

# Awareness of Stroke among Teachers in Asser Region, Saudi Arabia

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## Abstract

**Background:** Stroke is a serious life-threatening medical disorder, which is caused by disruption of blood vessels supplying oxygen to the brain cells. Stroke is mainly categorized into two types, ischemic and hemorrhagic.

**Objective:** To assess the knowledge of teachers and their contribution in spreading awareness related to stroke, its causes, risks, prevention, diagnosis and treatment.

**Design:** A cross-sectional survey.

**Settings:** Government schools in Asser region of Saudi Arabia.

**Subjects and methods:** A 25 questionnaire set was distributed to the teachers for filling up, which included questions to evaluate the teacher's knowledge on stroke.

**Main outcome measures:** Simple random sampling technique, SPSS software program, Chi-Square test.

**Results:** Teachers from Saudi origin were statistically more aware about stroke (p value=0.003). A statistically significant difference (p value=0.015) was observed in terms of gender of teachers where it was observed that males spread more stroke awareness. Teachers with a bachelor's degree (p value=0.020) and the ones who specialized in social subjects spread (p value=0.038) significant awareness.

**Conclusion:** It is essential to increase knowledge of teachers regarding stroke. Various campaigns and awareness camps should be conducted to spread awareness.

**Limitations:** This study was performed in only one tertiary hospital.

**Keywords:** Asser Region; Survey; Stroke

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## Introduction

A stroke is a serious life-threatening medical disorder that occurs due to disruption of blood vessels supplying oxygen to the brain cells. The blood vessels transport oxygen and nutrients to the brain and are essential for normal functioning of the central nervous system. When a blood vessel is either blocked by a clot or is ruptured, the part of the brain that normally receives blood from that vessel does not get sufficient amount of oxygen, resulting in the death of the cell [1].

Stroke is mainly categorized into two types, ischemic and hemorrhagic. When a stroke is caused by a blockage (often due to a clot) in the artery, it is known as ischemic stroke, while the leaking or ruptured blood vessels lead to hemorrhagic stroke. Some people experience only a temporary disruption of blood flow to the brain (transient ischemic attack, or TIA) that doesn't cause permanent damage [1].

In the year 2013, stroke was found to be the second largest cause of death worldwide, contributing to 11.8% of all deaths [2]. An increase in the incidence of stroke was also observed in the Middle East by El-Hajj et al. [3]. Their study reported a high incidence rate for all strokes ranging between 22.7 and 250 per 100,000 populations per year. A high prevalence rate, ranging between 508 and 777 per 100,000 population, was also reported with a high male-to-female ratio. In Kingdom of Saudi Arabia (KSA), stroke is a very prevalent condition, affecting 43.8 per 100,000 people other study conducted in 1993 by al Rajeh et al. [5]. Reported that males (p<0.001) are more affected with stroke and that the mean age of patient of stroke was 63 +/- 17 years.

Lack of awareness has been considered as one of the major causes of the high incidence of stroke in the Middle East. The population is not aware of the risks, causes and symptoms associated with a stroke. Being aware of the risks can help in the primary prevention of the



disease. Moreover, awareness regarding symptoms will lead to early initiation of medical treatment, thus avoiding permanent damage and complications. Therefore, there is a need to spread awareness among the entire population [3]. Teachers play an important role in a nation's development, as they are the lead source of creating awareness among the youth. By ensuring that teachers are aware about stroke, and are successfully managing to create a similar degree of awareness in their students, the morbidity and mortality associated with the disease can be reduced. Thus, the present cross-sectional study focused to assess the awareness of stroke among government schoolteachers in Asser region of KSA.

## Materials and Methods

### Targeted population

The study included male and female teachers employed in government schools, of both Saudi as well as non-Saudi origin. The teachers of private and international schools were excluded from the study.

**Study design:** A cross-sectional survey was conducted on a representative sample of teachers working in government schools in Asser region of Saudi Arabia. The survey was conducted by distributing a questionnaire among teachers of government schools.

**Sample size:** The sample size was calculated by using the following formula:

$$N = [Z^2 * p * (1-p)] / c^2$$

Where:

N = Calculated sample size

Z = Z value = 1.96 for 95% confidence level

p = Population Proportion = 0.50

c = confidence interval = 5%

Accordingly, the appropriate sample size was found to be at least 385. However, to avoid the possible non-response, a total sample of at least 400 was estimated to be appropriate.

**Sampling technique:** Simple random sampling technique was used for enrollment of subjects in the study.

### Data collection methods

After receiving the ethical approval, the questionnaire was distributed among teachers of government schools in Asser region of KSA. Based on the thorough review of relevant literature, a stroke awareness questionnaire was developed and included the following sections (appendix):

Demographics data including age, gender, ethnicity, education level, marital status, teaching years

Demographic data including age, gender, ethnicity, education level, marital status, teaching years, teaching level, specialization

A total of 25 questions were formed to cover various aspects of stroke, relating to the warning signs, risk factors, complications and treatment. The questionnaire was translated accurately into Arabic language and was divided into two parts. The first part contained five multiple-choice questions (MCQs) and the next 20 questions were to be marked as true or false.

A score of one mark was set for each correct answer for twenty questions. The five most important questions, which were considered important for teachers to know, were especially highlighted and were given a score of three each. In case any of these questions were missed or incorrectly marked, three marks were deducted out of the total score of 35 (20+5\*3) marks. The evaluation was done based on the scores awarded to the subject. Subjects with scores below 25 marks were considered having poor knowledge about stroke, while subjects scoring marks within 25-30 were considered to have good knowledge. Teachers scoring 30 marks or above were considered having excellent knowledge about the various aspects of stroke.

The teachers were also asked about the sources of their information, such as, television, social media, books, friends, a family member who had a history of stroke, school, public health provider, from which they gained information about stroke. The teachers were also asked about whether they had given any information about the risk involved in a stroke. The data was entered into a pre-designed excel spreadsheet.

### Data management and analysis plan

**Data cleaning and preparation:** Raw data was processed in accordance with the best practices for raw data management to identify any inaccuracies or incompleteness in advance of the statistical analysis. All the data was cleaned from any duplication or incompleteness. All the variables were included in the spreadsheet.

**Data analysis:** The statistical analysis began by transferring the data from Excel spreadsheet to SPSS software program. All variables were summarized and compared across the study groups. Interval variables such as age were summarized and reported in terms of mean and standard deviation. Categorical variables such as gender were summarized and reported in terms of frequency distribution with graphs. All categorical and interval variables were compared statistically across the study groups using Chi-Square test. A p-value of <0.05 was considered as significant.

**Ethical considerations:** Private information of teachers and their contact information were not made public.

## Results

A total of 626 subjects were included in the study with the mean (SD) age of 41 (8) years. Out of them, 79.1% (n=495) were males and 20.9% (n=131) were females. Saudi nationals were 596 in number, while 30 of the subjects were from other countries. The demographic profile of the subjects including their nationality, marital status, teaching experience has been explained in Table 1.

The questionnaire consisted of questions, which were developed to evaluate the knowledge of teachers on stroke awareness, its treatment, the risks as well as their understanding of the topic. A detailed account of the questionnaire with the answers given by the teachers has been presented in the Tables 2, 3 and 4. Table 5 represents the part of the questionnaire, which focused their ability to impart knowledge to the students.

About 77.2% (n=483) subjects were aware that the stroke happened in brain while 60.4% (n=378) subjects were aware that symptoms of stroke appear suddenly (Table 2). More than 80% of patients were aware that stroke is due to lack of blood supply to brain (88.0%, n=551) and it may cause paralysis (80.0%, n=501) (Table 3). However, only 49.0% (n=307) teachers knew that rash is not a sign of stroke. Only 35% (n=219) subjects marked "Stroke normally affects both sides of



**Table 1.** Demographic profile of subjects included in the study.

		Mean (SD)	N (626)	%
Age		41 (7.63) years		
Gender	Male		495	79.1
	Female		131	20.9
Nationality	Saudi		596	95.2
	Non-Saudi		30	4.8
Marital Status	Single		30	4.8
	Married		584	93.3
	Divorced		12	1.9
Degree	Doctoral		15	2.4
	Master		59	9.4
	Bachelor		517	82.6
	Diploma		35	5.6
Specialization	Islamic Subjects		149	23.8
	Arabic Languages		111	17.7
	Mathematics		105	16.8
	Sciences		84	13.4
	Social Subjects		78	12.5
	English Language		30	4.8
	Physical Education		20	3.2
	Computer Science		18	2.9
	General		16	2.6
	Art Education		12	1.8
	Housekeeping		3	0.5
Teaching years		19 ± (49.93) years		
Teaching Level	High school		239	38.2
	Middle School		132	21.1
	Elementary school		255	40.7
Score/35		21 ± (6)		

**Table 2.** Questionnaire with multiple choice questions.

		N	%
Stroke happens in	Heart	21	3.4
	Brain*	483	77.1
	Muscle	109	17.4
	I don't know	13	2.1
Stroke is more common among	Men*	309	49.4
	Women	12	1.9
	Women and men are same	141	22.5
	Not common	82	13.1
	I don't know	82	13.1
Do symptoms of a stroke usually come	Suddenly*	378	60.3
	Comes and go	33	5.3
	Gradually	110	17.6
	Without symptoms	31	5.0
	I don't know	74	11.8
Which of these could help reduce the chance of stroke	Vitamin C	12	1.9
	Fresh air	29	4.6
	Drinking a lot of water	209	33.4
	Exercise*	284	45.4
	I don't know	92	14.7
Diagnosis of stroke can be done by	CT Scan	244	39.0
	Blood Test	24	3.8
	CT scan and blood test*	214	34.2
	Creatinine analysis	19	3.0
	I don't know	125	20.0

\*The right answer

the body” as a false statement, which was the correct answer (Table 3). Only 15.8% (n=99) teachers knew that family history contributes to stroke (Table 4). A high percentage, 75.0% (n=468), of subjects

**Table 3.** Questionnaire with true and false questions related to stroke (Part I).

		N	%
Stroke is due to lack of blood supply to brain	True*	551	88.0
	False	32	5.1
	I don't know	43	6.9
Strokes may cause paralysis	True*	501	80.0
	False	80	12.8
	I don't know	45	7.2
Stroke is a medical emergency	True*	550	87.8
	False	43	6.9
	I don't know	33	5.3
A quarter of strokes occur in people under the age of 65	True*	134	21.4
	False	372	59.4
	I don't know	120	19.2
Fever and Sweating is a sign of stroke	True*	269	43.0
	False	151	24.1
	I don't know	206	32.9
Slurred speech is a sign of stroke	True*	358	57.2
	False	110	17.6
	I don't know	158	25.2
Weakness in the arms/legs is a sign of stroke	True*	518	82.7
	False	18	2.9
	I don't know	90	14.4
Rash is a sign of stroke	True	66	10
	False*	307	50
	I don't know	253	40
Stroke normally affects both sides of the body	True	273	43.6
	False*	219	35.0
	I don't know	134	21.4
Diabetes increases chance of stroke	True*	420	67.1
	False	85	13.6
	I don't know	121	19.3
High blood pressure increases chance of stroke	True*	550	87.9
	False	13	2.0
	I don't know	63	10.1
Epilepsy increases chance of stroke	True	307	49.0
	False*	113	18.1
	I don't know	206	32.9
High cholesterol increases chance of stroke	True*	453	72.4
	False	66	10.5
	I don't know	107	17.1

never guided their students about stroke. Social media (26.1%, n=292), television (17.8%, n=199), and books (12.9%, n=144) significantly contributed as the chief source of information (p value=0.245) for the teachers (Table 6).

A pie chart (Figure 1) was created on the basis of the total score calculated from the score of the subjects, which showed that 71.73% of the teachers were not aware of the magnitude of the problem of stroke, or the related risks, symptoms and the treatment.

Teachers from Saudi origin were statistically more aware of stroke (p value=0.003) as compared to those from other countries. There was no statistically significant difference among teachers as far as knowledge about stroke was concerned, in terms of gender (p value=0.273), marital status (p value=0.228), qualification (p value=0.64), specialization (p value=0.280) and teaching level (p value=0.311) as presented in Table 7. However, the same was not true when it came to about creating awareness about stroke among their students.

## Discussion



**Table 4.** Questionnaire with true and false questions related to stroke (Part II).

		N	%
Family history contributes to stroke	True*	99	15.8
	False	356	56.9
	I don't know	171	27.3
Nobody makes a full recovery after a stroke	True	209	33.4
	False*	262	41.8
	I don't know	155	24.8
Stroke survivors suffer from post-stroke depression	True*	196	31.3
	False	186	29.7
	I don't know	244	39.0
Stroke can be treated at house	True	49	7.8
	False*	475	75.9
	I don't know	102	16.3
There is a noticeable effect of the stroke on the patient's face	True*	448	71.6
	False	52	8.3
	I don't know	126	20.1
Stroke is a major cause of deaths in the world and Saudi Arabia	True*	364	58.1
	False	126	20.2
	I don't know	136	21.7
Drugs prescribed for stroke are aspirin and warfarin	True*	434	69.4
	False	66	10.5
	I don't know	126	20.1

\* The right answer

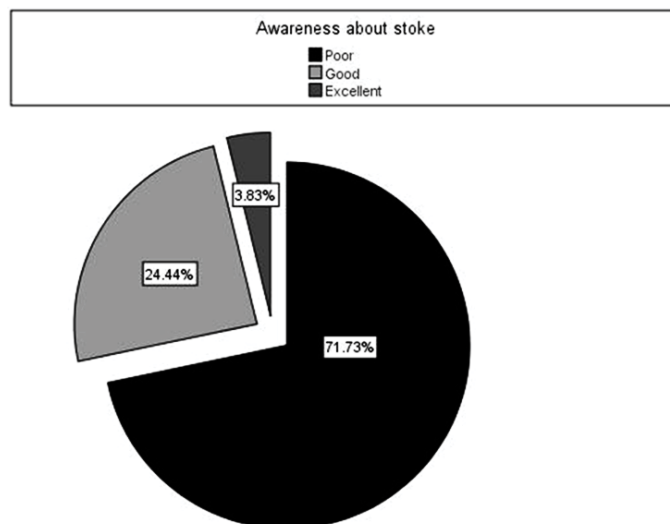
**Table 5.** Questionnaire with questions related to imparting knowledge to students.

		N	%
Have you ever told your students about a stroke?	Never	470	75.1
	Sometimes	142	22.7
	Always	14	2.2
What did you tell your students?	About symptoms and signs	0	0
	About complications	26	19.3
	About the treatment	97	71.9
	Methods of prevention	12	8.9
	Total	135	100.0

**Table 6.** Sources of information used to spread awareness.

Sources of information	N	N%
TV	199	17.8
Social media	292	26.1
School	41	3.7
Books	144	12.9
Health providers	95	8.5
A friend was attacked by stroke	83	7.3
	121	10.8
A family member was attacked by stroke	121	10.8
Nothing	121	10.8
	144	12.9
	121	10.8
	144	12.9
	121	10.8
	144	12.9

A stroke, also known as a Cerebro-Vascular Accident (CVA) is associated with the loss of functioning ability of areas of the brain due to a clot or bursting of a blood vessel which supplies oxygen to the brain. Stroke may lead to impairment of physical, psychological, social and/or cognitive functions, depending on its severity, type and areas affected in the brain. Arterial hypertension, diabetes mellitus, cigarette smoking, microvascular rupture, hyperlipidemia, advancing age, sickle cell disease, human immunodeficiency virus/acquired immune



**Figure 1:** Pie chart representing awareness of stroke among teachers.

**Table 7.** Demographic profile in teachers with poor, good and excellent knowledge.

		Poor		Good		Excellent		P-Value
		N	%	N	%	N	%	
Gender	Male	355	71.1	124	25.1	16	3.2	0.273
	Female	94	71.8	29	22.1	8	6.1	
Nationality	Saudi	434	72.8	142	23.8	20	3.4	0.003*
	Non-Saudi	15	50	11	36.7	4	13.3	
Marital status	Single	19	63.3	9	30	2	6.7	0.228
	Married	419	71.7	144	24.7	21	3.6	
	Divorce	11	91.7	0	0	1	8.3	
Degree	Doctoral	9	60	6	40	0	0	0.64
	Master	41	69.5	15	25.4	3	5.1	
	Bachelor	373	72.1	123	23.8	21	4.1	
	Diploma	26	74.3	9	25.7	0	0	
Specialization	English Language	23	76.7	5	16.7	2	6.7	0.280
	Mathematics	75	71.4	23	21.9	7	6.7	
	Computer Science	15	83.3	3	16.7	0	0	
	Arabic Language	84	75.7	22	19.8	5	4.5	
	General	13	81.3	3	18.8	0	0	
	Sciences	52	61.9	30	35.7	2	2.4	
	Housekeeping	2	66.7	1	33.3	0	0	
	Art Education	10	83.3	1	8.3	1	8.3	
	Social Subjects	62	79.5	14	17.9	2	2.6	
Physical Education	12	60	8	40	0	0		
Teaching Level	Islamic Subjects	101	76.8	43	28.9	5	3.4	0.311
	High School	169	70.7	62	25.9	8	3.3	
	Middle School	104	78.8	24	18.2	4	3	
	Elementary School	176	69	67	26.3	12	4.7	

\*The Chi-square statistic is significant at the 0.05 level

deficiency syndrome infection and cerebral malaria are the commonly established risk factors [6-11].

The incidence of stroke in low and middle-income countries is seen to be more than that in the high-income countries. Since the management of stroke is associated with a relatively high cost, it becomes difficult for the people in these countries to afford the management of consequences of this disease. The incidence of stroke in the Middle East is also very high and there is an urgent need to create awareness about this condition [12,13].

As teachers play an important role in spreading awareness, the



present study was conducted to assess the knowledge of teachers employed in government schools regarding stroke. The findings of the study inferred that a very small percentage (3.83%) of representative sample had excellent knowledge on the subject. The results also showed that teachers of Saudi nationality were significantly more knowledgeable. Male teachers, teachers with specialization in social subjects and those with a bachelor's degree spread significantly more awareness about stroke among their students than others.

Overall, the survey conducted on the subjects clearly gives an idea about the present-day scenario, as far as awareness about stroke in the country is concerned. It can be clearly understood that numerous awareness campaigns should take place in the respective regions of the nation on a priority basis. It is imperative that information about stroke is made available to the population. Of utmost importance and concern was the finding that only a few of the teachers were aware of the symptoms of stroke. This implies that they will most likely fail to recognize if anyone is having a stroke, thus delaying the treatment. Moreover, subjects were not aware of the treatment of the stroke.

Thus, this survey helped in understanding the demographic condition of stroke awareness in the population and gave a clear insight on the gaps in knowledge regarding the same. It brings to light the urgent need of creating more awareness in both the youth as well as the adult population of the nation about this life-threatening medical condition.

There have been some studies focusing on stroke awareness in different communities of the society, but to the best of our knowledge, this was the first attempt that assessed the knowledge of teachers on stroke for the purpose of spreading awareness. More such studies are warranted to assess the knowledge of different sectors and their contribution in spreading awareness regarding a disease such as stroke. This would help understand the need and level of awareness that is required to be achieved to decrease the incidence of disease, limit complications, and improve the overall quality of life.

The present study evaluated the knowledge of government teachers related to stroke and the level of their contribution in spreading awareness regarding the disease, its diagnosis, treatment, risks and prevention. It was found that a very less percentage of teachers had

excellent knowledge where teachers with Saudi origin were significantly more knowledgeable. Males, teachers with specialization in social subjects and those with a bachelor's degree spread significantly more awareness than others. The survey gives an insight of the awareness about stroke among the teaching group in the KSA. It is essential to increase knowledge of teachers regarding this disease with the help of various campaigns and awareness camps.

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