ORIGINAL ARTICLE

Knowledge and Awareness Level Regarding Stroke Management in Golden Hours among Medical Students in KSA

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Abstract

Background: Stroke is a serious medical condition brought on by diminished or interrupted blood flow to the brain. To reduce the cognitive and neurological impairment brought on by stroke, early identification and treatment are essential. Strokes cause death or permanent disabilities globally, with Saudi Arabia's stroke risk increasing, and by 2030, more people are expected to die from stroke-related causes. **Objectives:** Our aim was to evaluate the Knowledge and Awareness level of Stroke in general, plus its management during the golden hours among Medical Students and interns in Saudi Arabia. **Materials and Methods:** This was an observational cross-sectional study. The study was conducted in Saudi Arabia from January 2024 to February 2024, targeting medical students and interns. By using the Raosoft calculator, the sample size was estimated, with a confidence level of 95% and a marginal error of 5%, the minimal sample size was 384. Data were collected through an online questionnaire, entered into Microsoft Office Excel Software, and analyzed using IBM Statistical Package for the Social Sciences Statistics for Windows. **Results:** As regard the knowledge and awareness score about stroke management, there were 58.0% out of 400 participants demonstrated a high level of awareness regarding stroke management within the crucial golden hours. Moreover, 31.5% of respondents exhibited a moderate level of awareness. However, it is worth noting that 10.5% of participants displayed a low level of awareness. Regarding the relation between awareness level of stroke management in golden hours and sociodemographic characteristics, there was a statistically significant relation to college of medicine ($P = 0.0001$), present year of study ($P = 0.017$), present GPA ($P = 0.018$) and if the participant had enrolled in neurology training before ($P = 0.027$). It also shows a statistically insignificant relation to gender and age. **Conclusion:** The study revealed that there is a relatively high level of awareness regarding stroke management within the crucial golden hours, with 58.0% of participants demonstrating a good understanding. This is a positive indication of knowledge among a significant portion of the surveyed population. However, there is still room for improvement as 31.5% showed a moderate level of awareness, and 10.5% displayed a low level of awareness. Comparisons with other studies globally and within Saudi Arabia suggest that awareness levels vary, indicating a need for ongoing educational programs to enhance knowledge about stroke management and the importance of timely interventions.

Key words: Acute ischemic stroke, awareness, golden hours, KSA, management, medical students, therapeutic window for stroke, thrombolysis

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INTRODUCTION

Stroke is a medical emergency that happens when there is an interruption or reduction in the blood flow to the brain, either due to clot formation or rupture.[1] This can cause cognitive dysfunction, neurologic dysfunction, and other symptoms to start showing up.[2] These factors make early stroke diagnosis and treatment extremely crucial.[3] After an acute ischemic stroke, the rate of disability is improved by the administration of recombinant tissue-type plasminogen activator (rt-PA, alteplase) within 3–4.5 h of onset.[4] That is why we called it the golden period.[5] The World Health Organization states that around 15 million people worldwide have strokes every year. Out of these, five million people pass away, and another five million are left with lifelong disabilities.[6] The World Stroke Organization says that 1 out of every 4 people will likely have a stroke at some point in their life.[7] The issue of stroke in Saudi Arabia is becoming more prevalent, with a growing number of cases reported. There is an expectation that the count of stroke-related deaths will be approximately 2 times higher by the year 2030.[8] The figures presented suggest that stroke will result in considerable financial trouble for Saudi Arabia down the line. Previously, studies in Saudi Arabia found that high blood pressure and smoking were the most common things that increase the risk of having a stroke.[9] By promptly administering thrombolysis, the outcomes for stroke patients have been significantly improved, thereby lowering the potential for disability.[10] Despite an increase in the number of individuals undergoing intravenous thrombolysis therapy, there is still room for improvement in the rate of its administration. This treatment is not used very often and is only given to a small number of stroke patients (around 3.4–5.2%).[11]

The inadequate utilization of stroke treatment is caused by multiple factors, such as patients' lack of awareness regarding their stroke occurrence, the limited time window available for treatment, late arrival at medical facilities, stringent treatment eligibility criteria, and other deficiencies within the healthcare system.[12] Internationally, in 2023, a cross-sectional study from Bangladesh assessed stroke knowledge among 105 stroke caregivers, finding that 72.5% recognized stroke as a brain condition with hypertension as a risk factor and bed sores as a consequence. Less than one-third of caregivers correctly recognized the appropriate hospitalization duration, indicating gaps in medical management and patient care.[13] 144 nursing students participated in a 2017 study carried out in Bangladesh, which revealed a moderate understanding of stroke risk factors and a low awareness of stroke warning symptoms. Their first response behaviors and particular stroke patient management were at an extremely low level.[14] On a Middle Eastern level, Poor baseline knowledge was discovered in a cross-sectional study conducted in Dubai in 2017 to evaluate EMS staff's awareness of acute stroke identification and management. While educational lectures increase knowledge, regular reevaluation is still necessary.[15] On the Saudi Arabian level, in 2023, a cross-sectional study was conducted in Riyadh to evaluate knowledge of risk factors and warning signs of stroke among 205 future healthcare professionals. Founds that 41.3% of pharmacy students and 32.2% of healthcare undergraduate students at KSU had good knowledge of stroke risk factors, with educational level significantly correlated. Implementing advanced stroke education programs is recommended.[9] A cross-sectional study from Al-Hasa carried out in 2022 showed that 515 medical students at KFU correctly identified stroke warning signs and risk factors using a Stroke Awareness Questionnaire. However, 36.7% had a poor understanding of stroke meaning, while 69.3% had a strong understanding of transient ischemic attacks. Medical students had moderately high knowledge about stroke risk factors and symptoms.[16] Although it is widely assumed that today's students will become tomorrow's professionals, a full understanding of clinical facts related to diseases will allow them to provide the best possible treatment to their patient.[9,14,16] Due to insufficient numbers of studies related to our topics, and to increase the level of awareness about stroke and its golden hours to manage. The primary goal of this study is to evaluate the Knowledge and Awareness level of Stroke in general, plus its management during the golden hours among Medical Students and interns in Saudi Arabia.

Objectives

Our aim of this research was to evaluate the Knowledge and Awareness level of Stroke in general, plus its management during the golden hours among Medical Students and interns in Saudi Arabia.

MATERIALS AND METHODS

Study design

This is an observational cross-sectional study. The study was conducted in the Kingdom of Saudi Arabia from January 2024 to February 2025, targeting medical students and medical interns in KSA. The participants were recruited by receiving an online questionnaire accompanied by the consent within.

Inclusion and exclusion criteria

All medical students and interns in KSA were included. All non-medical students and students from other institutions were excluded.

Sample size

By using the Raosoft calculator, the sample size was estimated, with a confidence level of 95% and a marginal error of 5%, the minimal sample size was 384.

Method for data collection and instrument (data collection technique and tools)

In response, a self-administered survey was created after examining a number of studies.[9,13,16-21]

Using Google Forms, a self-administered survey was used to collect data. Starting in January 2024, it was available online through social media channels. There were 36 questions in all across the three sections of the questionnaire.

The first portion had a total of four questions that inquired about the participants' gender, region, place of residence, and sociodemographic data related to their academic year. Seven questions in the second session assessed the participants' general knowledge of stroke in terms of definition, types, symptoms, and risk factors. The participants' knowledge of the therapeutic window, the ideal time to treat a stroke, and how to give t-PA was examined in the final 24 questions of the questionnaire.

Scoring system

Thirty-five statements were utilized to evaluate the general knowledge and knowledge about the management of stroke in golden hour levels of medical student regarding to their academic level.

Score for General knowledge: Seven statements, one point for each accurate response, and a score of Zero points is awarded for wrong replies or I Don't know. The scoring method was divided into the following categories: follows: ≥6 for a high level of knowledge, 5 for a medium level of knowledge, and ≤4 for a low level of knowledge.

Knowledge about the management of stroke in the golden hour score: Twenty-four phrases totally were used to determine knowledge toward the management of stroke in the golden hour. For each correct answer, a score of 1 was considered. A score of "0" was provided for an incorrect response, and a response "I don't know" was similarly considered wrong and received a score of "0." Then the total score was calculated 20 ≥for a high level of knowledge, 15–19 for a medium level of knowledge, and ≤14 for a low level of knowledge.

Analyzes and entry method

Data were entered on the computer using the "Microsoft Office Excel Software" program (2016) for Windows. Data were transferred to the Statistical Package for the Social Science Software (SPSS) program, version 20 (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY nbm,nbvcxz: IBM Corp) to be statistically analyzed.

RESULTS

Table 1 displays various demographic parameters of a group of people with a total number of (n = 400). First, in terms of age distribution, most participants, accounting for 46.0%, fall within the age bracket of 22 or less, followed closely by those aged between 22 and 24 at 38.0%. A smaller proportion, constituting 16.0%, comprise individuals aged more than 24. The gender distribution indicates a balanced representation, with females comprising 52.0% and males 48.0% of the sample. Geographically, the Western region stands out as the most heavily represented area, with 49.5% of participants residing there, while the Northern region has the lowest representation at 1.5%. In terms of educational institutions, Jeddah University emerges as the most popular choice, attended by 51.5% of participants, followed by King Khalid University at 19.5%. The distribution across present academic years shows a higher concentration in the 5th year, with 51.0% of participants, while the 2nd year has the lowest representation at 2.5%. When considering cumulative GPA, the majority fall within the "Very good" category, with 44.5%, closely followed by those in the "Excellent" category at 39.0%. Notably, a significant portion of participants, 79.5%, have not been enrolled in neurology training before, indicating potential opportunities for exposure and learning in this area.

As shown in Figure 1, the data presented in the figure provides valuable insights into the distribution of prior neurology training experiences among the survey respondents. The overwhelming majority of respondents, 318 individuals, indicated that they have not been enrolled in a neurology training program, either through a rotation or elective course. This suggests that the sample population may have limited exposure to the field of neurology, which could have implications for their understanding and appreciation of neurological conditions and the unique challenges faced by neurologists. In contrast, a smaller but still significant proportion of respondents, 82 individuals, reported having previous neurology training experience. This subset of the population may be better equipped to navigate the complexities of neurological disorders and collaborate effectively with neurologists in a clinical or research setting. Understanding the background and prior exposure of the survey participants is crucial in interpreting the data and drawing meaningful conclusions, as it can shed light on potential biases or knowledge gaps that may influence their perspectives and decision-making processes. Further analysis of the demographic characteristics and professional backgrounds of the respondents could provide a more nuanced understanding of the factors influencing their neurology training experiences and preferences.

As illustrated in Table 2, most respondents correctly identified the brain as the organ affected by stroke, with a high

Table 1: Sociodemographic characteristics of participants (*n*=400)

Parameter	No.	Percentage
Age		
22 or less	184	46.0
22–24	152	38.0
More than 24	64	16.0
Gender		
Female	208	52.0
Male	192	48.0
Place of residence		
Northern region	6	1.5
Southern region	124	31.0
Central region	28	7.0
Eastern region	44	11.0
Western region	198	49.5
Which college of medicine do you attend?		
Jeddah University	206	51.5
King Khalid University	78	19.5
Najran University	50	12.5
Ibn Sina National College	22	5.5
Other	44	11.0
Present year		
2nd year	10	2.5
3rd year	34	8.5
4th year	78	19.5
5th year	204	51.0
6th year	36	9.0
Intern	38	9.5
Present cumulative GPA?		
Excellent (no <3.50 out of 4.00) OR (no <4.50 out of 5.00)	156	39.0
Very good (from 2.75 to 3.49 out of 4.00) OR (from 3.75 to 4.49 out of 5.00)	178	44.5
Good (from 1.75 to 2.74 out of 4.00) OR (from 2.75 to 3.74 out of 5.00)	58	14.5
Satisfactory (from 1.00 to 1.74 out of 4.00) OR (from 2.00 to 2.74 out of 5.00)	8	2.0
Have you ever been enrolled in neurology training before (rotation or elective)		
No	318	79.5
Yes	82	20.5

GPA: Grade point average

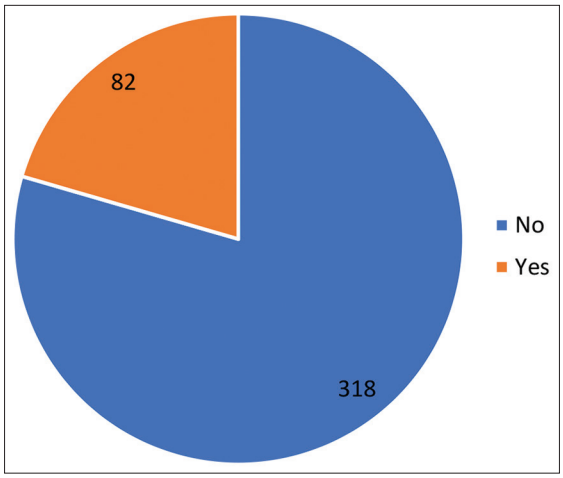

Figure 1: Illustrates if participants have enrolled in neurology training before

percentage of 93.5%. Furthermore, a significant proportion, 92.5%, recognized that an ischemic stroke occurs when blood flow to the brain is interrupted. When asked about the types of strokes, most participants (87.5%) correctly identified both hemorrhagic and thrombotic (ischemic) strokes. Regarding symptoms, a large percentage recognized facial asymmetry, sudden difficulty in speaking, and weakness of one side of the body as important signs of a stroke. It is encouraging to note that a high number of respondents (83.0%) believe that strokes can be prevented. In addition, the majority (88.0%) acknowledged the possibility of experiencing more than one stroke. Common risk factors, such as diabetes mellitus, heredity or genetics, and smoking were well-recognized by the participants. When asked about expected complications post-stroke, responses varied, with epilepsy being the most identified complication. Lifestyle modifications, such as restricted fatty foods, cessation of smoking, and regular exercise, were deemed important for stroke patients.

As shown in Figure 2, the data presented in the figure raises an important question regarding the potential for an individual to experience multiple strokes. The overwhelming majority of respondents (352 out of 400 total) indicated that it is indeed possible for a person to suffer more than one stroke, which aligns with the medical consensus. Strokes, which occur when blood flow to part of the brain is blocked, can have devastating and lasting impacts on an individual's physical and cognitive function. While some risk factors for stroke, such as age, high blood pressure, and lifestyle factors, can be mitigated through preventative measures, the recurrent nature of this condition is well-documented. Approximately 1 in 4 stroke survivors will experience a second stroke, underscoring the critical need for vigilant monitoring, adherence to treatment regimens, and ongoing management of underlying health conditions that predispose individuals to this neurological event. The relatively small number of respondents (16) who believed multiple strokes are not possible, as well as the sizable contingent (32) who

Table 2: Parameters related to awareness level of stroke management in golden hours (*n*=400)

Parameter	No.	Percentage
Which organ of the body is affected by a stroke		
Brain	374	93.5
Heart	2	2.0
Liver	2	0.5
Lungs	10	2.5
I don't know	6	1.5
An ischemic stroke happens when blood flow to the brain stops		
Yes	370	92.5
No	22	5.5
I don't know	8	2.0
What are the types of strokes?		
Hemorrhagic	8	2.0
Thrombotic (ischemic)	32	8.0
Both	350	87.5
I don't know	10	2.5
What are the important symptoms of stroke (you can choose more than one answer)?*		
Facial asymmetry	276	69
Sudden difficulty in speaking	348	87
Weakness of one side of the body	348	87
I don't know	10	2.5
Is it possible to prevent a stroke?		
Yes	332	83.0
No	24	6.0
I don't know	44	11.0
Is it possible for a person to have more than one stroke?		
Yes	352	88.0
No	16	4.0
I don't know	32	8.0
Risk factors for stroke (you can choose more than one)*		
Diabetes mellitus	294	73.5
Heredity or genetics	236	59
History of prior stroke	346	86.5
Smoking	344	86
Lack of physical activity	252	63
I don't know	14	3.5
What are the expected complications post-stroke? (you can choose more than one answer)*		
Epilepsy	240	60
Lung infection	112	28
Pressure sore	164	41
I don't know	94	23.5
Unknown	76	19
What is the Ideal lifestyle modification for stroke patients?*		
Restricted fatty food	290	72.5
Cessation of smoking	336	84
Regular exercise	344	86
Restricted table salt	262	65.5
I don't know	16	4

*Results may overlap

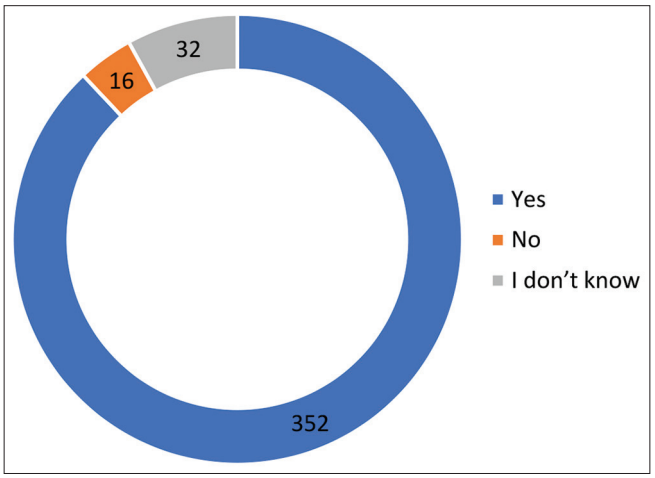

Figure 2: Illustrates if participants think that it is possible to prevent stroke

were unsure, highlights the importance of public education and awareness campaigns to ensure the broader population understands the realities of stroke risk and recurrence. Continued efforts to disseminate accurate, evidence-based information can empower individuals to proactively manage their health and seek timely medical intervention, which is essential for minimizing the debilitating effects of subsequent strokes.

In Table 3, the findings reveal a varied understanding among participants regarding crucial aspects of stroke management. For instance, a significant proportion (48.0%) correctly identified the window period for thrombolysis therapy as 0–4.5 h, while a notable percentage (27.5%) admitted to not knowing this information. In terms of treatment options for acute ischemic stroke, there was a range of responses, with varying levels of awareness. The majority recognized medications, such as Aspirin (56%) and Heparin or warfarin (57%) as potential treatments, while a considerable portion (11.5%) expressed uncertainty. Interestingly, a small percentage (8.0%) believed that strokes are self-healing, highlighting a misconception that warrants attention in educational interventions. The overwhelming majority

Table 3: Participants knowledge about stroke management in golden hours (*n*=400)

Parameter	No.	Percentage
The window period of thrombolysis therapy		
0–4.5 h	192	48.0
4.5–6 h	64	16.0
12–24 h	22	5.5
Above 24 h	12	3.0
I don't know	110	27.5
Medications or other treatments that can be used for acute ischemic stroke management (you can choose more than one answer)*		
Aspirin	224	56
Blood pressure control	216	54
Surgery	160	40
Heparin or warfarin	228	57
Thrombolysis	294	73.5
Clot extraction	210	52.5
I don't know	64	11.5
I won't do anything; the stroke is self-healing		
Yes	32	8.0
No	368	92.0
I'll provide the patient with Aspirin immediately		
Yes	214	53.5
No	186	46.5
I will wait for an hour, as this could be a transient ischemic attack		
Yes	44	11.0
No	356	89.0
I will call an ambulance		
Yes	390	97.5
No	10	2.5
What would you do if you suffered from a stroke? (God Forbid)**		
Go to the hospital immediately	370	92.5
Go to the hospital after an hour	16	4.0
Book an appointment within a few weeks	12	3.0
No need for hospital	2	0.5
Preventive measures for stroke complications (you can choose more than one answer)*		
Early mobility	256	64
Routine posture change	224	56
Skin infection control	108	27
I don't know	90	22.5
Do you think t-PA is an effective treatment for stroke within 4.5 h of onset?		
Yes	228	57.0
No	26	6.5
I don't know	146	36.5
What is the level of evidence for the use of t-PA in ischemic stroke within 4.5 h of onset?		
Strong (high level)	208	52.0
Weak (low level) Controversial	32	8.0
I don't know	160	40.0
Is t-PA a standard of care for ischemic stroke within 4.5 h from onset in an eligible patient?		
Yes	208	52.0
No	16	4.0
I don't know	176	44.0
In the absence of stroke expertise, what do you recommend for a patient presented with acute ischemic stroke (within 4.5 h from onset)? (you can choose more than one answer)*		
Train emergency physicians to give t-PA	164	41
Establish telestroke	74	18.5
Train internists to give t-PA.	100	25
No t-PA should be offered.	48	1
I don't know	180	45
When needed, would you be willing to be enrolled in training to administer t-PA for acute stroke management?		
Yes	326	81.5
No	74	18.5
If telestroke is implemented, would you be willing to administer IV t-PA for ischemic stroke in collaboration with remote stroke neurology consultation?		
Yes	294	73.5
No	106	26.5

*Results may overlap. T-PA: Tissue-type plasminogen activator

(97.5%) acknowledged the importance of calling an ambulance in case of a stroke, indicating a positive inclination toward seeking immediate medical help. Moreover, the readiness to enroll in training to administer t-PA for acute stroke management was notably high (81.5%), suggesting a

willingness among participants to enhance their skills in this critical area. Overall, the data underscores the importance of raising awareness and providing education on stroke management to ensure timely and effective interventions.

In analyzing the data presented in Table 4 regarding knowledge and awareness about stroke management in the golden hours score results, several key observations can be made. The table provides a breakdown of the respondents' awareness levels, categorized as high, moderate, and low. It is evident that a significant portion of the participants, constituting 58.0% of the total sample, demonstrated a high level of awareness regarding stroke management within the crucial golden hours. This finding is encouraging as it suggests that a majority of individuals possess a solid understanding of the importance of timely intervention in stroke cases. Moreover, 31.5% of respondents exhibited a moderate level of awareness, indicating a reasonable level of knowledge among a considerable portion of the surveyed population. However, it is worth noting that 10.5% of participants displayed a low level of awareness, signaling a potential area for improvement in education and awareness campaigns related to stroke management.

Table 5 shows that the awareness level regarding stroke management in golden hours among participants has statistically significant relation to college of medicine ($P = 0.0001$), present year of study ($P = 0.017$), present GPA ($P = 0.018$) and if the participant had enrolled in neurology training before ($P = 0.027$). It also shows a statistically insignificant relation to gender and age.

DISCUSSION

Stroke is a cerebral deficit due to vascular blockage (ischemic stroke) or leakage (hemorrhagic stroke) lasting more than 24 h.[22] It is the second leading global cause of mortality, causing an estimated 6.7 million deaths worldwide in 2012.[23] Most deaths from stroke are in low- and middle-income countries. The most crucial predictor of the outcome of the treatment of stroke is the time period (often called the golden time) between ictus and onset of treatment. If recognized early and managed optimally, acute paralysis in stroke can be reversed. Prompt access to medical services after noticing the initial symptoms may increase the chances of a favorable outcome. Low stroke awareness limits acute stroke care in high-risk populations and makes effective early treatment difficult.[24] Thus, we aimed in this study to evaluate the Knowledge and Awareness level of Stroke in general, plus its management during the golden hours among Medical Students and interns in Saudi Arabia.

Table 4: knowledge and awareness about stroke management in the golden hours score results

	Frequency	Percentage
High level of awareness	232	58.0
Moderate level of awareness	126	31.5
Low level of awareness	42	10.5
Total	400	100.0

As regard the knowledge and awareness score about stroke management in golden hours among the studied participants, we have found that 58.0% out of the 400 participants demonstrated a high level of awareness regarding stroke management within the crucial golden hours. Moreover, 31.5% of respondents exhibited a moderate level of awareness, indicating a reasonable level of knowledge among a considerable portion of the surveyed population. However, it is worth noting that 10.5% of participants displayed a low level of awareness. On the other hand, a study conducted by Khubaib *et al*.[25] revealed that more than half (55.5%) were not aware of the recommended initial therapy for ischemic stroke and 41.9% were unaware of the initial steps involved in the management of hemorrhagic stroke. Moreover, a previous study by Alam *et al*. among university students of Dhaka evaluated the awareness about stroke and reported that 74.2% of the students identified stroke as a brain disorder.[26] However, another similar study reported that 62.6% of the students were knowledgeable about various aspects of the stroke.[27] A study conducted by Alqahtani *et al*.[28] aimed to assess the knowledge and awareness level regarding stroke management in the golden hours among medical students in Saudi Arabia. The results showed that only 60% of the participants were aware of the importance of thrombolytic therapy within the golden hours of stroke onset. In addition, the study revealed that only 45% of the students correctly identified the typical presentation of stroke symptoms. Moreover, a study conducted by Smith *et al*.[29] aimed to assess the knowledge and awareness level regarding stroke management in the golden hours among medical students. The study found that only 45% of medical students demonstrated adequate knowledge in identifying stroke symptoms and initiating appropriate management within the critical golden hour's post-stroke onset. In another study by Jones and Brown,[30] the researchers investigated the awareness levels of medical students regarding the importance of time-sensitive interventions in stroke management. Their results showed that a significant percentage of medical students (65%) were unaware of the narrow timeframe for effective stroke interventions in the golden hours. Furthermore, a study by Alhazzani *et al*.[31] investigated the knowledge and awareness level of stroke management among medical students in Saudi Arabia. The study found that the average score percentage for knowledge related to stroke management in the golden hours was 55%. Furthermore, only 30% of the participants correctly identified the appropriate actions to take in the early management of stroke cases.

Regarding the knowledge about the risk factors of stroke, we have found that 86% reported smoking as a risk factor and 73.5% reported diabetes mellitus as a risk factor. However, a

Table 5: Relation between awareness level of stroke management in golden hours and sociodemographic characteristics

Parameters	Awareness level		Total (*n*=400)	*P*-value*
	High level	Moderate or low level		
Gender				
Female	112	96	208	0.215
	48.3%	57.1%	52.0%	
Male	120	72	192	
	51.7%	42.9%	48.0%	
Age				
22 or less	112	72	184	0.371
	48.3%	42.9%	46.0%	
22–24	90	62	152	
	38.8%	36.9%	38.0%	
More than 24	30	34	64	
	12.9%	20.2%	16.0%	
Place of residence				
Northern region	0	6	6	N/A
	0.0%	3.6%	1.5%	
Southern region	70	54	124	
	30.2%	32.1%	31.0%	
Central region	8	20	28	
	3.4%	11.9%	7.0%	
Eastern region	24	20	44	
	10.3%	11.9%	11.0%	
Western region	130	68	198	
	56.0%	40.5%	49.5%	
Which college of medicine do you attend?				
Jeddah University	130	76	206	**0.0001**
	56.0%	45.2%	51.5%	
King Khalid University	62	16	78	
	26.7%	9.5%	19.5%	
Najran University	8	42	50	
	3.4%	25.0%	12.5%	
Ibn Sina National College	16	10	26	
	6.9%	6.0%	6.5%	
Other	16	24	40	
	6.9%	14.3%	10.0%	
Present year				
2nd year	4	6	10	**0.017**
	1.7%	3.6%	2.5%	
3rd year	8	26	34	
	3.4%	15.5%	8.5%	
4th year	44	34	78	
	19.0%	20.2%	19.5%	
5th year	128	76	204	
	55.2%	45.2%	51.0%	
6th year	18	18	36	
	7.8%	10.7%	9.0%	
Intern	30	8	38	
	12.9%	4.8%	9.5%	
Present cumulative GPA				
Excellent (no <3.50 out of 4.00) OR (no <4.50 out of 5.00)	100	56	156	**0.018**
	43.1%	33.3%	39.0%	
Very good (from 2.75 to 3.49 out of 4.00) OR (from 3.75 to 4.49 out of 5.00)	110	68	178	
	47.4%	40.5%	44.5%	
Good (from 1.75 to 2.74 out of 4.00) OR (from 2.75 to 3.74 out of 5.00)	20	38	58	
	8.6%	22.6%	14.5%	
Satisfactory (from 1.00 to 1.74 out of 4.00) OR (from 2.00 to 2.74 out of 5.00)	2	6	8	
	0.9%	3.6%	2.0%	
Have you ever been enrolled in neurology training before (rotation or elective)				
No	172	146	318	**0.027**
	74.1%	86.9%	79.5%	
Yes	60	22	82	
	25.9%	13.1%	20.5%	

**P*-value was considered significant if ≤0.05. GPA: Grade point average

study in southwestern Nigeria among undergraduate students concluded that diabetes (35.9%) and smoking (27%) were the commonly identified stroke risk factors.[27] Regarding symptoms and signs of stroke, a large percentage of our studied participants recognized facial asymmetry, sudden difficulty in speaking, and weakness of one side of the body as important signs of a stroke. These findings were consistent with similar studies conducted in Saudi Arabia and other countries.[32,33] Other reports revealed numbness or weakness, difficulty in understanding speech, trouble in speaking or seeing, and walking, and headache are important signs and symptoms of stroke.[34]

CONCLUSION

The study revealed varying levels of awareness and knowledge regarding stroke management within the crucial golden hours. While a significant portion of participants demonstrated a high level of awareness, there were still notable percentages with moderate or low awareness levels. The study highlighted the importance of education and training in improving awareness levels, particularly in recognizing stroke symptoms and the need for prompt action. Comparisons with previous studies underscored the ongoing need for enhanced stroke education programs to ensure better outcomes for stroke patients. Addressing gaps in knowledge about stroke risk factors and symptoms, as well as promoting timely and appropriate interventions, remains crucial in enhancing stroke care in Saudi Arabia to reduce the burden of stroke-related disabilities and deaths.

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ETHICAL APPROVAL

Informed consent was obtained from each participant after explaining the study in full and clarifying that participation is voluntary. Data collected were securely saved and used for research purposes only.

INFORMED CONSENT

Written informed consent was obtained from all individual participants included in the study.

DATA AND MATERIALS AVAILABILITY

All data associated with this study are present in the paper.

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