



Public awareness of stroke risk factors and warning signs in the population of Ha'il region, Saudi Arabia: A cross-sectional study

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General Note

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ABSTRACT

Background: Stroke is considered the commonest cause of death globally after ischemic heart disease. In Saudi Arabia, the prevalence of stroke was estimated at 40 per 100,000 in the Eastern Province and, 43.8 per 100,000 per year in Riyadh with a male to female predominance of 2.2:1. **Objectives:** The study aimed to assess the awareness of stroke risk factors and warning signs in the population of Ha'il region, Saudi Arabia. **Methods:** A descriptive cross-sectional study was conducted in Ha'il region, Saudi Arabia, between June 2020 and July 2020. **Results:** Most of the participants were females (63%), and 37% were males. The relative majority of them were aged between 15 and 30 years old (42.9%). Most of the participants (84.8%) correctly named hypertension as a risk factor of stroke. Even though, 59.5% have not recognized dizziness as a warning sign of stroke. **Conclusion:** The study revealed that there is poor awareness regarding stroke risk factors and warning signs in the Ha'il region, Saudi Arabia. Without a doubt, Ha'il community needs comprehensive awareness campaigns.

Keywords: Stroke, Awareness, Cerebrovascular accident, Ha'il, Saudi Arabia.

1. INTRODUCTION

According to the world health organization (WHO), stroke is defined as "rapidly developing clinical signs of focal (or global) disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin" (Aho et al., 1980). Stroke is considered the commonest cause of death globally after ischemic heart disease, with a mortality rate of 5.5 million annually (Lopez et al., 2006). In Arabian countries, it is estimated per 100,000 population the prevalence of stroke ranges between 42 and 68, and the annual stroke incidence varies between 27.5 to 63 per 100,000 people (Benamer and Grosset, 2009). In Saudi Arabia, the prevalence of stroke was estimated at 40 per 100,000 in the Eastern Province and, 43.8 per 100,000 per year in Riyadh with a male to female predominance of 2.2:1 (Al Rajeh and Awada, 2002). These rates are low in comparison with those of other developed countries, while some of the developing countries have similar rates to Saudi Arabia, which thought to be caused by the majority of youth in these populations (Al Rajeh and Awada, 2002; Rajeh et al., 1993).

The most preventable neurological disease is stroke, due to many of its risk factors, for example, high cholesterol, diabetes, hypertension, and smoking, which can be prevented either through lifestyle modification or by medication (Sacco et al., 1997; Zade et al. 2020). In stroke management, it is important to have fast access to medical service, as delays result in poor outcome (Grond, 2001; Zangerle et al., 2007). Studies have shown that the most important cause of delay in hospital reporting of stroke is the lack of awareness of stroke warning signs (Pontes-Neto et al., 2008; Williams et al., 1997). Therefore, raising the public knowledge of stroke risk factors and warning signs is crucial for influencing stroke prevention, prehospital care, and therapeutic outcome (Ferris et al., 2005; Quinn et al., 2009; Schneider et al., 2003). Therefore, the aim of the present study was to assess the awareness of stroke risk factors and warning signs in the population of Ha'il region, Saudi Arabia.

2. MATERIALS AND METHODS

A descriptive cross-sectional study was conducted in Ha'il region, Saudi Arabia, between June 2020 and July 2020. The minimum effective sample size was 384 participants, estimated based on Ha'il population of 716,021 using the Raosoft online sample calculator (http://www.raosoft.com/sample_size.html), with a 95% confidence level and 5% margin of errors. Data was collected using a pre-validated questionnaire, that has been used in a study in the United States (Schneider et al., 2003). The questionnaire was composed of two sections. The first section obtained demographics such as age, gender, marital status, education level, income, and occupation. The second section included 21 questions to determine the awareness about stroke. The questionnaire was translated into Arabic and approved by 1 internist, thereafter, tested for both comprehension and readability by 27 subjects who were not included in the study. The questionnaire has been hosted by Google form and distributed to the inhabitants of Ha'il region, Saudi Arabia through social media platforms. The studied population included both genders female and male, Saudi, and Non-Saudi individuals living in Ha'il region who aged 15 years old and older. The exclusion criteria were participants living outside Ha'il region and those aged less than 15 years old.

Ethical consent

The purpose of the study has been explained to the volunteers and the consent to participate was received before answering the questionnaire. Ethical approval was obtained from the Research Ethics Committee at the University of Ha'il, Ha'il, Saudi Arabia. Ethical Approval Code is Nr. 55456/5/41.

Definitions

A classification has been used, according to a study in Spain, (Montaner et al., 2001) which defined the awareness of stroke risk factors and warning signs as follows: good awareness of stroke risk factors meant the ability to identify ≥ 5 risk factors and make ≤ 1 error; good awareness of stroke warning signs meant the ability to recognize correctly ≥ 3 warning signs and symptoms of the list and make ≤ 1 error.

Statistical analysis

The Statistical Package for Social Sciences (SPSS version 23) was used to analyze the data. Chi-square analysis was performed to test the association between ≥ 2 categorical variables. P-value less than 0.05 were considered the cutoff value for significance.

3. RESULTS

A total of 427 participants have completed the survey. Table 1 shows the demographics of the participants. The majority of participants were females (63%), and 37% were males. The relative majority of the population (42.9%) were aged between 15-30 years old, followed by those aged between 30-45 (32.8%). Regarding the marital status (59.7%) was married, while (36.5%) were single. More than half (74.9%) of the population had a university degree as the highest educational level, while the lowest was primary school degree (1.6%). Forty-one-point seven percent of the participants were employed; however, (10.1%) were retired. The majority (40.3%) had an income of less than 1333 United States Dollars (USD), while only (3.5%) had an income of more than 5334 USD.

Table 1 Demographic data of the participants (N = 427)

Demographic variable	Category	N	%
Age	15-30	183	42.9
	30-45	140	32.8
	45-60	93	21.8
	>60	11	2.6
Gender	Male	158	37
	Female	269	63
Marital status	Single	156	36.5
	Married	255	59.7
	widowed	5	1.2
	Divorced	11	2.6
Educational level	Primary school	7	1.6
	Secondary school	9	2.1
	Tertiary school	91	21.3
	University	320	74.9
Occupation	Employed	178	41.7
	Retired	43	10.1
	Student	104	24.4
	Unemployed	102	23.9
Monthly income	≤ 5000 SR (≤ 1333 USD)		
	5001-10,000 SR (1334-2666 USD)	172	40.3
	10,001-15,000 SR (2667-4000 USD)	88	20.6
	15,001-20,000 SR (4001-5333 USD)	111	26
	$\geq 20,001$ SR (≥ 5334 USD)	41	9.6
		15	3.5

Abbreviations: SR, Saudi Riyal; USD, United States Dollar.

Awareness of Stroke Risk Factors

Only a few of the participants were able to correctly identify stroke risk factors, including diabetes mellitus (213 [49.9%]), obesity (42 [9.8%]), alcohol use (280 [65.6%]), heart disease (315 [73.8%]), dyslipidemia (342 [80.1%]), tobacco use (349 [81.7%]), stress (59 [13.8%]), hypertension (362 [84.8%]), and family history of stroke (225 [52.7%]) as shown in Figure 1. Awareness of stroke risk factors in the present study was determined as being able to identify ≥ 5 risk factors correctly and make ≤ 1 error, those who met the criteria were only (20 [4.7%]) more data are shown in Table 2.

Table 2 Awareness of stroke risk factors with respect to age, gender, and level of education

Demographic variable	Category	Know ≥ 5 risk factors and make ≤ 1 error, n (%)	P value
Age	15-30 (n = 183)	10 (5)	0.766
	30-45 (n = 140)	5 (25)	
	45-60 (n = 93)	4 (20)	
	>60 (n = 11)	1 (5)	
Gender	Male (n = 158)	9 (45)	0.448
	Female (n = 269)	11 (55)	
Educational level	Primary school (n = 7)	0 (0)	0.710
	Secondary school (n = 9)	1 (5)	
	Tertiary school (n = 91)	5 (25)	
	University (n = 320)	14 (70)	

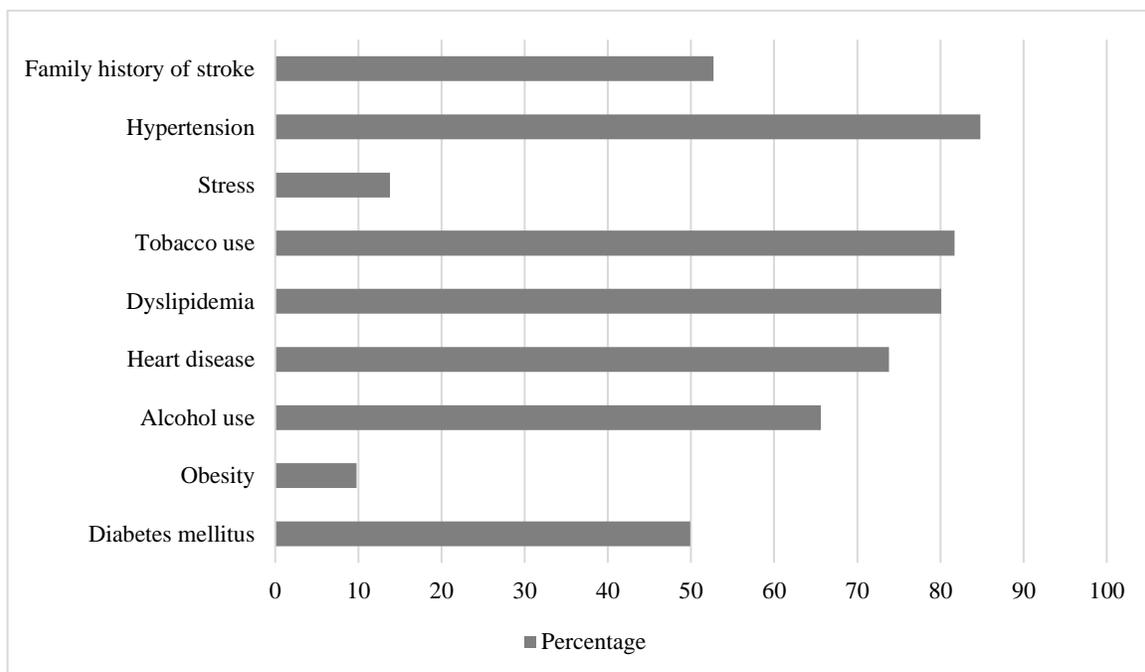


Figure 1 Awareness of stroke risk factors.

Awareness of Stroke Warning Signs

The responses of the participants were varied according to the warning signs of stroke, but a small percentage of them were able to choose the correct answers, including numbness (243 [56.9%]), dizziness (173 [40.5%]), headache (188 [44%]), focal weakness (251 [58.8%]), slurred speech (318 [74.5%]), and blurred vision (204 [47.8%]) as shown in Figure 2. Awareness of stroke warning signs in this study was determined as being able to identify ≥ 3 warning signs and symptoms correctly and make ≤ 1 error, those who met the criteria were only (95 [22.2%]). There is a significant correlation between age group and the good awareness of stroke warning signs ($P = 0.035$), being aged between 15 and 30 have more awareness (53.7%) compared to other age groups such as those aged 60 or older who had no awareness (0%), as shown in Table 3.

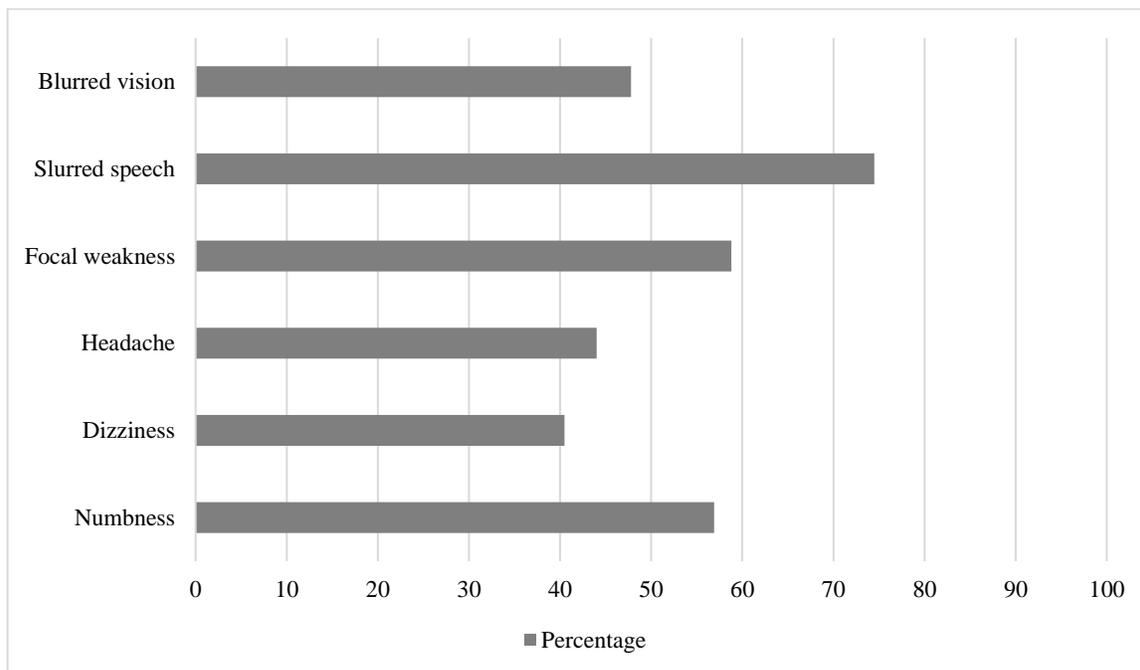


Figure 2 Awareness of stroke warning signs.

Table 3 Awareness of stroke warning signs with respect to age, gender, and level of education

Demographic variable	Category	Know ≥ 3 symptoms and make ≤ 1 error, n (%)	P value
Age	15-30 (n = 183)	51 (53.7)	0.035
	30-45 (n = 140)	24 (25.3)	
	45-60 (n = 93)	20 (21)	
	>60 (n = 11)	0 (0)	
Gender	Male (n = 158)	31 (32.6)	0.317
	Female (n = 269)	64 (67.4)	
Educational level	Primary school (n = 7)	0 (0)	0.433
	Secondary school (n = 9)	1 (1.1)	
	Tertiary school (n = 91)	21 (22.1)	
	University (n = 320)	73 (76.8)	

4. DISCUSSION

Out of our knowledge, this is the first study of its kind in Ha'il region to measure the awareness of Ha'il society about the risk factors and warning signs of stroke. The responses of the participants were varied about the most common risk factors and warning signs of stroke. Unfortunately, the majority of the responses suggested that there is a lack of awareness in Ha'il community. The most identifiable risk factor was hypertension (84.8%), this is found to be the same as in other studies (AlOtaibi et al., 2017; Hickey et al., 2009; Jones et al., 2010; Schneider et al., 2003; Sug Yoon et al., 2001). On the other hand, it was the least identifiable risk factor in a community-based study that was done in Riyadh (Alaqeel et al., 2014). While the least recognizable risk factor was obesity (9.8%), this result is alarming especially due to the high rate of obesity (63.6%) in Ha'il region (Ahmed et al., 2014). In contrast to a study conducted in Nigeria, found that it was recognizable by a decent proportion (53.5%) (Obembe et al., 2014). The three most correctly identified risk factors for stroke in this study were: hypertension, tobacco use, and dyslipidemia. Although they are not limited to cause stroke only, so they are generic risk factors more to say. Participants may have identified generic health risk factors, possibly showing the media's focus on hypertension and dyslipidemia.

In regard to the warning signs of stroke, slurred speech was the most recognizable warning sign with a percentage of 74.5. This contradicts a study in the United States which found that (16%) of the participants identified slurred speech as a warning sign of stroke (Schneider et al., 2003), this may be due to the time gap between the two studies and the access to online medical resources

was made easier in recent years. Whereas, dizziness (40.5%) was the least identifiable warning sign, which is similar to a previous study (42.8%) (Obembe et al., 2014). According to the criteria of good awareness of the warning signs of stroke, only (22.2%) of the respondents were able to identify ≥ 3 warning signs and symptoms and made ≤ 1 error. This is similar to a previous study (21.7%) (Alaqeel et al., 2014). This decreased percentage of knowledge may result in delayed recognition of an on-going stroke, which may lead to poor outcomes (Pontes-Neto et al., 2008; Williams et al., 1997). Some of the participants have identified shortness of breath, and feeling of pain as warning signs of stroke, which may show bewilderment between warning signs of heart attack and those of stroke (Greenlund et al., 2003; Hickey et al., 2009; Reeves et al., 2002; Sug Yoon et al., 2001).

5. CONCLUSION

The study revealed that there is poor awareness regarding stroke risk factors and warning signs in Ha'il region, Saudi Arabia. Without a doubt, educational programs about stroke in Ha'il's community are a necessity; measures must be taken to raise the level of knowledge about risk factors and warning signs of stroke.

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Author Contributions

All the authors listed above have participated equally in collecting the data, analyzing the data, writing the manuscript, and reviewing the article.

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Conflict of Interest

The authors declare that there are no conflicts of interests.

Informed consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

Ethical approval

The study was approved by the Research Ethics Committee at the University of Ha'il, Ha'il, Saudi Arabia (Ethical Approval Code: Nr. 55456/5/41).

Data and materials availability

All data associated with this study are available upon request to the corresponding author.

Peer-review

External peer-review was done through double-blind method.

REFERENCES AND NOTES

1. Ahmed HG, Ginawi IA, Elsbali AM, et al. Prevalence of obesity in Hail region, KSA: in a comprehensive survey. *Journal of obesity* 2014;2014.
2. Aho K, Harmsen P, Hatano S, et al. Cerebrovascular disease in the community: results of a WHO collaborative study. *Bull World Health Organ* 1980;58:113-30.
3. Al Rajeh S, Awada A, Niazi G, et al. Stroke in a Saudi Arabian National Guard community. Analysis of 500 consecutive cases from a population-based hospital. *Stroke* 1993;24:1635-9.
4. Al Rajeh S, Awada A. Stroke in Saudi Arabia. *Cerebrovasc Dis* 2002;13:3-8.
5. Alaqeel A, AlAmmari A, Al Syefi N, et al. Stroke awareness in the Saudi community living in Riyadh: prompt public health measures must be implemented. *J Stroke Cerebrovasc Dis* 2014;23:500-4.
6. AlOtaibi. MK, Alotaibi. FF, Alkhodair. Y, et al. Knowledge and Attitude of Stroke among Saudi Population in Riyadh, Kingdom of Saudi Arabia. *International Journal of Academic Scientific Research* 2017;5:149-57.

7. Benamer HT, Grosset D. Stroke in Arab countries: a systematic literature review. *J Neurol Sci* 2009;284:18-23.
8. Ferris A, Robertson RM, Fabunmi R, et al. American Heart Association and American Stroke Association national survey of stroke risk awareness among women. *Circulation* 2005;111:1321-6.
9. Greenlund KJ, Neff LJ, Zheng ZJ, et al. Low public recognition of major stroke symptoms. *Am J Prev Med* 2003;25:315-9.
10. Grond M. Clinical thrombolysis in stroke. *Thrombosis research* 2001;103:S135-S42.
11. Hickey A, O'Hanlon A, McGee H, et al. Stroke awareness in the general population: knowledge of stroke risk factors and warning signs in older adults. *BMC Geriatr* 2009;9:35.
12. Jones SP, Jenkinson AJ, Leathley MJ, et al. Stroke knowledge and awareness: an integrative review of the evidence. *Age Ageing* 2010;39:11-22.
13. Lopez AD, Mathers CD, Ezzati M, et al. Global and regional burden of disease and risk factors, 2001: systematic analysis of population health data. *Lancet* 2006;367:1747-57.
14. Montaner J, Vidal C, Molina C, et al. Selecting the target and the message for a stroke public education campaign: a local survey conducted by neurologists. *Eur J Epidemiol* 2001;17:581-6.
15. Obembe AO, Olaogun MO, Bamikole AA, et al. Awareness of risk factors and warning signs of stroke in a Nigeria university. *J Stroke Cerebrovasc Dis* 2014;23:749-58.
16. Pontes-Neto OM, Silva GS, Feitosa MR, et al. Stroke awareness in Brazil: alarming results in a community-based study. *Stroke* 2008;39:292-6.
17. Quinn TJ, Paolucci S, Sunnerhagen KS, et al. Evidence-based stroke r-e habilitation: an expanded guidance document from the European stroke organisation (ESO) guidelines for management of ischaemic stroke and transient ischaemic attack 2008. *J Rehabil Med* 2009;41:99-111.
18. Reeves MJ, Hogan JG, Rafferty AP. Knowledge of stroke risk factors and warning signs among Michigan adults. *Neurology* 2002;59:1547-52.
19. Sacco RL, Benjamin EJ, Broderick JP, et al. American Heart Association Prevention Conference. IV. Prevention and Rehabilitation of Stroke. Risk factors. *Stroke* 1997;28:1507-17.
20. Schneider AT, Pancioli AM, Khoury JC, et al. Trends in community knowledge of the warning signs and risk factors for stroke. *Jama* 2003;289:343-6.
21. Sug Yoon S, Heller RF, Levi C, et al. Knowledge of stroke risk factors, warning symptoms, and treatment among an Australian urban population. *Stroke* 2001;32:1926-30.
22. Williams LS, Bruno A, Rouch D, et al. Stroke patients' knowledge of stroke. Influence on time to presentation. *Stroke* 1997;28:912-5.
23. Zade R, Sahu P, Shende G, Phansopkar P, Dadgal R. Comprehensive physical therapy improves functional recovery in a rare case of stroke associated with asthma: A case report. *Medical Science*, 2020, 24(105), 2893-2899
24. Zangerle A, Kiechl S, Spiegel M, et al. Recanalization after thrombolysis in stroke patients: predictors and prognostic implications. *Neurology* 2007;68:39-44.