



Research Article

AWARENESS OF UNIVERSITY STUDENTS TOWARDS STROKES: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Mortality due to stroke is rising among Bangladeshi population and needs focused attention for prevention and early management of stroke. Baseline stroke knowledge in a targeted population is indispensable to promote the effective stroke education. We report the baseline knowledge, attitude, and practice (KAP) of university students with respect to stroke from Bangladesh. **Materials and Methods:** A self-structured questionnaire survey regarding awareness about stroke was conducted among university students of Dhaka, Bangladesh. Descriptive statistics including Chi-square test was used, and selected variables were subjected to binary logistic regression. **Results:** Here response from 384 participants was collected. All of the students (100%) had heard or read about stroke, 4.9 % of the students had someone with stroke in their family, 40.4% of students had someone with stroke in their neighborhood, and 75.3% personally know someone with stroke. Stroke was identified as a brain disorder by 285 (74.2%) students. Most of the students 329 (85.7 %) would take a stroke patient to a hospital in an emergency, nearly one out of seven 55 (14.3 %) would sprinkle water over the face of a person having a stroke. Most students 335 (87.2 %) identified high blood pressure as a risk factor of a stroke followed by smoking 305 (79.4 %) and Alcohol consumption 255 (66.4 %). Several socio demographic factors found significantly associated with adequate knowledge on risk factors and warning signs. The binary logistic regression analysis showed that adequate knowledge on risk factor and warning symptoms are good predictors of response choosing to take a patient to a hospital. **Conclusion:** Though a few misconceptions persisted, awareness of university students of Dhaka city regarding stroke was satisfactory, and the students having adequate knowledge about the risk factors and warning symptoms were more likely to take stroke patients to a hospital.

Keywords: Awareness, attitude, knowledge, practice, stroke, students

Introduction

Stroke is one of the most frequently faced neurological emergencies in Tertiary Care Hospitals and is one of the leading causes of mortality in Bangladesh.¹ World Health Organization (WHO) defines stroke as rapidly established clinical signs of focal disturbance of cerebral function lasting for more than 24 hours or leading to death without any apparent cause other than vascular origin.² Despite recent advances in stroke therapy, the majority of stroke patients do not seek immediate medical attention.^{3,4} Stroke is the second leading cause of death worldwide and

the leading cause of long-term disability in high-income countries.⁵

According to the latest WHO data published in May 2014 Stroke Deaths in Bangladesh reached 48,951 or 6.72% of total deaths. The age adjusted Death Rate is 53.59 per 100,000 of population ranks Bangladesh #124 in the world.⁶ These numbers indicate that stroke will have a great economic burden in Bangladesh in the future.

Timely hospital presentation and improved control of risk factors for stroke have a great impact on stroke prevention and treatment.^{7,8} Unfortunately, many stroke patients arrive late at the hospital

due to lack of knowledge about stroke⁹ and its symptoms.¹⁰ Reduction of time from stroke onset to hospital presentation and risk reduction rely on the stroke knowledge of both patients and their family members including the general population.¹⁰⁻¹² Therefore, by initial recognition and reduction of these risk factors, it may likely to decrease the incidence of stroke and this is influenced by the public knowledge and awareness of stroke and its risk factors.

The signs and symptoms which may associate with strokes include weakness or numbness involving one or both sides of the body, headache, vertigo, vomiting, cranial nerve deficits and visual disturbances. Risk factors for stroke include non-modifiable factors like age, sex and modifiable factors like hypertension, heart disease, diabetes mellitus, and hyper lipidemia, smoking and excess alcohol intake.¹³ A more widespread education program is required to improve the knowledge, attitude, and practice (KAP) of students regarding stroke, which in turn might improve the control of risk factor(s), treatment and outcomes, by early hospital presentation in the near future. Moreover, stroke education for the youth would be a promising mean to spread stroke knowledge widely.¹⁴ The aim of the present study was to assess baseline knowledge, attitudes and practices towards stroke using a structured questionnaire.

MATERIALS AND METHODS

This cross-sectional study was conducted from 1 to 20 January, 2017 among university students of Dhaka city. The students who have mental illness, seriously ill were excluded from the study. The sample size was calculated by using Epi Info software package based on single population proportion formula (estimated prevalence rate of 50% knowledge, margin of error 5% and a 95% confidence interval). The calculated sample size was 384. Study participants were selected using purposive sampling technique.

Knowledge, attitude and practice of students towards strokes were considered as dependent variables and the independent variables were Age, gender, father's occupation, study area, religion, and familiarity with strokes. A self-structure questionnaire consisting of 23 questions was developed to collect information about the socio-demographic characteristics of respondents,

knowledge attitude and practice towards strokes. The questions were designed to cover KAP with respect to stroke and had "yes" or "no" responses. The English version of the questionnaire was used to collect the information from the respondents. The questionnaire was pretested on 5% of students other than study samples and necessary changes were implemented. Ethical clearance was taken from the authority of North South University, Dhaka. Then informed written consent was obtained from each study participants. Training was given for data collectors and the overall data collection activities were supervised. The participants were anonymously responded to the items on the questionnaire.

Data was checked for completeness and consistency. Coded data were entered and cleaned using Epi Data software and analyzed using SPSS version 23.0. Descriptive statistics were conducted using frequencies and proportions. Chi-square test was used to evaluate the association between demographic variables (age, gender, religion, and family history of stroke) and risk factor; demographic variables and warning sign response as choosing to take a stroke patient to a hospital and demographic variables; hospital taking response and risk factors; and hospital taking response and warning sign.

Knowledge of stroke risk factors and warning signs were taken as the indicator of stroke knowledge. All the demographic variables for association analysis were converted into dichotomous. The response of stroke knowledge was either "Yes" (identified ≥ 3 risk factors or ≥ 4 warning symptoms) for adequate knowledge or "No" (unable to identify at least 3 risk factors and 4 warning symptoms) for inadequate knowledge. The response of stroke first aid practice was either choosing to take a stroke patient to a hospital (Yes) or not choosing (No). In all analysis, $P < 0.05$ was taken as statistically significant value.

RESULTS

A total of 384 students completed the questionnaire. Average age of the respondents were 22.724, minimum age was 19 and maximum 27. The majority were male 53.1%. Average family income was 44057 among the respondents. Most students were Muslim (80.7%) followed by Hindus (16.1%). 4.9% students had someone with stroke

in their family, 40.4% of students had someone personally knew someone with stroke. with stroke in their neighborhood, and 75.3%

Table 1: Socio demographic profile of the participants

Characteristics (n=384)	Questions	n (%)
Age	19-24	310(80.7)
	25-27	74(19.3)
Gender	Male	204(53.1)
	Female	180(46.9)
Father's Occupation	Health care related	64(16.7)
	Others	320(83.3)
Study area	Business Studies	142(37)
	Humanities	105(27.3)
	Science	137(35.7)
Religion	Buddhist	5(1.3)
	Christian	7(1.8)
	Hindu	62(16.1)
	Muslim	310(80.7)
Familiarity with strokes	Family history of Stroke	19(4.9)
	Stroke in neighbor	155(40.4)
	Personally know someone with stroke	289(75.3)

All of the students (100%) had heard or read about stroke. Stroke was identified as a brain disorder by 285 (74.2%) students, and about 1 out of 7 (14.8 %) students believed that stroke is a disease of an elderly. A few misconceptions were prevalent among the students, including the beliefs that stroke is a contagious disease 8 (2.1 %) and the result of an ancestors' sin 9 (2.3%). Most of the students 300 (78.1 %) thought that the stroke could be treated and prevented 329 (85.7 %). However, 157 (40.9 %) students felt that ayurvedic treatment is effective. Stroke was felt as a

hindrance to a happy life by 168 (43.8 %) students. Almost, all of the students 375 (97.7 %) students believed that family care is helpful for early recovery. Most of the students 329 (85.4%) would take a stroke patient to a hospital in an emergency, nearly one out of seven 55 (14.6%) would sprinkle water over the face of a person having a stroke. Most students 335 (87.2 %) identified high blood pressure as a risk factor of a stroke followed by smoking 305 (79.4 %) and Alcohol consumption 255 (66.4 %).

Table 2: Responses of selected knowledge, attitude, and practice question

Characteristics (n=384)	Questions	Positive response, n (%)
Knowledge about stroke	Have you ever hear/ read about a disease called stroke?	384(100.0)
	Is stroke an old person disease?	57(14.8)
	Is stroke a disease of brain?	285(74.2)
	Is stroke a contagious disease?	8(2.1)
	Is stroke a hereditary disease?	49(12.8)
	Do you think that stroke is caused by an ancestor's sin	9(2.3)
	Do you think stroke can be prevented?	329(85.7)
	Do you think stroke can be treated?	300(78.1)
Attitudes towards	Do you think Ayurveda treatment is beneficial for stroke?	157(40.9)
	Do you think people had stroke cannot lead happy life?	168(43.8)

stroke	Do you think family care is helpful for early recovery of stroke patients after discharge?	375(97.7)
Stroke first aid practice	What will you do if you happened to witness a person with stroke?	
	Take him to the hospital	329(85.7)
	Sprinkle water over the face	55(14.3)
Stroke warning signs	Wait for spontaneous recovery	0(0)
	Which of the following are the warning signs of stroke?	
	Sudden onset of double vision	139(36.2)
	Sudden onset of loss of vision	168(43.8)
	Sudden onset of headache	224(58.3)
	Sudden onset of weakness	270(70.3)
	Sudden onset of fainting	262(68.2)
Strokes risk factors	Sudden onset of dizziness	291(75.8)
	Which of the following are the risk factors of stroke?	
	High blood pressure	335(87.2)
	Smoking	305(79.4)
	Diabetes	179(46.6)
	Alcohol	255(66.4)
	Obesity	229(59.6)

The Chi-square test showed no significant association of age and Religion with risk factor (s) identified, however significant association was identified ($P < 0.05$) for gender, father's occupation, study area and family history of stroke. On the other hand, no significant

association of gender, study group and stroke warning sign (s) was identified. However, there was a significant association of age, fathers occupation, religion, family history and warning sign (s) was identified ($P < 0.05$).

Table 3: Association of risk factors and warning signs of stroke with socio demographic factors

Characteristics	Adequate knowledge on Risk factor			Adequate knowledge on Warning sign		
	Adequate(n)	Inadequate(n)	P	Adequate(n)	Inadequate(n)	P
Age						
19-24	238	72	0.242	142	168	0.003
25-27	52	22		48	26	
Gender						
Male	145	59	0.031	105	99	0.406
Female	145	35		85	95	
Father's Occupation						
Health care	62	2	0.000	56	8	0.000
Others	228	92		134	186	
Religion						
Muslim	230	80	0.216	164	146	0.006
Others	60	14		26	48	
Group						
Science	127	10	0.000	74	63	0.186
Other	163	84		116	131	
Family history						
No	272	93	0.046	173	192	0.000
Yes	18	1		17	2	

Moreover, there was a significant association of response choosing to take a patient to a hospital (if they witness him/her with stroke) with study area ($P < 0.05$), moreover, highly significant

association was found for adequate knowledge on risk factors ($P < 0.001$) and warning symptoms ($P < 0.001$).

Table 4: Association of response of the students taking a person to hospital (if they witness him/her with stroke) with sociodemographic variables, adequate knowledge on risk factors and warning signs

Characteristics	Hospitalization		
	Yes (n)	No (n)	P
Age			
19-24	267	43	0.605
25-27	62	12	
Gender			
Male	177	27	0.517
Female	152	28	
Fathers occupation			
Health care	59	5	0.103
Others	270	50	
Religion			
Muslim	266	44	0.882
Others	63	11	
Study area			
Science	124	13	0.044
Others	205	42	
Family history			
No	310	55	0.068
Yes	19	0	
Risk factor			
No	55	39	0.000
Yes	274	16	
Warning sign			
No	151	43	0.000
Yes	178	12	

Table 5: Binary logistic regression of response of students taking a person to hospital (if they witness a person with stroke) with selected variables

Characteristics	Taking to hospital when person with stroke is witnessed		
	B (SE)	OR (95% CI)	P value
Adequate knowledge on risk factors	2.316 (.338)	10.140 (5.227 - 19.669)	0.000
Adequate knowledge on warning signs	1.058 (.371)	2.881 (1.392 - 5.964)	0.004

SE: Standard error, CI: Confidence interval, OR: Odds ratio.

The binary logistic regression analysis showed that adequate knowledge on risk factor ($P < 0.001$, odds ratio [OR] [confidence interval (CI)] = 10.140 [5.227 - 19.669]) and adequate knowledge on warning symptoms ($P \leq 0.004$, OR [CI] = 2.881 [1.392 - 5.964]) are good predictors of response choosing to take a patient to a hospital [Table 5].

DISCUSSION

This survey indicates adequate knowledge of university students on risk factors and warning sign, attitude, and practice with respect to stroke. All of the students had heard or read about stroke, and 75.3 % personally knew someone with stroke. Such high degrees of social contact in developing countries like Bangladesh may be related to warmer social and interfamily relationships in these regions.

There was no significant association of age and Religion with risk factor (s) identified, however significant association was identified for gender, father's occupation, study area and family history of stroke. Which means female students have better knowledge about risk factors for stroke. Students whose father is associated with any kinds of health related profession have better knowledge about both risk factors and warning signs. Science background students identified risk factor and warning sign more than others. Moreover, students whose had family history of strokes, has more adequate knowledge on risk factors and warning signs. On the other hand, no significant association of gender, study group and stroke warning sign (s) was identified.

Some studies have also revealed no significant difference in knowledge by gender.^{15, 16} We found significant association for risk factor identification. This may be due to difference in sample size or study methodology. This shows that any intervention about providing information about stroke might increase the knowledge, change the attitude, and practice regarding stroke. In contrast, a systematic review from a gender perspective concludes that women had better knowledge of stroke risk factor and its warning sign as compared to men,¹⁷ which supports our study finding. Moreover, women showed a better stroke knowledge and also a better gain of information after stroke-related educational campaign in Germany.¹⁸

Having a family history of stroke was significantly associated with having knowledge about stroke risk factors or warning signs. Similar result was observed in some other studies.^{19, 20} Most of the students did recognize stroke to be a disease of the brain. Similar results were obtained in a study among the Australian urban population, showed

73% respondent correctly identified brain as the target organ of stroke.²⁰ However, a few misconceptions about the cause of stroke were prevalent in our study. About 13% of the university students believed stroke to be a hereditary disease and even few believed stroke to be a contagious disease, about 1 out of 7 (14.8 %) students believed that stroke is a disease of an elderly, and the result of an ancestors' sin 9 (2.3%). These indicate that Bangladesh needs to promote educational program about stroke to improve the knowledge of its population and to come out of the prevailing misconception. Most students 335 (87.2 %) identified high blood pressure as a risk factor of a stroke followed by smoking 305 (79.4 %) and Alcohol consumption 255 (66.4 %).

Most of the students 300 (78.1 %) thought that the stroke could be treated and prevented 329 (85.7 %). However, 157 (40.9 %) students felt that ayurvedic treatment is effective. Much more study should be conducted to find out the actual reason behind this thinking. About 44% students believed stroke could be a hindrance to the happy life. It may be due to their lack of knowledge about thrombolytic treatment, interventional therapy, rehabilitation, and physiotherapy. Recent years have seen giant leaps in the science of rehabilitation in stroke.²¹

Almost, all of the students 375 (97.7 %) students believed that family care is helpful for early recovery. Most of the students 85.4 % would take a stroke patient to a hospital in an emergency, nearly one out of seven would sprinkle water over the face of a person having a stroke. In a survey done by Reeves *et al.*, in response to a situation while encountering stroke, 90% of the respondents suggested immediate medical treatment,²² which supports the result of our study.

Students with adequate knowledge about risk factors and warning signs tended to choose to take a stroke patient to a hospital. There was a highly significant association between response choosing to take to a hospital if they witness a person with stroke and risk factor identified as well as warning symptoms identified. The binary logistic regression analysis also showed that students with adequate knowledge on risk factor and warning signs are good predictors of response choosing to take a

patient to a hospital. This suggests that improving the knowledge about risk factors and warning signs of stroke improves the awareness to seek hospital emergency.

Our research has several limitations, first of all research based on a self-structured questionnaire. Furthermore, only ten universities were covered in this study and all located in the center of Dhaka city. The scenario of knowledge status could be different in universities located different division of Bangladesh. On the other hand quantitative nature of the study using structured questions with “yes” or “no” answers does not permit exploration of the reasons why the respondents hold particular views about stroke.

CONCLUSION:

In our study we tried to clarify awareness of university students towards stroke in Dhaka city.

Knowledge, attitude and practice appeared sound but still a few misconceptions were present. There is a need of widespread stroke related health camps across the universities of Bangladesh. Later students can play important role to change the level of the overall population’s knowledge, attitude and practices towards stroke.

CONFLICTS OF INTEREST

There are no conflicts of interest.

REFERENCES

1. Islam MN, Moniruzzaman M, Khalil MI, Basri R, Alam MK, Loo KW, Gan SH. Burden of stroke in Bangladesh. *International journal of stroke*. 2013 Apr;8(3):211-3.
2. Sacco RL, Kasner SE, Broderick JP, Caplan LR, Culebras A, Elkind MS, George MG, Hamdan AD, Higashida RT, Hoh BL, Janis LS. An updated definition of stroke for the 21st century. *Stroke*. 2013 Jul 1;44(7):2064-89.
3. BorhaniHaghighi A, Karimi AA, Amiri A, Ghaffarpasand F. Knowledge and attitude towards stroke risk factors, warning symptoms and treatment in an Iranian population. *Medical Principles and Practice*. 2010 Sep 28;19(6):468-72.
4. Williams LS, Bruno A, Rouch D, Marriott DJ. Stroke patients’ knowledge of stroke. *Stroke*. 1997 May 1;28(5):912-5.

5. Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJ. Global and regional burden of disease and risk factors, 2001: systematic analysis of population health data. *The Lancet*. 2006 Jun 2;367(9524):1747-57.
6. Stroke in Bangladesh [Internet]. *World Life Expectancy*. 2017 [cited 5 May 2017]. Available from: <http://www.worldlifeexpectancy.com/bangladesh-stroke>.
7. NINDS rt-PA Stroke Study Group. Tissue plasminogen activator for acute ischemic stroke. *N Engl J Med*. 1995;333:1581-7.
8. Wolf PA, D’Agostino RB, Kannel WB, Bonita R, Belanger AJ. Cigarette smoking as a risk factor for stroke: the Framingham Study. *Jama*. 1988 Feb 19;259(7):1025-9.
9. Ferro JM, Melo TP, Oliveira V, Crespo M, Canhão P, Pinto AN. An analysis of the admission delay of acute strokes. *Cerebrovascular Diseases*. 1994;4(2):72-5.
10. Del Zoppo GJ, Higashida RT, Furlan AJ, Pessin MS, Rowley HA, Gent M. PROACT: a phase II randomized trial of recombinant pro-urokinase by direct arterial delivery in acute middle cerebral artery stroke. *Stroke*. 1998 Jan 1;29(1):4-11.
11. Donnan GA, Davis SM, Chambers BR, Gates PC, Hankey GJ, McNeil JJ, Rosen D, Stewart-Wynne EG, Tuck RR. Streptokinase for acute ischemic stroke with relationship to time of administration. *Jama*. 1996 Sep 25;276(12):961-6.
12. Hacke W, Kaste M, Fieschi C, Toni D, Lesaffre E, Von Kummer R, Boysen G, Bluhmki E, Höxter G, Mahagne MH, Hennerici M. Intravenous thrombolysis with recombinant tissue plasminogen activator for acute hemispheric stroke: the European Cooperative Acute Stroke Study (ECASS). *Jama*. 1995 Oct 4;274(13):1017-25.
13. Paresh P, Sheetal S, Sagal H. Stroke: classification and diagnosis. *Clinical Pharmacist*. 2011 Jan; 3: 200.
14. Matsuzono K, Yokota C, Takekawa H, Okamura T, Miyamatsu N, Nakayama H, Nishimura K, Ohyama S, Ishigami A, Okumura K, Toyoda K. Effects of stroke education of junior high school students on stroke knowledge of their parents. *Stroke*. 2015 Feb 1;46(2):572-4.

15. Ennen KA, Zerwic J. Stroke knowledge: how is it impacted by rural location, age, and gender?. Online Journal of Rural Nursing and Health Care. 2012 Jan 18;10(1):9-21.
16. Góngora-Rivera F, Gutiérrez-Jiménez E, Zenteno MA, GEPEVC Investigators. Knowledge of ischemic stroke among a Mexico City population. Journal of Stroke and Cerebrovascular Diseases. 2009 Jun 30;18(3):208-13.
17. Stroebel N, Müller-Riemenschneider F, Nolte CH, Müller-Nordhorn J, Bockelbrink A, Willich SN. Knowledge of risk factors, and warning signs of stroke: a systematic review from a gender perspective. International Journal of Stroke. 2011 Feb 1;6(1):60-6.
18. Marx JJ, Klawitter B, Faldum A, Eicke BM, Haertle B, Dieterich M, et al. Gender-specific differences in stroke knowledge, stroke risk perception and the effects of an educational multimedia campaign. J Neurol 2010;257:367-74.
19. Yin A, Heng BH, Toh M, Wong LY, Venketasubramanian N, Cheah JTS. Impact of family history on the knowledge, attitude, belief and practice of stroke and its risk factors among Singaporeans. Combined Scientific Meeting 05, National healthcare group; Singapore, 4-6 November, 2005.
20. Sug Yoon S, Heller RF, Levi C, Wiggers J, Fitzgerald PE. Knowledge of stroke risk factors, warning symptoms, and treatment among an Australian urban population. Stroke 2001;32:1926-30.
21. Bernhardt J, Cramer SC. Giant steps for the science of stroke rehabilitation. International Journal of Stroke. 2013 Jan 1;8(1):1-2.
22. Reeves MJ, Hogan JG, Rafferty AP. Knowledge of stroke risk factors and warning signs among Michigan adults. Neurology. 2002 Nov 26;59(10):1547-52.