Short Report

Awareness of Stroke Warning Symptoms, Risk Factors, and Response to Acute Stroke in Biswanath District, Assam, India

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Abstract

Introduction: This study was undertaken with the following objectives: (a) to find out the awareness of warning symptoms and risk factors of stroke, (b) response to acute stroke, and (c) factors associated with awareness, risk factors, and response to acute stroke among community-dwelling adults in Biswanath district of Assam.
Methods: Using a cross-sectional design, a community-based study was done among 340 adults (mean age 38 years, men 55%) selected using multistage cluster sampling. Information on sociodemographic variables, stroke warning symptoms, risk factors, and response to acute stroke was collected using an adapted World Health Organization (WHO) STEPs stroke surveillance tool. Bivariate and logistic regression analysis were done to find out the factors associated with stroke warning symptoms, risk factors, and response to acute stroke. A "*P*" value < .05 was considered for statistical significance.
Results: Awareness of stroke was significantly higher among males ($P < .01$), better educated ($P < .01$), government employees ($P < .05$), high-income group ($P < .01$), and those who reported receiving information from a professional source ($P < .01$) compared to their counterparts. Knowledge of at least one stroke risk factor and providing at least one correct response to acute stroke was higher among males, better educated, government employees, higher income groups, and those who received information from professional source compared to their counterparts ($P < .05$).
Conclusion: Awareness of stroke warning symptoms, risk factors, and response to acute stroke needs to be improved focusing on women, low education groups, those working in the nongovernment sector, and low-income groups by health professionals.

Keywords

Assam, India, response to acute stroke, risk factors, stroke, warning symptoms

Introduction

Worldwide, every year 5.5 million deaths and 116.4 million disability adjusted life years (DALYs) are due to stroke, which is the second commonest cause of mortality after coronary artery disease.[1] In India, every year 6,94,144 people die due to stroke.[1] The annual incidence rates (AIS) of stroke in India is higher than that of the developed countries. The AIS in Kolkata, Mumbai, and Trivandrum were 123, 148, and 135 per 100,000 population, respectively, as compared to 107 in the United States and 99 in Australia.[2] While the mortality and morbidity due to stroke are declining in the Western population they are increasing in India due to the lack of awareness of warning symptoms and risk factors of stroke and delay in seeking treatment.[2] Awareness of one, two, and three warning symptoms of stroke among the urban population in India was 55%, 16.2%, and 6.2%, respectively.[2] Awareness of more than three-stroke warning symptoms in Germany was 28% much higher than that of urban India.[3] One study in

northwest India among stroke patients and their relatives reported that 29% of them did not know even a single warning symptom of stroke.[4]

Assam in northeast India had 2229 stroke DALYs per 100,000 population, which was almost double that of the 1234 stroke DALYs for India as a whole.[5] A hospital-based study on the epidemiology of stroke in Assam reported poor awareness of warning symptoms and risk factors of stroke.[6] However, data on awareness of warning symptoms, risk factors of stroke, and response to acute stroke among the

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general population are not available from Assam. Therefore, this study was undertaken with the following objectives: (a) to find out the awareness of warning symptoms and risk factors of stroke, (b) response to acute stroke, and (c) factors associated with awareness, risk factors, and response to acute stroke among community-dwelling adults in Biswanath district of Assam.

Methods

Two of the seven community development blocks of Biswanath district were selected randomly. From both of the selected blocks, a total of 20 villages out of 832 villages were randomly selected (10 villages/block). From each village, 17 adults were selected to complete the sample size of 340 estimated using the formula $n = z^2 \times p \times q/d^2$, where z is the critical ratio for 95% confidence level (1.96), and p the anticipated proportion of population aware of stroke symptoms as 29%,[4] q is $1 - p$ (0.71), d is the half-width of the confidence interval which was taken as 6%. As per the formula, the estimated sample size was 219. Since we used cluster sampling a design effect of 1.5 was used to estimate the final sample size, that is 329 which was rounded off to 340 to ensure selection of 17 participants from each of the 20 selected villages (20 × 17 = 340).

The list of the adults in each village was available in the voters' list; the last updated for 17th Lok Sabha elections conducted in 2019.

One household was randomly selected from the list of households in each village. One adult aged 18 years and above was selected from each household using KISH method, which is a procedure for objective respondent selection from a household.[7] The households were visited continuously until we completed 17 adults in that village. From 20 villages, we recruited 340 adults (20 × 17 = 340).

The WHO STEP wise approach to stroke surveillance tool was adapted and used. This questionnaire was administered in the participants' home by the first author (SK). The tool included information on socio-demographics, warning symptoms of stroke, the golden period of stroke, risk factors of stroke, and their response to acute stroke.

Data analysis was done using Statistical Package of Social Sciences version 20. Logistic regression analysis was conducted to find out the factors associated with their awareness of warning symptoms, knowledge of risk factors, and response to acute stroke. A P value of ≤.05 was considered for statistical significance.

The ethics approval for this study was obtained from the Institutional Human Ethics Committee of the Central University of Kerala (approval number: CUK/IHEC/2019/052). Informed written consent was obtained from all the participants before the survey.

Results

A total of 340 participants were approached for the study and all of them consented to participate in the study. The mean age of the participants was 38 years.

The study sample characteristics are given in Table 1. Awareness of warning symptoms, risk factors of stroke, and response to acute stroke are given in Table 2.

Table 1. Study Sample Characteristics (n = 340)

Variables	Categories	Frequency N (%)
Age	<38	178 (52.4)
	≥38	162 (47.6)
Gender	Male	187 (55.0)
	Female	153 (45.0)
Marital status	Married	271 (79.7)
	Others	069 (20.3)
Education	<5 years of schooling	104 (30.6)
	≥5 years of schooling	236 (69.4)
Occupation	Government employee	021 (06.2)
	Others[a]	319 (93.8)
Household expenses per month (INR)	<10 000	232 (68.2)
	≥10 000	108 (31.8)
Family history of stroke	Yes	219 (64.4)
	No	121 (35.6)

Abbreviation. INR, Indian rupees.

Note. [a]Others occupations reported were employees of the nongovernment sector (8.8%), self-employed (70.3%), and unemployed (14.7%).

Table 2. Awareness of Warning Symptoms, Risk Factors of Stroke, and Response to Acute Stroke Among the Participants (n = 340)

Variables	Frequency N (%)
Warning symptoms of stroke	
Face weakness	008 (02.4)
Speech impairment	007 (02.1)
Sudden trouble with walking, loss of balance, or dizziness	218 (64.1)
Headache with no known causes	107 (31.5)
Visual impairment	002 (00.6)
Risk factors of stroke	
Diabetes	013 (03.8)
High blood pressure	133 (39.1)
Smoking	009 (02.6)

(Table 2 Continued)

(Table 2 Continued)

Variables	Frequency N (%)
Heart disease	027 (07.9)
High cholesterol	002 (00.6)
Obesity	001 (00.3)
Alcohol use	001 (00.3)
Response to acute stroke	
Call 108 ambulance	181 (53.2)
Wait for symptoms to be cured by itself	001 (00.3)
Getting help from the local health care provider	105 (30.9)
Take the patient urgently to a well-equipped hospital	005 (01.5)
Call other family members	071 (20.9)

Note. Percentage does not add to 100 due to multiple responses.

A large majority of the sample (98.8%) were not aware of the golden period of stroke (within 4.5 hours of the onset of stroke) and the treatment available within the golden period. Only 122 (35.9%) of the respondents knew that the brain is the affected organ in stroke. Sixty-nine (21.1%) of the respondents received information from a professional source and the remaining from the nonprofessional source. In logistic regression analysis, awareness of stroke was significantly higher among males vs females ($P < .01$), those who had ≥5 years of schooling vs <5 years of schooling ($P < .01$), those who were working in government service vs others ($P < .05$), those who reported a monthly expense of Rs ≥10,000 vs Rs <10,000 ($P < .01$), those who reported receiving information from a professional source vs nonprofessional sources ($P < .01$) and those who had a family history of stroke ($P < .02$).

Knowledge of at least one risk factor for stroke was higher among males, better educated, those working in Government service and those who reported a monthly expense of Rs ≥10,000 compared to their counterparts ($P < .05$). Those who reported receiving information on stroke from a professional source were significantly more aware of at least one risk factor of stroke ($P < .01$).

Factors associated with response to acute stroke are given in Table 3. More than half of the participants (54.1%) reported at least one correct response to acute stroke.

Table 3. Factors Associated With Response to Acute Stroke: Results of Logistic Regression Analysis (n = 340)

Variables	At Least One Correct Response to Acute Stroke (%)	OR (95%, CI)
Gender		
Female	41.2%	Reference
Male	64.7%	2.62 (1.69-4.07)**

(Table 3 Continued)

(Table 3 Continued)

Variables	At Least One Correct Response to Acute Stroke (%)	OR (95%, CI)
Education		
<5 years of schooling	46.2%	Reference
≥5 years of schooling	57.6%	1.91 (1.11-3.28)*
Occupation		
Others	52.4%	Reference
Government employee	81.0%	3.87 (1.27-11.75)*
Household expenses per month		
<10,000	48.3%	Reference
≥10,000	66.7%	2.75 (1.66-4.55)**
Family history of stroke		
No	48.9%	Reference
Yes	63.6%	1.37 (0.84-2.22)
Source of knowledge about stroke		
Nonprofessional	49.2%	Reference
Professional	76.8%	3.42 (1.86-6.29)**

Note. *$P < .05$, **$P < .01$.

Discussion

Our study examined the awareness of warning symptoms, risk factors of stroke, and response to acute stroke in a community-based sample population of adults aged 18 years and above in Biswanath district of Assam.

A large majority of the population (98.8%) were not aware of the golden period of stroke. A study in Egypt found that 23.9% of study participants knew the golden period for stroke treatment.[8] Only 35.9% of the participants could correctly identify the brain as the affected organ in stroke which was approximately less than half (74.7%) compared to a report from Egypt[8] and similar to the findings of a study from northwest India (33%)[4] Close to half of the participants (45.9%) were unable to identify a single warning symptom of stroke which was much higher than the 11.4% reported in a study from Spain.[9] Awareness of warning symptoms and risk factors of stroke were significantly higher among the better educated and high-income group which is reflecting the reports from Western countries with high income and better-educated population, where the awareness of risk factors and warning symptoms are much better. This could be the major reason for the reduction in stroke mortality and morbidity in the developed countries compared to the developing countries.

Hypertension was identified as a risk factor for stroke by 39.1%. This is consistent with several other studies including one from north India[4] and Assam[6], although the awareness was much higher in the Western population.[3] In a previous hospital-based study from Assam, it was reported that close

to half (49.1%) of the participants had no idea about risk factors of stroke.[6] Participants who received information from a professional source were better aware of warning symptoms and risk factors. Several risk factors such as tobacco use, hypertension, diabetes, and coronary heart diseases are high in India. Even in an advanced state like Kerala, the control rates of hypertension (12.4%) and diabetes (15.3%) are low.[10] The awareness of warning symptoms and risk factors of stroke can now be effectively communicated through mobile phones by the health workers in India, which could reduce the stroke risk factors in the population.

More than half of our participants (53.2%) reported that they would call 108 Emergency Ambulance for stroke care. It is much lower than the 88% in France and 75% in the United States where the respondents reported calling the emergency service as an immediate response to acute stroke.[3] Those who reported a family history of stroke reported a better response to acute stroke compared to their counterparts. This could be due to their previous experience related to stroke management in the family. Stroke survivors and their family members will also be a useful resource in educating the public on a better response to acute stroke.

In conclusion, awareness of warning symptoms and risk factors of stroke in this population were low and the response to acute stroke was poor. Under the new national health program for prevention and control of cancer, cardiovascular diseases, diabetes and stroke, awareness of warning symptoms, risk factors, and better response to stroke can effectively be improved using different technologies particularly mobile phones which has a very high penetration even in rural areas of India including Assam. This is likely to reduce mortality and morbidity from a stroke in this population.

Declaration of Conflicting Interests

Funding

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