anticipated population proportion of 64%, and with an absolute precision of 3%, the minimal sample size required for the study was 984 persons.^{12,16} With an assumed response rate of 75%, a sample size around 1300 was planned to be recruited.

Consecutive persons attending the participating PHCCs on selected days during the study period were invited to participate. Those below 18 years were excluded. A representative sample was selected from each center and interviewed using a structured questionnaire.

Participants' awareness about stroke was assessed using a validated Arabic questionnaire. The study questionnaire was based on a study conducted in Riyadh, Kingdom of Saudi Arabia.¹⁷ Expert judges in Epidemiology and Neurology constructed the questionnaire using the Delphi technique. We assessed the reliability of the tool by measuring internal consistency using Cronbach's alpha test and it was found to be acceptable ($p=0.792$). The questionnaire contained items related to the participants' demographic characteristics and awareness assessment items. These items included sources of knowledge, knowledge about risk factors, symptoms, response, and outcomes of stroke. Insufficient knowledge for symptoms or risk factors was considered if the participant identified less than 2 correct items.

We used the Statistical Package for Social Sciences Version 22 (IBM Corp., Armonk, NY, USA) for the analyses. Descriptive statistics for categorical data are presented as number and percentages. Univariate and multivariate analysis were used to study factors affecting knowledge. Binary logistic regression analysis was used to identify these factors. Crude odds ratios (cOR), adjusted odds ratios (aOR), and their respective 95% confidence intervals (CIs) were calculated. The study was approved by the research ethical committee of College of Medicine, King Khalid University, Abha, Kingdom of Saudi Arabia (REC# 2014-03-08).

Results. The present study included 1472 persons that visited urban PHCCs in Abha city, southwestern Kingdom of Saudi Arabia. Participants were attending the PHCCs for any reason including seeking care in different clinics. They also attended to accompany other family members for immunization, well-baby clinic, or ante natal care. They were interviewed regarding their

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awareness of stroke. Most of the participants were 18-40 years old (n=1047; 71.1%), male (n=991; 67.3%), and married (n=846; 57.5%). Secondary (n=516; 35.1%) and tertiary education (n=713; 48.4%) were the most frequent levels of education. The least frequent were primary (n=59; 4.0%) and intermediate level of education (n=138; 9.4%).

Table 1 shows the awareness regarding stroke site, stroke types, and risk factors. Approximately 21.3% of the study subjects (n=313) were unable to correctly identify more than one risk factor for stroke. This group was regarded as having insufficient knowledge of risk factors.

The most frequent source of information was the media (n=858; 58.3%), followed by friends and relatives (n=627; 42.6%). Only 20.6% (n=303) mentioned that physicians and nurses were their source of stroke knowledge.

Table 2 shows the awareness regarding symptoms, outcomes, and proper response to an attack of stroke. Sudden severe headache (n=796; 54.1%), dizziness (n=750; 51.0%), difficulty in speaking (n=657; 44.3%), and one-sided paralysis (n=518; 35.2%) were the most frequently recognized symptoms. Approximately 23.3% of the study subjects (n=347) were unable to correctly identify more than one symptom of stroke and were regarded as having insufficient knowledge of symptoms.

Regarding the awareness about proper response to stroke, contacting a doctor (n=1075; 73.0%), going to

the hospital (n=989; 67.2%) and calling an ambulance (n=772; 52.4%) were the most frequently reported correct responses. The study noted improper responses to an occurrence of stroke (ignoring the condition or self-prescribed medications) in 18.8% (n=277) of the participants.

Regarding awareness of the outcome of stroke, death (n=931; 63.2%), paralysis (n=803; 54.6%), and speech difficulties (n=491; 33.4%) were the most frequently identified outcomes. However, most participants considered the disease as treatable (n=1085; 73.7%) and that early treatment improves the outcome (n=1224; 83.2%).

Binary logistic regression analysis of factors affecting insufficient knowledge of stroke symptoms (knowledge of less than 2 symptoms) showed that media as a source of knowledge was significantly associated with lower insufficient knowledge (aOR=0.43, 95% CI: 0.32-0.59) (Table 3). Similarly, physicians, nurses, friends and relatives as a source of knowledge were significantly

Table 2 - Knowledge of stroke symptoms, outcomes and responses to an attack among the study sample of primary healthcare attendants in Abha city, Southwestern Saudi Arabia (n=1472).

Knowledge	Proper Knowledge No. (%) n (%)
<i>Symptoms</i>	
Dizziness	750 (51.0)
Sudden severe headache	796 (54.1)
Sudden confusion	263 (17.9)
Disturbed vision	460 (31.3)
Difficulty speaking	657 (44.6)
Difficulty walking	228 (15.5)
One side paralysis	518 (35.2)
Face paralysis	289 (19.6)
One side numbness	412 (28.0)
<i>Number of correctly identified symptoms</i>	
Less than 2 symptoms	347 (23.6)
2 - 4 symptoms	856 (58.2)
More than 4 symptoms	269 (18.3)
<i>Response to attack</i>	
Inform a family members and neighbors	515 (35.0)
Contact a doctor	1075 (73.0)
Go to the hospital	989 (67.2)
Call an ambulance	772 (52.4)
Improper response (Ignore/self-prescribed medication)	277 (18.8)
<i>Outcomes</i>	
Paralysis	803 (54.6)
Speech problem	491 (33.4)
Walking problem	476 (32.3)
Visual problem	361 (24.5)
Hearing problem	276 (18.8)
Psychological problem	243 (16.5)
Death	931 (63.2)

Table 1 - Knowledge of stroke, site, types and risk factors among the study sample of primary healthcare attendants in Abha, Southwestern Saudi Arabia (n=1472).

Knowledge	Proper knowledge n (%)
<i>Site</i>	
Brain	1285 (87.3)
<i>Types</i>	
Thrombosis	936 (63.6)
Hemorrhage	643 (43.7)
<i>Risk factors</i>	
Stress and anxiety	428 (29.1)
Hypertension	821 (55.8)
Dyslipidemia	674 (45.8)
Smoking	616 (41.8)
Diabetes mellitus	513 (34.9)
Obesity	508 (34.5)
Sedentary life	400 (27.2)
Aging	539 (36.6)
Family tendency	172 (11.7)
<i>Number of correctly identified risk factors</i>	
Less than 2 risk factors	313 (21.3)
2-4 risk factors	835 (56.7)
More than 4 risk factors	324 (22.0)

associated with lower insufficient knowledge of symptoms.

Binary logistic regression analysis of factors affecting insufficient knowledge of risk factors (knowledge of less than 2 risk factors) revealed that sources of knowledge (media, physicians, nurses, friends and relatives) were significantly associated with lower knowledge of risk factors (Table 4).

Table 5 shows potential determinants of insufficient knowledge of proper response to an attack. In binary logistic regression analysis, women (aOR=1.70, 95% CI: 1.29-2.25), persons above 40 years old (aOR=1.84, 95% CI: 1.32-2.55), and married persons (aOR=1.36, 95% CI: 1.01-1.85) were significantly more prone to have an insufficient knowledge of a proper response to a stroke attack. Moreover, the study showed that sources of knowledge (media, physicians and nurses, friends and relatives) were significant associated factors for insufficient knowledge of a proper response to a stroke attack.

Discussion. Stroke is one of the most important causes of mortality and is the leading cause of acquired handicaps in adults worldwide. According to WHO, 6.2 million die from stroke each year.¹⁷

In the present study, although most of the participants correctly identified the brain as the site of stroke, only 63.6% and 43.7% correctly recognized

thrombosis and hemorrhage as types of stroke. Similar results were noted in a study in Riyadh, Kingdom of Saudi Arabia, where 64% of the people were able to define stroke correctly.¹⁸

The time interval from the onset of cardiovascular stroke symptoms to emergency medical care is affected by the level of awareness about major stroke symptoms and methods of response among the general population.⁶ In the current study, sudden severe headache was the most frequently recognized symptom, while difficulty in speaking and one-sided weakness were the third and fourth most commonly identified symptoms. Paralysis, numbness, and difficulty in speaking have been identified as the most important stroke symptoms as they are often associated with acute stroke and alert the general population to activate emergency care.^{5,19,20} This should be regarded as low awareness about major stroke symptoms among the public.¹⁹ However, a Spanish study reported that sudden severe headache was associated with a proper response to stroke.⁶

In the present survey, 23.3% of the respondents were unable to correctly identify more than one symptom of stroke. This group was considered to have an insufficient knowledge of symptoms which may affect their proper response to stroke and lead to unfavorable outcomes.²⁰ This result is consistent with other reports from studies in Riyadh, Kingdom of Saudi Arabia, the Gulf region, and other European countries.^{5,12,19,20}

Table 3 - Uni-variate and multivariate analysis of potential determinants of insufficient knowledge of stroke symptoms (knowledge less than 2 symptoms) among the study sample of primary healthcare attendants in Abha, Southwestern Saudi Arabia (n=1472).

Variables	Knowledge of symptoms		Uni-variate cOR (95%CI)	Multivariate aOR (95%CI)
	Sufficient n (%)	Insufficient n (%)		
<i>Gender</i>				
Male	755 (67.1)	236 (68.0)	-	
Female	370 (32.9)	111 (32.0)	0.96 (0.74-1.24)	0.96 (0.74-1.26)
<i>Education</i>				
<secondary	181 (16.1)	62 (17.9)	-	
≥secondary	944 (83.9)	285 (82.1)	0.88 (0.64-1.21)	0.92 (0.64-1.33)
<i>Age (years)</i>				
<40	790 (70.2)	257 (74.1)	-	
≥40	335 (29.8)	90 (25.9)	0.83 (0.63-1.08)	0.86 (0.62-1.20)
<i>Marital status</i>				
Single	470 (41.8)	156 (45.0)	-	
Married	655 (58.2)	191 (55.0)	0.88 (0.69-1.12)	0.97(0.74-1.28)
<i>Sources of knowledge*</i>				
Media*	685 (60.9)	173 (49.9)	0.64 (0.50-0.81)	0.43 (0.32-0.59)**
Physician and nurses*	253 (22.5)	50 (14.4)	0.58 (0.42-0.81)	0.46 (0.32-0.66)**
Friends and relatives*	514 (45.7)	113 (32.6)	0.57 (0.45-0.74)	0.40 (0.29-0.55)**

cOR - crude odds ratio, CI - confidence interval, aOR - adjusted odds ratio for other studied variables, *Presence of each source of knowledge was compared to absence of this source, **Significant at p -value<0.05

Table 4 - Uni-variate and multivariate analysis of potential determinants of insufficient knowledge of stroke risk factors (knowledge less than 2 risk factors) among the study sample of primary healthcare attendants in Abha, Southwestern Saudi Arabia (n=1472).

Variables	Knowledge of symptoms		Uni-variate cOR (95%CI)	Multivariate aOR (95%CI)
	Sufficient	Insufficient		
			n (%)	
<i>Gender</i>				
Male	788 (68.0)	203 (64.9)	-	1.25 (0.94-1.65)
Female	371 (32.0)	110 (35.1)	1.15 (0.88-1.50)	
<i>Education</i>				
<secondary	195 (16.8)	48 (15.3)	-	1.37 (0.92-2.06)
≥secondary	964 (83.2)	265 (84.7)	1.12 (0.79-1.57)	
<i>Age (years)</i>				
<40	812 (70.1)	235 (75.1)	-	0.94 (0.66-1.34)
≥40	347 (29.9)	78 (24.9)	0.78 (0.58-1.03)	
<i>Marital status</i>				
Single	481 (41.5)	145 (46.3)	-	0.89 (0.67-1.18)
Married	678 (58.5)	168 (53.7)	0.82 (0.64-1.05)	
<i>Sources of knowledge*</i>				
Media*	719 (62.0)	139 (44.4)	0.49 (0.38-0.63)	0.28 (0.20-0.39)**
Physician and nurses*	260 (22.4)	43 (13.7)	0.55 (0.39-0.78)	0.38 (0.26-0.57)**
Friends and relatives*	524 (45.2)	103 (32.9)	0.59 (0.45-0.77)	0.35 (0.25-0.49)**

cOR - crude odds ratio, CI - confidence interval, aOR - adjusted odds ratio for other studied variables, *Presence of each source of knowledge was compared to absence of this source, **Significant at *p*-value <0.05

Table 5 - Uni-variate and multivariate analysis of potential determinants of insufficient knowledge of proper response to stroke attack among the study sample of primary healthcare attendants in Abha, Southwestern Saudi Arabia (n=1472).

Variables	Knowledge of proper response		Uni-variate COR (95%CI)	Multivariate AOR (95%CI)
	Yes	No		
			n (%)	
<i>Gender</i>				
Male	831 (69.5)	160 (57.8)	-	1.70 (1.29-2.25)**
Female	364 (30.5)	117 (42.2)	1.67 (1.27-2.18)	
<i>Education</i>				
<secondary	185 (15.5)	58 (20.9)	-	0.94 (0.64-1.38)
≥secondary	1010 (84.5)	219 (79.1)	0.69 (0.49-0.96)	
<i>Age (years)</i>				
<40	885 (74.1)	162 (58.5)	-	1.84 (1.32-2.55)**
≥40	310 (25.9)	115 (41.5)	2.03 (1.54-2.66)	
<i>Marital status</i>				
Single	537 (44.9)	89 (32.1)	-	1.36 (1.01-1.85)**
Married	658 (55.1)	188 (67.9)	1.72 (1.30-2.27)	
<i>Sources of knowledge*</i>				
Media*	678 (56.7)	180 (65.0)	1.41 (1.08-1.86)	1.95 (1.43-2.67)**
Physician and nurses*	224 (18.7)	79 (28.5)	1.73 (1.28-2.33)	1.88 (1.38-2.57)**
Friends and relatives*	500 (41.8)	127 (45.8)	1.17 (0.90-1.53)	1.54 (1.15-2.06)**

cOR - crude odds ratio, aOR - adjusted odds ratio for other studied variables, CI - confidence interval. *Presence of each source of knowledge was compared to absence of this source, **Significant at *p*-value <0.05

Hypertension was the most frequently identified risk factor for stroke, followed by dyslipidemia, smoking, and aging. This finding was similar to the reports of studies from Brazil, Australia, and Ireland, where hypertension was the most common risk factor

for stroke.²¹⁻²³ However, our findings contrasted with a Saudi study that reported smoking as the most common risk factor for stroke.¹² The awareness of the population about hypertension and its association with stroke is important because it is highly prevalent in the Saudi

population and is considered the most important single risk factor for stroke.^{12,24}

Contacting a doctor and going to the hospital were the most frequently reported correct responses to stroke in the present survey and were reported by three-fourths and two-thirds of the respondents. Calling an ambulance ranked third and was noted by approximately half of the respondents. Our findings contrasted with those of a Georgian study, in which 70% of the participants reported that they should activate the emergency system.²⁵ Calling the doctor or going to hospital may delay the activation of emergency care and minimize the opportunity of appropriate care.⁶

A considerable portion of the study population (18.8%) mentioned improper responses to stroke such as ignoring the condition or self-prescription. Ignoring and waiting to see if the condition will resolve spontaneously is an important factor for delay in treatment.²⁶ Women, those above 40 years old, and married were significantly more prone to an improper response to stroke attack. These groups should be targeted in stroke educational programs.

In the current study, education through media and healthcare providers was a significant factor for improving knowledge regarding symptoms and risk factors for stroke. Different types of media such as television, radio, and newspapers have been reported the most important information sources in stroke education.²⁷ However, the current study provides evidence that these sources may increase the probability of improper stroke response. This could be explained by the possibility that educational messages may focus only on disease symptoms and risk factor awareness and ignore the methods of proper response.

Limitations. The study limitations include design of the study being addressing patients attending urban PHCCs in the southwestern region. Generalization may be questionable in different settings. Another limitation is nature of the study being cross-sectional reflecting only the current level of awareness and not considering changes over time.

In conclusion, the present study reveals a notable deficit of knowledge about warning symptoms, risk factors, and proper response to stroke. Urgent health education strategies using different media methods are required to improve stroke awareness among a large section of the Saudi population. Health education messages about stroke symptoms, risk factors, and proper response should be provided for all patients receiving care in chronic disease clinics at PHCCs. Moreover, we recommended stroke awareness campaigns targeting different age groups and educational levels.

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