Variations in Knowledge and Awareness of Stroke Signs and Symptoms Amongst the High Risk Adult Population of Lahore

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Abstract

Objective: The objective of this study is to assess the knowledge of signs, symptoms and response to stroke in the high risk adult population of Lahore. We aim to analyze any possible associations to help conduct successful stroke awareness campaigns.

Method: Cross sectional study was conducted on the high risk adult population for stroke at Combined Military Hospital Lahore. Adequate knowledge of stroke was determined if five correct signs and symptoms were identified from a twenty-two component list. Descriptive analysis of participants' demographics variables, of stroke/signs and response to stroke was reported. The Pearson Chi-squared correlation coefficient was used to determine the correlation between adequate knowledge of stroke signs and symptoms with possible associative factors. Data was analyzed using IBM SPSS Software version 24.

Results: A total of 398 participants were included. Adequate knowledge of stroke was expressed by 287 (75.5%) respondents. Most common sign identified was sudden weakness in one half of the body by 316 (79.4%) patients. Majority expressed adequate stroke response of calling 1122 70 (17.6%) and going to hospital immediately 228 (57.3%). Statistically significant association of gender, education level, social class and appropriate response to stroke with adequate knowledge of stroke signs and symptoms was revealed ($p<0.05$).

Conclusions: Knowledge of stroke signs and symptoms in the high risk population of Lahore is sufficient. This outcome is a result of the high education level and social class in our study population.

Keywords: adult, association, education of patients, high risk, knowledge, stroke, signs and symptoms.

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Introduction

Stroke is defined as a sudden onset of focal neurological deficit due to underlying compromise of cerebral perfusion.[1] It is identified worldwide as a major cause of death and long term morbidity.[2] In 2018, a study conducted in Pakistan on the epidemiology of stroke reported a stroke prevalence of 4.8%, revealing pregnancy and prolonged contraceptive use as the most rampant risk factor among females.[3] Other impor-tant and preventable risk factors included: overweight patients with concomitant diabetes mellitus and hypertension (49%), smokers (41.70%), patients with ischemic heart disease (34.50%), etc. However, despite the rampant prevalence of stroke in the country, there is no research available that correctly identifies whether or not the Pakistani population is well equipped with the know-ledge to identify stroke danger signs.

In a country where the estimated prevalence of diabetes mellitus is 19.9% amongst ages 20-79, and that of hypertension is reported to be 46.2%, there is an imperative need for stroke education due to the large number of high risk individuals. Timely reporting to healthcare facilities is the most important prognostic factor in the

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management of stroke. According to the American Heart Association/American Stroke Association guidelines, an intravenous infusion of tissue plasminogen activator (tPA) is the recommended treatment option for patients who present within 3 hours of symptom onset.[5] The rationale behind the use of intravenous thrombolytic in stroke management is derived from the findings of the National Institute of Neurological Disorders and Stroke (NINDS) tPA trial. Patients who had received tPA had a 30% greater chance of having minimal disability or no disability at all after 3 months.[6]

In Pakistan, TPA had previously not been approved by the Drug Authority of Pakistan. Consequently, the drug was only available privately at an exuberant price, rendering it all but impossible for the common man to purchase. However, in October 2020, Alteplase was registered under section 7 of the Drugs Act 1976 making it economically more accessible.

The purpose of our study was twofold: to assess the awareness of stroke signs and symptoms among the high risk adult population of Lahore, and educate them regarding the danger signs. We wish to utilize this data to hold public education campaigns that would assist the common population in effectively recognizing stroke signs and symptoms. A multidimensional approach involving early intervention via early recognition and early reporting is not only cost effective, but also an essential to combat this stroke epidemic. This leads to timely medical admissions and effective thrombolysis alleviating the major consequences of stroke.

Material and Method

This cross sectional study was conducted at CMH Lahore and Institute of Dentistry, Pakistan through April 2021 till October 2021. After approval from the institutional 'Research Ethical Review Committee' a sample size of 349 was calculated.

The questionnaire was pilot tested on 30 volunteers who were not part of the final study sample. No changes were required in the structure of the questionnaire. Informed consent was taken and using non probability conve-nience sampling a total of 398 participants were inter-viewed in a semi structured approach allotting 20-30 minutes on each. Patient confidentiality was maintained via the informed consent section of the questionnaire and a sequential code was used during data entry, analysis and interpretation. Inclusion criteria for both male and females comprised of adults aged 18 years and older who had any of the following stroke comorbidities: overweight (BMI greater than or equal to 25 kg/m^2), smokers, ischemic heart disease, hypertension, dysrhythmias, diabetes mellitus, valvular/rheumatic heart disease, pregnant females and individuals using oral contraceptive pills.

We excluded from our study individuals with prior stroke history, barriers in verbal communication and healthcare professionals. The questionnaire consisted of 3 sections. Section 1 was allotted to information regarding demographic details. Section 2 was a table containing stroke and non-stroke signs and symptoms. The participants selected "yes" or "no" whether to their knowledge the listed variable pertained to stroke. Section 3 gauged participant response to stroke symptoms from a list of available options.

Section 2 of the study questionnaire was taken from a previous study 'Stroke Recognition Questionnaire" and following permission from corresponding author it was modified to fit our study requirements. Cronbach's alpha for the modified scale was 0.935 with fair internal consistency. Statistical analysis of the study was performed using version 24 of SPSS (Statistical Package for the Social Sciences) for Windows. In all the cases, $P<0.05$ was established as statistically significant. Shapiro-Wilk's test was used to assess the normality of age for both male and female participants. Non-normally distributed quantitative variables were reported as medians and interquartile ranges (IQR: Q3-Q1). A descriptive analysis of the variables of stroke that were assessed in the study was undertaken. Independent sample t test was undertaken to assess for any significant difference in ages of male and females. To assess whether or not participants reported an appropriate response to stroke, one point was given to each correctly identified stroke sign and symptom from the list below and expressed as a cumulative frequency:

- Diplopia, confusion, sudden weakness in one limb, sudden weakness in both legs and arms, numbness of face, difficulty in walking, sudden severe headache, slurred speech, pain in one arm, trouble controlling body movements, sudden unexplained dizziness

We deemed participants to have 'Appropriate Stroke Knowledge' if their score was greater than 5 (the cutoff point used in a previous research.[9] Indi-viduals having an appropriate knowledge of stroke underwent

Pearson's rank correlation analysis to assess the association with gender, education, previous stroke occurrence in a relative, social class, appropriate response to stroke (i.e. call 1122, go to hospital immediately).

Results

Of the total 398 participants, there were 218 (54.8%) females and 180 (45.2%) males. The overall median (IQR) age of the participants was 54 (21). The independent sample t test revealed a significant difference for age p=0.000. Of the total sample, 170 (42.7%) individuals reported 'Yes' and 228 (57.3%) individuals reported 'No' to "Has anyone closely known to you suffered from a stroke?". Further demographic details are presented in Table 1. Table 2 reports descriptive frequencies of stroke signs and symptoms and response to stroke reported by the participants of the study. After calcula-ting the cumulative scoring of appropriately identified stroke signs and symptoms it was revealed that adequate knowledge was expressed by 287 (75.5%) respondents. The Pearson Chi-squared correlation coefficient was used to determine the correlation between adequate knowledge of stroke signs and symptoms with associative factors. As shown in Table 3, a statistically significant association of gender, education level, social class and appropriate response to stroke with adequate knowledge of stroke signs and symptoms exists.

Table 1: *Socio-demographic and clinical characteristics of participants*

Socio-demographic	n (%)
Education level: Uneducated	94 (23.6)
Education level: Primary School	81 (20.4)
Education level: High School	102 (25.6)
Education level: University	81 (20.4)
Education level: Postgraduate	40 (10.1)
Urban Residence	309 (77.6)
Rural Residence	89 (22.4)
Upper Class	26 (6.5)
Upper Middle Class	73 (18.3)
Middle Class	151 (37.9)
Lower Middle Class	104 (26.1)
Lower Class	44 (11.1)

*Obesity is defined as a BMI greater than 25kg/m^2.
n= number of individuals

Table 2: *Descriptive frequencies of Stroke Signs and Symptoms and response to Stroke.*

Stroke Signs and Symptoms	Yes n (%)	Insufficient Knowledge n (%)	No n (%)
Diarrhea	19 (4.8)	35 (8.8)	344 (86.4)
Difficulty Breathing	98 (24.6)	36 (9)	264 (66.3)
Confusion	148 (37.20)	47 (11.8)	203 (51.0)
Chest Pain	77 (19.3)	35 (8.8)	286 (71.9)
Diplopia	104 (26.1)	55 (13.8)	239 (60.1)
Sudden Weakness in One limb	282 (70.9)	44 (11.1)	72 (18.1)
Sudden weakness in left or right side of the body	316 (79.4)	35 (8.8)	47 (11.8)
Sudden weakness in both legs or arms	218 (54.8)	54 (13.6)	126 (31.7)
Swollen Ankles	62 (15.6)	35 (8.8)	301 (75.6)
Numbness on One side of the face	192 (48.2)	61 (15.3)	145 (36.4)
Heartburn	48 (12.1)	35 (8.8)	315 (79.1)
Dizziness or Loss of Balance	176 (44.2)	65 (16.3)	157 (39.4)
Difficulty in Walking	235 (59)	36 (9)	127 (31.9)
Sudden Severe Headache	154 (38.7)	51 (12.8)	193 (48.5)
Fever	58 (14.6)	35 (8.8)	305 (76.6)
Slurred Garbled Speech	237 (59.5)	42 (10.6)	119 (29.9)
Cough	43 (10.8)	37 (9.3)	318 (79.9)
Sudden Pain in One arm	149 (37.4)	39 (9.8)	210 (52.8)
Leg Cramps	109 (27.4)	37 (9.3)	252 (63.3)
Sudden Unexplained Dizziness	149 (37.4)	68 (17.1)	181 (45.5)
Chronic Fatigue	123 (30.9)	37 (9.3)	238 (59.8)
Trouble Controlling Body Movements	150 (37.7)	70 (17.6)	178 (44.7)
Response to Stroke Signs and Symptoms			n (%)
Tell close family member			115 (28.9)
Go to Hospital Immediately			228 (57.3)
Call 1122			70 (17.6)
Wait For a Few Hours			62 (15.6)
Schedule a Doctor's Appointment			41 (10.3)
Alternate Medicine			19 (4.8)
Do Nothing			17 (4.3)

Table 3: *: Pearson Chi-Squared Test: Correlation of adequate stroke knowledge with associated factors*

	Gender	Education Level	Previous Stroke Occurrence in a relative	Social Class	Appropriate response to stroke-Call 1122	Appropriate response to stroke – Go to Hospital immediately
Adequate Stroke Knowledge						
Value	4.034	13.201	1.862	13.071	26.655	11.661
Sig.	**0.045***	**0.010***	0.172	**0.011***	**0.000***	**0.003***

*** p-value <0.05 is considered statistically significant**

Discussion

Identifying patients who are more prone to cerebrovascular accidents and acknowledging the need to raise adequate awareness amongst them is a key step towards alleviating burden on healthcare facilities. The general impression is that people lack adequate knowledge regarding stroke signs and symptoms. The previous studies conducted in west support this notion.[10,11,12] Surprisingly, in our study population overwhelming majority possessed ample knowledge in this respect. These results are in stark contrast to previous studies. Multiple reasons can explain the conclusion of these results. Foremost being over half (56%) of the respondents in our study having an education level of high school or above and 62.8% belonged to the middle class or higher. Therefore, the number is representative of the educated class as opposed to Pakistani population as a whole. This hypothesis is further attested by the fact that there was a significant correlation with education and social class of adequate stroke knowledge (table3).

The commonly recognized, and correctly so, symptom of stroke was sudden weakness in one half of the body (79.4% of the respondents). This is one of the most poignant manifestations of stroke and also the most widely identified symptom in previous research data.[13] In contrast, the incorrect symptom that was most confusing for people was chronic fatigue. Including fatigue was a tricky question, because fatigue is a common post stroke symptom but does not occur at the time of stroke.[14] Nevertheless, the correlation is not completely irrelevant. It is equally important for healthcare professionals to guide patients regarding incorrect symptoms of stroke (e.g. diarrhea) to avoid unnecessary panic and overburdening of the emergency department. As to our knowledge, no previous studies conducted on stroke awareness focus on recognizing that patients also have incorrect information regarding the subject that needs to be addressed.

Our study also revealed over half of the respondents selected the correct responses to stroke, which were immediately go to the hospital or calling rescue 1122. The association between adequate stroke knowledge and appropriate response is understandable as someone who is familiar with the presentation of stroke would most likely recognize its emergent nature as well. However, it is disconcerting that a number of people with adequate stroke knowledge chose the wrong option, such as waiting for a few hours or trying alternate methods. This may be due to the hesitance amongst the population due to factors such as unexpected complications or unexpected deaths.[15] Furthermore, private medical hospitals charge an exuberant amount of fee, which only the affluent can afford. In contrast, government hospitals are free, but have long waiting lines and an overall lower quality of services.[16] Due to these reasons, even the people who chose 'tell a close family member' as their primary response may be at risk as family member may harbor these doubts and hinder patients from seeking timely treatment. Keeping these obstacles in mind, it is incumbent upon doctors in Pakistan whilst counselling the patients to stress upon the importance of timely intervention, especially now that tPA is available at government institutes. Although the cost is still high, spending money on prevention and early intervention is still better than spending it on rehabilitation.[17] Interestingly, there was no correlation between respondents who had adequate knowledge of stroke and had a relative or friend who suffered from stroke, despite the fact such respondents made up over half of the sample size. This lack of association also prevailed in previous researches, which found that majority of stroke patients and their caregivers had inadequate knowledge regarding strokes.[18] This could be because they were too panic stricken to notice the

individual symptoms aside from the one or two glaringly obvious ones. However this is alarming, as it highlights the need for educational campaigns to increase awareness of stroke. Personal experience is not enough to understand the correct course of action that must be taken should the patient experience any stroke symptoms.

One of the major reasons behind us undertaking this endeavor was to educate the high risk population about signs and symptoms of stroke, along with counselling them regarding the appropriate response. All our respondents belonged to a high risk category of stroke, with a majority of hypertensive and diabetic patients. According to previous research studies, educational campaigns are one of the most effective methods of spreading aware-ness regarding stroke, alongside television advertise-ments and stroke screening.[19] Our educational campaigns should aim to not only educate the masses regarding the correct symptoms of stroke, but also clarify which symptoms are not lethal or not indicative of an emer-gency situation. Additionally, the general population needs to be encouraged to report to the doctor imme-diately should they experience any stroke symptom, to maximize the benefit of tPA and limit morbidity.

A limitation of our study is being a single center study which may not provide full representation of the population. Furthermore, majority of our patients were educated thus the figures cannot be used to generalize the response of the overall population of the country.

Conclusion

To the best of our knowledge, this was the first report of an initiative taken to create awareness regarding one of the most serious complications associated with diabetes and hypertension in the Pakistani population. The mentioned diseases are highly prevalent in our demographic population and are responsible for healthcare financial burdens due to high mortality and morbidity. The results of our study revealed the need to educate the common population regarding signs and symptoms that were not characteristic of stroke in order to avoid panic and burden at healthcare facilities.

Conflict of Interest *None*

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RK, RT, MB, AA: Conceptualization of Project
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RK, RT, MB: Literature Search
RT: Statistical Analysis
RK, RT, MB, AA: Drafting, Revision
RK, RT, MB, AA: Writing of Manuscript