ORIGINAL ARTICLE

Stroke Community Awareness among Public: A Cross Sectional Study

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ABSTRAK

Tujuan penyelidikan ini dijalankan ialah untuk menilai tahap pengetahuan masyarakat terhadap faktor risiko, tanda-tanda, rawatan dan sumber maklumat berhubung strok dan serangan iskemia transien, dan seterusnya menjana profil risiko strok and melihat hubungkaitnya dengan pengetahuan mereka. Menggunakan borang kajiselidik yang telah divalidasi dan dicuba, 112 orang telah berjaya disoalselidik pada dua acara kemasyarakatan yang berbeza iaitu Hari Kesedaran Strok dan Hari Terbuka Kemasyarakatan. Orang ramai telah mengisi borang kajiselidik dan kemudian menjalani ujian saringan kesihatan. Seratus orang telah layak untuk kajian ini. Maklumat yang dikumpul telah dianalisa menggunakan SPSS versi 20. Secara keseluruhannya, pengetahuan awam didapati sangat lemah. Hanya 35% daripada peserta dikategorikan sebagai mempunyai pengetahuan yang memuaskan berkaitan tanda-tanda strok (p=0.94) dan 29% mempunyai pengetahuan memuaskan berkaitan faktor risiko (p=0.46). Setelah dibahagikan antara kumpulan risiko, didapati peratusan pengetahuan mengenai strok yang memuaskan adalah: pesakit berisiko tinggi (41%), berisiko sederhana (30%) dan berisiko rendah (26%). Tiada seorang peserta pun yang tahu berkenaan wujudnya rawatan bagi serangan strok akut atau kepentingan rehabilitasi sebagai sebahagian daripada pengurusan strok. Kesedaran awam berhubung faktor risiko, tanda-tanda dan pengurusan strok adalah pada tahap yang membimbangkan.

Kata kunci: strok akut, serangan iskemia transien, kesedaran awam mengenai strok, tanda-tanda strok

ABSTRACT

This study assessed the level of public awareness pertaining to risk factors, symptoms, treatment and source of information in relation to stroke and transient

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ischaemic attack. Stroke risk profile of the respondents was correlated with their level of knowledge. Using a validated pre-tested questionnaire, 112 respondents were recruited during two separate community events. Respondents completed the questionnaire and underwent health screening. The data were analysed using SPSS version 20. Overall knowledge was poor. Only 35% of the respondents had satisfactory knowledge of the warning signs (p= 0.94) and 29% had satisfactory knowledge on the risk factors (p=0.46). When analysed according to risk groups, 26%, 30% and 41% of respondents had satisfactory awareness in the low, intermediate and high risk group, respectively. None of the respondents knew about the availability of treatment of acute stroke in the emergency department or the importance of rehabilitation as part of stroke management. Public awareness on stroke risk factors, symptoms and management is poor.

Keywords: acute stroke, transient ischaemic attack, community awareness, stroke awareness, risk factors, stroke warning signs

INTRODUCTION

It is estimated that about 40,000 people suffer from stroke annually in Malaysia (National Stroke Association Malaysia, 2012). It is the 3rd leading cause of death in the country, losing only to heart disease and cancer. Stroke is a preven disease. The majority of the established risk factors of stroke are preventable or modifiable either through lifestyle modification or medication. Poor knowledge of stroke risk factors and warning signs in the general population has been shown in previous studies. Unfortunately, it has been the poorest in the group with the highest risk of stroke, e.g., those age over 75 (Pancioli et al. 1998; Yoon & Byles 2002; Reeves et al. 2002; Schneider et al. 2003; Carroll et al. 2004; Reeves et al. 2008). When comparing between those who are aware that they have a risk for stroke and those who do not have risk factors, the knowledge of warning signs among them is more or less the same (Sug Yoon et al. 2001).

Pancioli et al. (1998) reported in their study that only 49% of the respondents named hypertension as a risk factor of stroke, followed by stress (23%), poor eating (20%) and smoking (19%). In term of warning signs, dizziness was identified by 24% of respondents, followed by numbness (19%), headache (16%) and weakness (15%). When specific warning signs based on definition by the National Institute of Neurological Disorders and Stroke were used, 57% of respondents listed at least one of them correctly, 28% listed at least two correctly and only 8% listed three correctly.

The risk profile of stroke differs between men and women. Men are more likely to have cardiac illness and smoking as their risk factors, whereas women are more likely to have hypertension and atrial fibrillation as part of their risk factors. Dearborn et al. in their study of predominantly white, higher income and well educated cohort of 805 women from the University

of Connecticut Cardiology Center, found that generally these women underestimated their risk of stroke, and the high risk group women did not perceive their risk as being higher that their peers (Dearborn et al. 2009).

Access to emergency services plays a crucial role in determining how fast a stroke sufferer can reach the hospital. Between 27-100% of respondents reported in several studies that they would call the emergency medical services if they developed symptoms of stroke (Sug Yoon et al. 2001; Reeves et al. 2002; Cheung et al. 1999). However, in a study among stroke sufferers, it was noted that only 18% had actually called the emergency medical services (Sug Yoon et al. 2001). A study performed among members of the public in major cities in Brazil reported that the knowledge of the emergency telephone number was alarmingly low (Pontes-Neto et al. 2008). It was reported that only 34.6% of the 814 respondents knew about the nationwide emergency number. In Malaysia no such studies have been performed. Another obstacle to early treatment is the emergency response time. In Malaysia the reported emergency response time is 21.1 minutes, compared to seven minutes in the United Kingdom and 11 minutes in New York (Shah et al. 2008). Another factor that may affect the time to treatment is the living condition. Few of the stroke sufferers at the time of onset of symptoms are alone at home, hindering them from seeking treatment immediately.

Public education campaigns has brought to significant improvement in awareness of stroke warning signs among the population (Schneider et al. 2003; Reeves et al. 2008; Fogle et al. 2008). However, this improvement was seen less effective in older people (Reeves et al. 2008; Silver et al. 2003). Silver et al. (2003) in their study looking at advertising strategies to increase public awareness on stroke found that the most effective media was television. People who were exposed to television campaigns were able to name more than two warning signs of stroke. It was also noted to be effective in increasing knowledge among men regardless of their high school education level. However, it was found not to be effective among the senior population, the group with highest risk of stroke. Stroke screening and education programmes are also important tools in increasing awareness. In a study done by Stern et al, the ability of participants to recognise stroke symptoms, namely weakness, numbness on one side, difficulty talking or understanding speech, and difficulty with vision, improved from 59% to 94% immediately following intervention but then declined to 77% when tested again three months later (Stern et al. 1999). Silver et al. (2003) similarly found that intermittent low level advertising is more effective than the intensive one off approach. This study aimed at addressing the issues of stroke awareness among the public and to ascertain our achievement in stroke prevention.

MATERIAL AND METHODS

GENERAL OBJECTIVE

To assess the public's knowledge of risk factors, symptoms, treatments and

source of information in relation to stroke and transient ischaemic attack.

SPECIFIC OBJECTIVE

1. To determine the level of knowledge on stroke or transient ischaemic attack (TIA) warning signs, symptoms, treatments and source of information among the community dwellers.
2. To characterise stroke risk profiles among the respondent and correlate them to their knowledge of stroke warning signs and risk factors.

STUDY POPULATION

All adults attending the two community-based programmes: Community Stroke Awareness Day and Community Open Day, gave their consent to be included for the study.

STUDY SITE

1. Community Stroke Awareness Day, Primary Health Clinic site.
2. Community Open Day, Taman Saujana Impian.

STUDY DURATION

November 2013- January 2014

INCLUSION CRITERIA

Individuals above 18 years of age

EXCLUSION CRITERIA

1. Individuals who were not willing to participate (not consented)
2. Individuals who were mentally challenged
3. Individuals who did not comprehend English or Bahasa Malaysia.

STUDY DESIGN

This was a cross sectional questionnaire based survey. The study questionnaire was designed by an expert panel consisting of Family Medicine Specialists, Emergency Medicine Specialist and a Clinical Epidemiologist based on comprehensive literature review, theoretical concepts and expert knowledge. A modified Delphi process was used to achieve a consensus about the relevance of each question that was included in the questionnaire. The questionnaire was pre-tested on 10 individuals for face validity: to test the flow and comprehensibility of the questions, and time required to complete it. Queries and feedback from respondents were incorporated into the revision of the questionnaire. The finalized questionnaire was then administered to the participants for data collection.

During the programmes, participants were approached during the registration and were invited to participate in the study. Those who agreed were given further information by investigators prior to signing the consent form. Each participant was then given the questionnaire the first two parts of which has to be filled up before presenting to the screening station.

At the screening station, the staff in charge completed the questionnaire by recording the relevant investigation results i.e. the blood pressure measurement, heart rate recording, physical measurement to determine BMI and blood sugar level in the form.

Completed questionnaires were then collected and respondents were given

a copy of the screening information that contained their investigation results and their stroke risk with explanation of the information by the staff. Those who were at high risk of stroke were referred for further investigation and follow up at the Primary Health Clinic Centre.

STUDY TOOL

There were three parts to the questionnaire. The first part of the questionnaire gathered demographic information and personal medical history.

The second part of the questionnaire assessed knowledge of stroke warning signs or symptoms, risk factors for stroke, emergency telephone number in Malaysia, treatment for stroke and source of information.

The third part of the questionnaire assessed the respondents risk for stroke or TIA through health screening using the National Stroke Association checklist (Figure 1) and relevant investigations (blood pressure measurement, heart rate recording, physical measurements to determine BMI and blood glucose level) by the staff nurse. Each factor carried one point within a particular category (high risk, caution or low risk), depending on the level measured or presence/absence of the factor. The cumulative score of each category determined whether the participant had high or low risk for stroke (Figure2).

ETHICS APPROVAL

Ethics approval was obtained from the Universiti Kebangsaan Malaysia Medical Centre (UKMMC) Research Ethics Committee.

STATISTICAL ANALYSIS

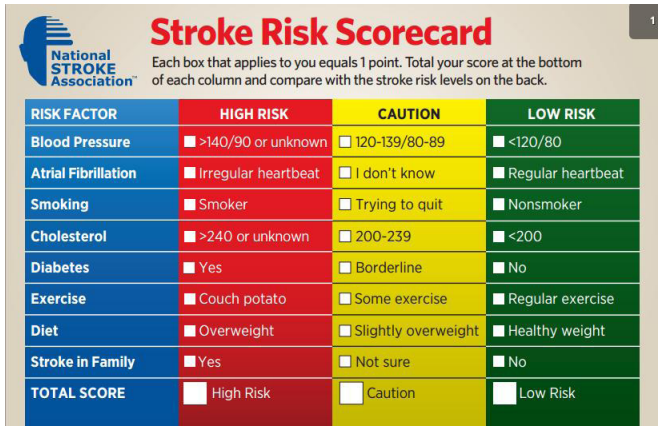
All data were entered into SPSS version 20 for analysis. Descriptive analysis was done on the demographic data and presented as mean with standard deviation or median with inter quartile range depending on its normality distribution. The categorical data were expressed as frequency and percentages. Score for knowledge was presented as mean (standard deviation) or median (inter quartile range) and the cut off score was determined based on the upper 25th centile. Categorisation of the Stroke Risk Score was presented in frequency and percentages based on the category as provided by the American Stroke Association (National Stroke Association, 2014). The Chi Square test was used to assess the association between knowledge of stroke symptoms and risk factors and the patient's own risk of stroke based on the Stroke Risk Card.

RESULTS

A total of 112 questionnaires were distributed during the two day events. Out of this 12 were excluded – 10 were incomplete while the other two were excluded because the respondents were below 18 years of age.

DEMOGRAPHICS

All of the 100 respondents were Malaysians. The age of the respondents ranged from 20-82 years, with a mean age of 50.88 years. Forty per cent of the respondents were men with majority being Malay (93%), followed by Chinese (3%), Indian (2%) and other races (2%).



National STROKE Association

Stroke Risk Scorecard

Each box that applies to you equals 1 point. Total your score at the bottom of each column and compare with the stroke risk levels on the back.

RISK FACTOR	HIGH RISK	CAUTION	LOW RISK
Blood Pressure	☐ >140/90 or unknown	☐ 120-139/80-89	☐ <120/80
Atrial Fibrillation	☐ Irregular heartbeat	☐ I don't know	☐ Regular heartbeat
Smoking	☐ Smoker	☐ Trying to quit	☐ Nonsmoker
Cholesterol	☐ >240 or unknown	☐ 200-239	☐ <200
Diabetes	☐ Yes	☐ Borderline	☐ No
Exercise	☐ Couch potato	☐ Some exercise	☐ Regular exercise
Diet	☐ Overweight	☐ Slightly overweight	☐ Healthy weight
Stroke in Family	☐ Yes	☐ Not sure	☐ No
TOTAL SCORE	☐ High Risk	☐ Caution	☐ Low Risk

Figure 1: National Stroke Association Stroke Risk Scorecard

National STROKE Association

Risk Scorecard Results

High Risk ≥3: Ask about stroke prevention right away.

Caution 4-6: A good start. Work on reducing risk.

Low Risk 6-8: You're doing very well at controlling stroke risk!

Ask your healthcare professional how to reduce your risk of stroke.

To reduce your risk:

1. Know your blood pressure.
2. Find out whether you have atrial fibrillation.
3. If you smoke, stop.
4. Find out if you have high cholesterol.
5. If diabetic, follow recommendations to control your diabetes.
6. Include exercise in your daily routine.
7. Enjoy a lower-sodium (salt), lower-fat diet.

Act FAST and CALL 9-1-1 IMMEDIATELY at any sign of a stroke:

F **FACE:** Ask the person to smile. Does one side of the face droop?

A **ARMS:** Ask the person to raise both arms. Does one arm drift downward?

S **SPEECH:** Ask the person to repeat a simple phrase. Is their speech slurred or strange?

T **TIME:** If you observe any of these signs, **call 9-1-1 immediately**.

1-800-STROKES (787-6537) • www.stroke.org

Figure 2: National Stroke Association Risk Scorecard Results

The majority of them had some form of formal education with 12% having basic education. Twenty two percent of respondents were unemployed and in terms of social support, 62% were married. Table 1 showed the baseline characteristic of the respondent.

MEDICAL HISTORY

Forty seven percent of respondents reported that they had a medical illness. The three commonest medical conditions reported were hypertension (33%), hypercholesterolaemia (24%) and diabetes mellitus (14%). No respondent suffered from any cardiac rhythm disturbances, such as atrial fibrillation. It is possible that some of them were not aware of their irregular heart rhythm or did not understand about the condition.

Overall, the mean systolic and diastolic BP measured were within the acceptable range with the mean SBP being of 128.5mmHg and median DBP 77mmHg. The median blood glucose level was 6.25mmol/L. Only one of the respondents fasted. The majority of the

Table 1: Baseline demographic data of the study population

Demographic Variables	
Age, years (%)	**Mean (SD)**
	50.88(14.55)
Age	**n (%)**
18-30	10(10)
31-50	35(35)
51-60	21(21)
61-70	29(29)
71-80	4(1)
>80	1(1)
Gender	
Male	40(40)
Female	60(60)
Race	
Malay	93(93)
Chinese	3(3)
Indian	2(2)
Others	2(2)
Education	
Primary school	12(12)
Secondary school	40(40)
Higher education	45(45)
Non-schooling	3(3)
Occupation	
Unemployed	22(22)
Employed	48(48)
Retired	30(30)
Marital status	
Married	62(62)
Single/Separated/Widow(er)	38(38)

respondents did not perform regular exercise. Only 25% reported that they exercised regularly. The median for BMI was 26. Most of the respondents did not smoke (91%) at the time of the study – 1 respondent had quit smoking. Table 2 detailed the clinical characteristics of the respondents.

Table 2: Clinical characteristic of respondents

Clinical Characteristics	
SBP	**(mmHg)**
Mean (SD)	128.5 (16.1)
DBP	**(mmHg)**
Median (IQR)	77 (71, 84.75)
DXT	**(mmol/L)**
Median (IQR)	6.25(5.2, 7.75)
BMI	
Median (IQR)	26 (23.2, 29)
Exercise	**n (%)**
Regular	25 (25)
Infrequent	67 (67)
No exercise	8 (8)
Smoker	**n (%)**
Yes	9 (9)
No	90 (90)
Quit	1 (1)

KNOWLEDGE OF STROKE

Warning Signs and Management

Quite a high number of respondents were able to identify at least one warning sign of stroke. The commonest identified warning sign was altered sensation of one limb (57%), followed by facial asymmetry (41%) and arm weakness (32%). More than a quarter of the respondents (27%) were unable to identify even a single warning sign. We included a few distracters in the list of warning signs. Most of the respondents were able to exclude them. Chest pain and dyspnoea were the top two that were commonly mistaken for stroke symptoms in 29% and 22% of respondents respectively. The commonest risk factors identified by respondents were hypertension (68%),

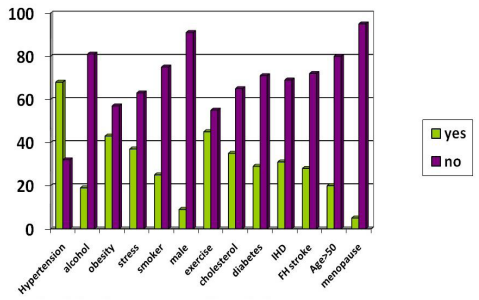


Figure 3: Knowledge of respodents of the risk factors of stroke

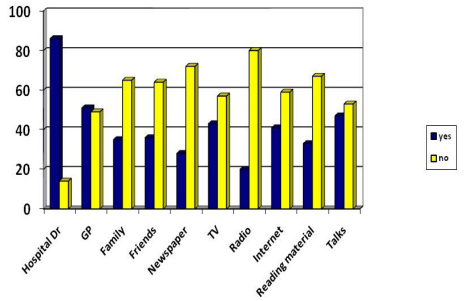


Figure 4: Source of information

followed by lack of exercise (45%) and alcohol use (43%). The non-modifiable variables like menopause (5%) and male gender (9%) were least likely to be identified as risk factors.

Figure 3 showed the distribution of the risk factors. Seventy eight percent of respondents were able to correctly identify the EMS number. Only 11% of the respondents said that they are aware of the emergency treatment of stroke but when asked to elaborate, no one was able to do so. More than half (58%) thought rehabilitation was an important part of stroke management. When asked whether stroke sufferers can have full recovery, 53% said 'yes' but 42% did not know. The majority of the respondents reported that their source of information was from doctors – hospital based and GP. Among the mass media options, television was the most popular source with 43% reported it as their source of information. Figure 4 represented the distribution of the source of information used by the respondents.

STROKE AWARENESS

In assessing their awareness of the warning signs of stroke, we classified those who were only able to identify less than three signs as having unsatisfactory awareness and those who were able to identify at least three signs to have satisfactory awareness. Only 35% of respondents had satisfactory awareness of stroke. When we analysed according to the risk group, the percentage of respondents with satisfactory awareness in the low, caution and high risk group were 34%, 40% and 35% respectively.

Awareness about the risk factors contributing to stroke was also low. We classified those who were able to identify at least five modifiable risk factors as having satisfactory awareness. Those who identified less than five modifiable risk factors was classified as unsatisfactory awareness. A total of 29% of the respondents were deemed to have satisfactory awareness of the risk factors. Analysis within the risk groups showed a 26%, 30% and 41% satisfactory awareness in the low, caution and high risk groups, respectively. However, this was not statistically significant (p=0.46) (Table 3).

DISCUSSION

This study was carried out at two sites within the Cheras locality-UKMMC

Table 3: Respondents awareness based on stroke risk

Category	Low risk	Caution	High risk	Total	p value
Warning signs					
Satisfactory awareness	25	4	6	35	
Unsatisfactory awareness	48	6	11	65	0.94
Risk factors					
Satisfactory awareness	19	3	7	29	
Unsatisfactory awareness	54	7	10	71	0.46

Primary Health clinic site and Taman Saujana Impian, on two separate days. Stroke awareness among the respondents was noted to be low both in terms of risk factors and warning signs. This is true across the three risk groups. This finding is not surprising and consistent with other studies (Pancioli et al. 1998; Yoon & Byles 2002; Reeves et al. 2002; Schneider et al. 2003; Carroll et al. 2004; Reeves et al. 2008). In the study by Pancioli et al. (1998) hypertension was commonly identified as a risk factor for stroke followed by stress and poor eating. However, in this study commonly identified risk factors were hypertension, followed by hypercholesterolaemia and diabetes mellitus. This is rather encouraging in a sense that this study population may have some insight into these chronic illnesses and their complications. The most commonly identified warning signs or early symptoms of stroke were altered sensation of limb, facial asymmetry and limb weakness. It is worrying to note that stroke awareness is low and more worrying that more than a quarter of the respondents were unable to identify a single risk factor and warning sign from the given list.

The respondents' knowledge on the EMS was encouraging as the majority of them knew the access number. This is in contrast to the study done in Brazil (Pontes-Neto et al. 2008) where such important knowledge was lacking. We should continue to educate the public that early access to EMS is crucial. However, when it came to treatment of stroke, the feedback was somewhat mixed. We concluded that all of our respondents were unaware of the emergency treatment of stroke and its availability. Furthermore, only about half of the respondents were aware that stroke sufferers could make full recovery, while the others were not sure. Similarly, about half felt rehabilitation was a key factor for recovery. All these factors can certainly hamper any effort directed at improving outcome of patients with stroke. These findings highlight the fact that the problem is not just lack of information, but also misperception. This lack of knowledge and misconception need to be addressed and rectified if we want to improve our stroke outcome.

Most of the respondents reported that their main source of information was medical professionals-form direct contact as well as health talks. This highlights the important role we, the healthcare providers, have on educating the public. Sadly, with the

increase in patient numbers, healthcare providers are spending less time with, and explaining less to the patients. Among the media sources, television was the most common source used by respondents. This is consistent with the study done by Silver et al. (2003).

There are a few limitation of this study. Firstly, the sample size of the study was small to be able to deduce any statistically significant findings. We should allocate more time and choose more sites that have a better mix of respondent ethnicity to be able to obtain a larger sample size representative of the general population.

Secondly, as we could not conduct bedside tests for blood cholesterol level, we made assumption that those who reported that they had hypercholesterolaemia, would have high blood cholesterol levels. Bedside electrocardiography (ECG) was not available and feasible at a medical screening station; hence arrthymias such as paroxysmal atrial fibrillation can be missed.

CONCLUSION

In conclusion, stroke awareness among our study population was alarmingly low. A more proactive approach to educating the public is needed in order to improve the outcome of stroke sufferers. Health campaigns regarding stroke risk factors, early signs/symptoms and management (emergency and long term) need to be run more regularly targeting the public generally, and moderate and high risk groups specifically. The public need to know about the availability of emergency treatment of stroke that leads to better outcome for stroke sufferers. Healthcare providers need to realise the important role they have in educating their patients as well as the public. In order to do so, they themselves have to be updated on the issue at hand. Television advertisements are good and effective means of education.

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