Awareness of stroke among elderly public in Eastern India

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Abstract

Background and Objective: Cerebrovascular accident is the major cause of mortality and morbidity throughout the world. Elderly populations are more vulnerable to stroke. This study aims to assess awareness level of stroke signs, symptoms, risk factors and response to anticipatory stroke symptoms among a non-stroke elderly population attending a tertiary care centre in Eastern India. *Methods:* Patients ≥ 65 years, attending geriatric and medical outpatient departments (OPD), who had a Mini Mental State Examination (MMSE) score ≥24, were included. The study subjects were asked to respond to a standardized pre-set questionnaire. *Results:* Out of a study population of 418, 57.2% were male and 42.8% were female. Among them 33.0% were unaware of any stroke symptoms and 49.8% were unaware of any stroke risk factors. On multiple regression analysis, higher income, Hindu religion and urban residence were associated with better knowledge of stroke symptoms; and male gender, higher education and higher income were associated with better knowledge of stroke risk factors. Close to two fifths of the respondents were reluctant to seek medical assistance in response to anticipatory stroke symptoms.
Conclusion: There was lack of awareness of symptoms and risk factors of stroke among the elderly population in Eastern India, particularly among those with lower income and education, non-Hindus, rural and female populations.

INTRODUCTION

Aging population is a common phenomenon world wide. Asia and India are no exception. Nearly 6.0% to 15.5% of the population in Asia, Europe, and North America were >65 years of age in year 2000. The projected increase of the geriatric population by 2030 is approximately 12% to 24.3%.[1] In India, the population >65 years of age was 45 million in 2000, 58 million in 2010 and will rise to 76 million in 2020.[2] Older people are at risk for multiple co-morbidities.[3] Stroke is the second leading cause of mortality and permanent disability worldwide.[4] Therefore, early recognition of stroke signs and symptoms, risk factors and early treatment can reduce the mortality and disability of stroke as well as reduce the financial burden of the community. The present study was designed to assess the knowledge of warning signs and symptoms of stroke, its risk factors and the probable response to anticipatory stroke symptoms among a elderly population

attending a hospital out-patient department (OPD) in Eastern India.

METHODS

The study was conducted between April, 2009 to March, 2010 with a questionnaire adopted from previous studies.[5,6] The study subjects were patients in the geriatric age group attending the Geriatric and Medical Outpatient Department of IPGME&R/SSKM Hospital, Kolkata, with some medical problems other than stroke. Patients ≥ 65 years of age, who were willing to participate in the study, were randomly selected and their ability to comprehend a previously set questionnaire (in the local language) was judged through a Mini Mental State examination (MMSE). Subjects scoring equal to or more than 24/30 were included in the study. We excluded subjects who has past history of stroke or had seen someone with a stroke to avoid re-call bias. Written consent was obtained. The demographic details and education

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level was obtained. The education level was classified as: Lower education - no schooling or non high school [< class - x standard]; Higher education - high school [> class - x standard] or college level. The average monthly income in Indian rupees was also obtained. The income was classified as: Higher income ≥ 5000 rupees/month; lower income ≤ 5000 rupees/month, adopted from a previous study.[7] The responses to questions were spontaneous and no query was made about the source of income. The study subjects were provided with a pre-set questionnaire related to their knowledge of stroke awareness level and what will be their likely response to anticipatory stroke symptoms. They had options for multiple responses from a check-list, and responses were spontaneous. No attempt was made to suggest any answer directly. However, clarification about a question was made if asked for.

Pre-set questions on stroke were as follows:

Whether the patients know the following stroke related/ stroke warning signs and symptoms? (Each point score 1; minimum score-0; maximum-8). 1. Slurred speech/ difficulty in understanding/reading; 2. Sudden onset headache; 3. Dizziness/ vertigo (rotational movement of self / environment)/ unsteadiness; 4. Numbness/ tingling sensations/ dead sensations- any part of body or one side of body; 5. Paralysis (complete) of any part of body or one side of body; 6. Weakness (partial) of any part or one side of body; 7. Chest pain / tightness; 8. Visual disturbances-blurring of vision/ double vision/ loss of vision in one or both eyes.

Whether the patients know the following stroke predisposing risk factors? (Each point score 1; minimum score-0; maximum-11). High blood pressure; 2. High cholesterol level; 3. Diabetes mellitus; 4. Stress; 5. Obesity; 6. Lack of exercise/ sedentary life style; 7. Alcohol; 8. Smoking; 9. Unhealthy diet; 10. Heart disease; and 11. Family history of stroke.

Level of awareness of stroke signs and symptoms was predefined by scoring their knowledge regarding the eight features of stroke. Not-aware: scoring 0/8; Aware: scoring 1-8 / 8 (Very well aware: 6-8/8, Well aware: 3-5/8, Just aware: 1-2/8).

Level of awareness of risk factors was predefined by scoring their knowledge regarding 11 risk factors of stroke. Not aware: scoring 0/11; Aware: scoring 1-11/11 (Very well aware: 8-11/11; Well aware: 4-7/11; Just aware: 1-3/11).

Simple statistical methods were used for data analysis. Exact values, percentages, and mean values were used for expression of data. Chi-square test and multiple regression analysis were used for assessment of statistical significance.

RESULTS

A total of 418 patients of more than 65 years of age were enrolled for the study. Among them, 239 (57.2%) were males and 179 (42.8%) were females. Mean age was 73.5 ± 8.5 years. Demographic details are shown in Table 1. The lower education group (294) comprised mostly females, non-Hindus, rural residence and they mainly of lower income. Nearly 15% approached declined to participate in the study. They had similar demographic characteristics with participants.

Out of the 418 participants, 280 (67.0%) were found to be aware of stroke signs and symptoms and the rest (138, 33.0%) were unaware (Table 2A). The overall prevalence of knowledge

Table 1: Demographic distribution of the study population (n=418)

Age (mean ± SD)	73.5 ± 8.5 years
Sex (male: female)	239 : 179
Religion, Hindu (Bengali & others) : Muslim	259 : 159
Education, Lower : Higher	294 : 124
Income, Lower : Higher	292 : 126
Residence, Urban : Rural	266 : 152

Lower income: <5000 rupees /month; Higher income: >5000 rupees/month
Lower education: non school or non high school (< class-x standard)
Higher education: High school (> class-x standard) or college level

Table 2A: Knowledge of stroke signs and symptoms of the study population

Signs and symptoms	N = 418
Paralysis (complete) of any part of body or one side of body,	224 (53.6%)
Visual disturbances: Blurring of vision, double vision, or loss of vision in one or both eyes.	147 (35.2%)
Slurred speech or difficulty in understanding or speaking	131 (31.3%)
Weakness (partial) of any part or one side of body	123 (29.4%)
Sudden onset headache or head pain	90 (21.5%)
Dizziness, vertigo or unsteadiness	71 (17.0%)
Numbness, tingling sensations, dead sensations at any part of body or one side of body	59 (14.1%)
Chest pain/chest tightness	26 (6.2%)
None recognized	138 (33.0%)

of risk factors of stroke showed equal distribution of awareness (50.2%) and unawareness (49.8%) (Table 3A), although level of awareness varied considerably among the different sub groups of the study population (Tables 2B, 3B).

Univariate analysis (Table 4A) of this study showed that 71 (39.7%) women were not aware of any stroke symptoms while it was 67 (28.0%) of the males. This high unawareness among females was statistically significant (P= 0.0165). Similarly, unawareness of stroke risk factors among females (59.8%) was also statistically significant (p<0.001) compared to the males (42.3%). This statistical significance of unawareness regarding stroke symptoms and risk factors was also found in the subgroups of lower education, lower socio-economic status and rural population. Nearly 56% to 62% of the study population was not aware of stroke risk factors and nearly 35% to 46% were unaware of stroke symptoms (p value ranging from 0.0449 to 0.0001). In the present study, awareness of stroke symptoms among Hindus

Table 2B: Level of awareness of stroke signs and symptoms (N=418)

	Level of awareness of stroke signs and symptoms	Very well aware 80 (19.1%)	Well aware 114 (27.3%)	Just aware 86 (20.6%)	Not aware 138 (33.0%)
Gender	Male (N=239)	51 (21.3%)	78 (32.6%)	43 (17.9%)	67 (28.0%)
	Female (N=179)	29 (16.2%)	36 (20.1%)	43 (24.0%)	71 (39.6%)
Residence	Urban (N=266)	63 (23.7%)	85 (31.9%)	50 (18.8%)	68 (25.6%)
	Rural (N=152)	17 (11.2%)	29 (19.1%)	36 (23.7%)	70 (46.1%)
Income	Higher (N=126)	38 (30.2%)	41 (32.5%)	9 (7.1%)	38 (30.2%)
	Lower (N=292)	42 (14.4%)	73 (25.0%)	77 (26.4%)	100 (34.2%)
Education	Higher (N=124)	46 (37.1%)	46 (37.1%)	6 (4.8%)	26 (20.9%)
	Lower (N=294)	34 (11.6%)	68 (23.1%)	80 (27.2%)	112 (38.1%)
Religion	Hindu (N=259)	65 (25.1%)	78 (30.1%)	51 (19.7%)	65 (25.1%)
	Muslim (N=159)	15 (9.4%)	36 (22.6%)	35 (22.0%)	73 (45.9%)

Table 3A: Knowledge of stroke risk factors of the study population

Risk Factors	N = 418
High blood pressure	210 (50.2%)
Diabetes mellitus	146 (34.9%)
Smoking,	143 (34.2%)
Obesity	141 (33.7%)
High cholesterol level	71 (16.9%)
Alcohol	65 (15.6%)
Stress	61 (14.6%)
Lack of exercise / sedentary life style	52 (12.4%)
Heart disease	37 (8.9%)
Family history of stroke	9 (2.2%)
Unhealthy diet	6 (1.4%)
Non recognized	208 (49.8%)

(74.1%) was significantly greater (p<0.001) than the other religious groups (54.1%). However, there was no significant difference (p=0.0736) was observed when in knowledge of risk factors for stroke between the two groups.

On multiple regression analysis (Tables 4B and 4C), higher income (p<0.001), Hindu religion (p=0.005) and urban residence (p=0.001) were significantly associated with better knowledge of stroke warning signs /symptoms and no association was found with gender and level of education. On the other hand, variables such as male gender (p<0.001), higher education (p<0.001) and higher income (p = 0.002) showed highly significant

Table 3B: Level of risk factor awareness of stroke (N=418)

	Level of awareness of stroke risk factors	Very well aware 52 (12.4%)	Well aware 86 (20.6%)	Just aware 72 (17.2%)	Not aware 208 (49.8%)
Gender	Male (N=239)	38 (15.9%)	59 (24.7%)	41 (17.2%)	101 (42.3%)
	Female (N=179)	14 (7.8%)	27 (15.1%)	31 (17.3%)	101 (42.3%)
Residence	Urban (N=266)	43 (16.2%)	63 (23.7%)	38 (14.3%)	122 (45.9%)
	Rural (N=152)	9 (5.9%)	23 (15.1%)	34 (22.4%)	86 (56.6%)
Income	Higher (N=126)	34 (26.9%)	45 (35.7%)	20 (15.9%)	27 (21.4%)
	Lower (N=292)	18 (6.2%)	41 (14.0%)	52 (17.8%)	181 (61.9%)
Education	Higher (N=124)	31 (25.0%)	47 (37.9%)	12 (9.7%)	34 (27.4%)
	Lower (N=294)	21 (7.1%)	39 (13.3%)	60 (20.4%)	174 (59.2%)
Religion	Hindu (N=259)	40 (15.4%)	60 (23.2%)	39 (15.1%)	120 (46.3%)
	Muslim (N=159)	12 (7.5%)	26 (16.4%)	33 (20.8%)	88 (55.3%)

Table 4A: Responses to stroke symptoms and risk factor awareness questions (N-418)

	Signs and symptoms			Risk Factors		
	Aware **280 (66.9%)**	**Not Aware** **138 (33.0%)**	**P value**	**Aware** **210 (50.23%)**	**Not Aware** **208 (49.8%)**	**P value**
Sex						
Men (N=239)	172 (71.9%)	67 (28.0%)	0.165	138 (57.7%)	101 (42.3%)	<0.001
Women (N=179)	108 (60.3%)	71 (39.7%)		72 (40.2%)	107 (59.8%)	
Education						
Lower (N=294)	182 (61.9%)	112 (38.1%)	0.001	120 (40.8%)	174 (59.2%)	<0.001
Higher (N=124)	98 (79.0%)	26 (20.9%)		90 (72.6%)	34 (27.4%)	
Income						
Lower (N=292)	192 (65.8%)	100 (34.2%)	0.482	111 (38.0%)	181 (61.9%)	<0.001
Higher (N=126)	88 (69.8%)	38 (30.2%)		99 (78.6%)	27 (21.4%)	
Religion						
Hindu (N=259)	194 (74.9%)	65 (25.1%)	<0.001	139 (53.7%)	120 (46.3%)	0.0736
Muslim (N=159)	86 (54.1%)	73 (45.9%)		71 (44.7%)	88 (55.3%)	
Residence						
Urban (N=266)	198 (74.4%)	68 (25.6%)	<0.001	144 (54.1%)	122 (45.9%)	0.0449
Rural (N=152)	82 (53.9%)	70 (46.1%)		66 (43.4%)	86 (56.6%)	

Table 4B: Result of multiple regression analysis in the signs / symptoms awareness group (post – hoc)

Independent variable	Beta value	SE	p-value
Sex	1.32	0.43	0.187
Educational status	-0.385	0.059	0.7
Income	5.46	0.057	<0.001
Religion	2.79	0.04	0.005
Residence	3.296	0.046	0.001

Table 4C: Result of multiple regression analysis in the stroke risk factor awareness group (post - hoc)

Independent variable	Beta value	SE	p-value
Sex	5.45	0.046	<0.001
Educational status	3.586	0.063	<0.001
Income	3.049	0.061	0.002
Religion	1.502	0.047	0.134
Residence	1.643	0.04	0.101

association with better knowledge of stroke risk factors. Religion and residence had no significant effect on knowledge of stroke risk factors.

When the recognition of individual stroke warning signs and symptoms was analyzed, it was found that symptoms such as paralysis of any part of the body or one side of the body as harbingers of stroke was the commonest recognized symptom and was found in 224 (53.6%) of the study population. The second commonest recognized symptom was visual disturbance which was found in 147 (35.2%). It is noteworthy to mention that one- third were totally unaware of any warning signs / symptoms for stroke (Table 2A).The most commonly recognized stroke risk factor was hypertension (50.2%) and close to one third of the study population recognized diabetes mellitus, smoking and obesity as risk factors of stroke. Nearly half of the study population was not aware of even a single stroke risk factor (Table 3A).

Degree of awareness/unawareness as per score

Overall 21% - 33% of the male and 16%- 20% of the female were well aware to very well aware of stroke signs /symptoms. Among the Muslims, it was observed that 10% -19% of the study population was well aware to very well aware regarding stroke symptoms and 8% - 16% were well aware to very well aware regarding stroke risk factors. The rural population, lower education and lower income group were well aware to very well aware of stroke symptoms in 11% - 25% cases and of stroke risk factors in only 5.92% - 15.13% respectively. Only 16% - 25% of the males and 8% -15% of the females were very well aware to well aware of stroke risk factors.

DISCUSSION

In order to control the stroke problem, its magnitude should be assessed. India is ranked among the countries where the information on stroke is minimal.[8] The present study showed poor awareness of stroke warning signs/symptoms particularly among the lower income group, non-Hindus and rural population as compared to the higher income group, Hindu religion and urban population. As for awareness of stroke risk factors, female gender, lower education and lower income group had significant association with poor awareness, but not religion and residence. Overall reaction to anticipatory stroke symptoms was also very disappointing.

Table 5: Individual response to anticipatory stroke symptoms (N=418)

Response to anticipatory stroke symptoms	Attend nearby hospital/ nursing home immediately 103 (24.6%)	Visit to General Practitioners / Others 82 (19.6%)	Visit to Internist 45 (10.8%)	Visit to Neurologist 16 (3.8%)	Reluctant 172 (41.1%)
Sex					
Men (239)	68 (28.5%)	51 (21.3%)	29 (12.1%)	12 (5.0%)	79 (33.1%)
Female (179)	35 (19.6%)	31 (17.3%)	16 (8.9%)	4 (2.2%)	93 (51.9%)
Education					
Lower (294)	60 (20.4%)	63 (21.4%)	7 (2.4%)	2 (0.7%)	162 (55.1%)
Higher (124)	43 (34.7%)	19 (15.3%)	38 (30.6%)	14 (11.3%)	10 (8.1%)
Income					
Lower (292)	58 (19.9%)	60 (20.5%)	10 (3.4%)	5 (1.7%)	159 (54.5%)
Higher (126)	45 (35.7%)	22 (17.5%)	35 (27.8%)	11 (8.7%)	13 (10.3%)
Religion					
Hindu (259)	73 (28.2%)	37 (14.3%)	37 (14.3%)	10 (3.9%)	102 (39.4%)
Muslim (159)	30 (18.9%)	45 (28.3%)	8 (5.0%)	6 (3.8%)	70 (44.0%)
Residence					
Urban (266)	93 (34.9%)	48 (18.0%)	39 (14.7%)	12 (4.5%)	74 (27.8%)
Rural (152)	10 (6.8%)	34 (22.4)	6 (3.9%)	4 (2.6%)	98 (64.5%)

Awareness of stroke warning symptoms among the general population in India is unsatisfactory. This lack of awareness can lead to delay in hospitalization and initiation of necessary treatment. Previous Indian studies had shown improved socioeconomic status and higher education was associated with better awareness of the warning symptoms of stroke for both rural and urban subjects.[7,9] These findings were very similar to the present study. The previous studies had shown that the warning symptoms of stroke such as unilateral motor and sensory symptoms were readily recognized by both urban and rural populations, but other symptoms such as headache, dizziness, difficulty in speaking or understanding speech and altered sensorium were less familiar among the public.[7,9] These findings were very similar to the present study. In our study, paralysis of any part or one half of the body was the most commonly (53.6%) recognized symptom, whereas only 6.2% (chest pain/chest tightness) to 35.2% (visual disturbances) of the study population were able to recognize other warning symptoms. This was comparable with the study by Pandian *et al* from Northwest India, where healthy relatives (mean age 40.1 ± 12.9 years) of patients could identify paralysis of one side of the body as the most common symptom in 62.2%, and less than 8% could identify other stroke symptoms.[7] Thirty three percent of our study subjects were not aware of any stroke symptoms, 20.6% could identify one to 2 symptoms, 27.3% could identify 3 to 5 symptoms and 19.1% could identify more than 5 symptoms. These findings were again comparable with the study of Pandian *et al* where 23% of the study population was not aware of any symptoms of stroke, 35.6% could identify one to 2 stroke symptoms and only 6.2% knew 3 or more symptoms.[7] Hickey *et al* showed a better awareness in Ireland, with 18% of the geriatric population in Northern Ireland, and 7% in Republic of Ireland could not identify any warning symptom of stroke, less than half could identify established warning signs, with slurred speech as the exception (54%).[10] Other studies revealed varying levels of awareness in different countries, with lack of awareness among the general population being prevalent even in some developed countries.[5,6,11,12]

Knowledge of stroke risk factors can affect the stroke incidence, and help design the prevention strategies. Awareness of stroke risk factors in the general population of India is inadequate. In our study, 49.8% of elderly subjects were not aware of any stroke risk factors; 17.2% could recognize one to 3 risk factors, 20.6% recognized 4 to 7 risk factors and 12.4% recognized ≥ 8 risk factors. These findings were comparable with the study by Pandian *et al* from Northwest India, which showed that one fifth of healthy subjects could not identify a single risk factors for stroke; 51.2% of the healthy urban respondents could name one risk factor, 18.5% could name 2 risk factors and 9.7% could identify 3 risk factors.[7] Two other studies on healthy subjects from rural and urban backgrounds could identify hypertension as a risk factor in 25% and 45% of the study subjects. Stress as a risk factor of stroke was identified by 41% of the urban subjects. The other risk factors such as diabetes, smoking, hyperlipidemia and heart disease were identified by the urban population in 19%, 24%, 15%, and 6% of subjects compared with 10.7%, 1.2%, 6.7% and 2% by the rural population[9,13] Hickey *et al* showed that 8% of the study population of more than 65 years age group of Northern Ireland and 4% of Republic of Ireland subjects were unable to identify any stroke risk factors and with the exception of hypertension (identified by 74%); less than half of the study population correctly identified established stroke risk factors.[10] Most studies from developed countries found knowledge on stroke positively correlated with income and education, and was lower in men than women.[5,6] In our study and that by Pandian from Northwest India, males were more knowledgeable than females with regards to stroke risk factors and awareness was higher among the higher socioeconomic group, urban population and among Hindus than the other religious groups.[7]

There are many advances in the risk factors and acute treatment of stroke which requires early presentation to hospitals.[14-18] Many stroke patients present late to hospital due to lack of knowledge and poor awareness of the potential beneficial treatment.[19,20] In our study, close to two fifths of the elderly subjects were reluctant to seek any medical assistance when they have stroke symptoms. They comprised mostly of the illiterate, low socio-economic group and rural population. Only 103 (24.6%) participants opted for attending nearby hospital / nursing home. In contrast, more than two thirds of the general population in Burdwan[9], 71% population (mean age 40.1 ± 12.9 years) in Northwest India[7], 89.9% in urban Australia[6], and 46% in South Korea[12] opted to call for an ambulance or visit a hospital emergency department in response to symptoms of stroke. In our study, close to a fifth of the elderly would seek medical assistance from

general practitioners which may also results in delay to hospital emergency treatment. It is interesting to note that in Pandian *et al* study from Northwest India, only 4.1% identified blood thinning agent, 3.3% identified asprin as treatment for acute stroke. The other responses were "don't know" (56.1%), control BP (29.1%), oil massage (7.1%), Ayurvedic treatment (1.4%), faith healing, homeopathic treatment, witchcraft and magician (<1%).[7] In another Indian study, more than half of the subjects were not aware of the available treatment strategies.[9]

Our study subjects may not be representative of the general elderly population of India, as it is a hospital-based study. The study may overestimate the awareness of stroke warning symptoms and risk factors among the Indian elderly population. A population-based survey will be more informative, though it would require greater resources.

In conclusion, the present study highlights the lack of awareness of stroke signs / symptoms, its risk factors and inadequate response to stroke symptoms in the Indian elderly population. Stroke awareness programme should be undertaken at various levels in the community to different population subgroups, using different modes of education to overcome this lack of knowledge. Further community based studies are required in both rural and urban populations to track the level of awareness of stroke in the Indian elderly population, to improve stroke care in this country.

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