ORIGINAL ARTICLE

Stroke care challenges in rural India: Awareness of causes, preventive measures and treatment options of stroke among the rural communities

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Citation

Article Cycle

Abstract

Introduction: Management of stroke in the remote rural areas in India faces major challenges because of lack of awareness. Stroke care services can be optimally implemented only if the communities have an understanding of the disease. **Method:** A population based, cross sectional survey of an adult general population sample between the ages of 31-60 years in a rural block in Tamil Nadu, India was carried out to study their knowledge, attitude, beliefs about cause, signs and symptoms, preventive measures and treatment options of stroke. **Results:** Of the 174 subjects studied only 69% were aware of the term stroke and 63% were able to list the symptoms. Only a little more than half the participants (58%) were aware that diabetes, smoking and hypertension are risk factors for stroke. None of the participants were aware of the endovascular thrombolysis injection for better recovery from stroke. About quarter (23%) of the participants did not think that the stroke is an emergency condition and they need to take the patient urgently to the hospital. Only 56% of the participants had checked their blood pressure and 49% for diabetes. A history of having either hypertension or diabetes and stroke in the family was the only factor that was significantly associated with better awareness (p=<0.001) independent of other potential facilitating factors including age, occupation, education and gender. **Conclusion:** There is a need to educate the rural communities about the risk factors, how to recognize the onset, the preventive measures and optimum care of stroke to reduce the burden.

Key Words

Community Awareness; Community Education; Stroke Awareness; Stroke Prevention; Stroke Care

Introduction

Current estimates of the prevalence of stroke vary in different regions in India which ranges from 44 to 424 per 100,000 population [1,2] and there is an increasing trend reported in the prevalence of stroke [3]. It is projected that the combined annual cost to India of stroke, coronary heart disease, and diabetes will go up to about $54bn (£34bn; €41bn) by 2015, about six times the $8.7bn lost through these diseases in 2005 [4]. While effective preventive measures and timely treatment with intravenous tissue plasminogen activator for acute ischaemic stroke have shown to significantly reduce the morbidity and mortality due to stroke, public awareness of it remains poor in India [5,6]. A hospital based study done in Northwest India reported that about one-fifth of the subjects could not identify a single risk factor of stroke and only 7.4% of respondents were aware that "blood clot–dissolving

drugs" are available for treatment and better recovery for stroke [1].

Considering the enormous burden of the disease, its high morbidity and mortality and cost, the preventive measures of stroke including access to stroke referral centers with facility for endovascular thrombolysis and rehabilitation will certainly be very cost effective in low resource settings [7,8]. Research shows that about 80% of the incidence of stroke could be prevented with adequate control of hypertension, glycemic control, abstinence from smoking, control of alcohol use, diet and exercise [9-14] and a study from UK reported that preventive measures alone could save GBP900 per person per year [7]. Additionally, preventive measures against stroke will also eventually prevent other non-communicable diseases like myocardial infarction and cancer and thus will have greater impact on public health system. The evidence from studies suggest that good public awareness about the risk factors and early diagnosis and treatment options of stroke could indeed offer greater benefits in resource poor countries.

Aims & Objectives

To discuss the extent of awareness about the preventive measures and treatment options of stroke and its risk factors among the rural population in South India.

Material and Methods

Setting: The study was carried out by the rural community health center of a teaching institution in the State of Tamil Nadu, India, in order to plan for appropriate educative intervention services. The community health center has been providing primary health care services for about 130,000 population residing in a rural development block(block is an administrative unit of a district) for 4 decades. The block has 39 Panchayats and 107 villages. For service purpose, the block is divided in to 18 peripheral service units (PSU) with about 7000 population residing in each of these geographic units. A mobile health care team including a doctor, public health nurse, social worker, community health workers visit these PSUs once a week to conduct half a day clinics; to facilitate collection of data for as part of ongoing socio-demographic surveillance; and to promote socio-economic developmental activities to improve rural health.

Study design and Subjects: The study was a population based, cross sectional survey among adult population of 31-60 years of age in K V Kuppamrural development block. A multistage cluster random sampling technique was used to select study subjects. In the first stage, 3 Panchayats were chosen based on proximity to the community health center for easy access and also we know from the previous research that the people in all the villages in the block are relatively homogenous and choosing participants from the neighbouring cluster panchayats will not bias the study. In the second stage, of the 14 cluster villages in the 3 panchayats, 10 villages were chosen using simple random sampling technique. In the third stage, using the existing village map, all the streets in the cluster villages were identified and a consenting eligible adult from every third household, either a male or a female making sure about 50% are females were surveyed, first pick being a random pick, starting from the first street to get a sample size of 183. Subjects aged between 31 to 60 years were included in the study and only one person from one household was chosen. The sample size of 183 was obtained using the formula for a prevalence survey with a prevalence of poor awareness of stroke of 45% [1], a precision of 20% and design effect of 1.5. Our inclusion criteria were people of 31-60 years of age in 10 villages in KV Kuppam block who had given a verbal consent for the study.

The questionnaires included the following aspects: Socio-demographic characteristics, Knowledge, Attitude, and health seeking behavior of the participants. The socio-demographic characteristics include age, gender, literacy, education, religion, occupation, member of an organized self-help women group or not, housing type. Other predictors that were assessed include history of hypertension and diabetes and whether any household member had a stroke before. Under Knowledge, the subjects were asked if they have heard of the term "stroke" in the vernacular language, signs and symptoms, organ affected, risk factors, warning signs, whether the onset of stroke was sudden or gradual, and the various treatment options available. Under attitude, the subjects were asked if they thought stroke was a disease or something of supernatural causes, if stroke was an emergency event or not, if one can be completely cured of stroke, if stroke could be prevented or not, and if so their opinions on various preventive measures. They were also asked who in their opinion was responsible for prevention of stroke. Under health seeking behavior, they were

asked where the subject would take a stroke patient for treatment, the ideal time duration to bring a stroke patient to hospital, if the subject would seek medical aid in the event of Transient Ischaemic attack (TIA), and if subject had checked their blood pressure and diabetic status in the past.

Statistical analysis: Descriptive statistics including frequencies, marginal percentages, mean with standard deviations and medians with quartiles were used to describe socio-demographic characteristics, exposure variables and outcome variables. Bivariate association between socio-demographic variables, other exposure variables including having diabetes, hypertension and history of stroke in the family and knowledge, attitude and health seeking behavior was assessed using Chi square statistics for categorical variables and t-test for continuous, normally distributed variables. The items under KAB were scored to get a composite score under each domain. Final multivariate, logistic regression model was constructed using the following covariates: age, gender, education, whether the participant was diabetic or hypertensive and history of stroke in the family. The data was entered in Epidata Version 3.1 and analyzed using SPSS Version 20.0. This study was carried out by the Rural Unit for Health and Social Affairs (RUHSA) of one of the leading medical education institutions in the area as part of the regular needs assessment of the rural community in order to implement appropriate intervention services for stroke.

Results

Socio-demographic characteristics of the participants: We surveyed 174 consenting participants with equal number of men and women in the sample. The participant ages ranged from 30 to 60 years with a mean age of 46 years (S.D =7.9). Fifty six percent of the participants had education less than 8th grade. Occupations among men included manual labour, farming, driver, petty business, shopkeeper and army service and among the women, 58% of them were home makers and the remaining were manual labourers. Only about 11% of them lived in houses with palm leaf thatched and asbestos roofs, remaining had tiled or terraced roofs [Table 1].

Knowledge relating to stroke: Of the 174 subjects, only 69% were aware of the term stroke; about 28% of the subjects said brain is the primary organ affected in stroke and 34% of the participant's

perceived the musculoskeletal system as the primary organ affected. About 63% were able to list the symptoms of stroke including deviation of mouth, slurred speech, limb weakness and altered sensorium. However 41% of them felt fever and 2% of them felt rashes were also one of the early signs and symptoms of stroke. Sixty percent (104) stated that the onset of stroke is usually sudden and 92% (159) was aware that stroke is a disease and only 2% (4) thought that the stroke was a curse by God.

Only fifty-eight percent of the subjects were aware that diabetes, smoking and hypertension are risk factors for stroke and the disease could be prevented if those conditions are controlled. About 40% of the subjects mentioned fever as a risk factor for stroke and a few others mentioned injection (9%) and seizures (31%) as risk factors and a few others were of the opinion that drinking clean water and fresh air can prevent stroke. Though 93% (161) said treatment of stroke was available, when asked what the treatment was, none could elaborate on the available mode of treatment, but just mentioned that they need to go to hospital (93%) or take native treatment (1.1%).

Attitude and health seeking behavior relating to stroke: Only about 77% of them felt that the stroke is an emergency condition and they would take a stroke patient to hospital immediately. About 25% of them disagreed to the statement that no one could be completely cured from a stroke. Only about seventy-nine percent of them said that they need to see a doctor if they develop sudden onset of weakness, slurring of speech for a few minutes and then recover completely , the symptoms suggestive of Transient Ischaemic Attack. Eighty-nine percent of the subjects were of the opinion that one's own self is responsible for prevention of stroke and not the responsibility of health care providers or the Government. It was found that only 56% (98) of the participants had checked their blood pressure and 49% of them had checked their diabetic status in the past.

Determinants of the adequate awareness: We calculated the association between potential determinants of better awareness including age, gender, education, occupation, socio-economic status and history of diabetes or hypertension or stroke in the family using chi-square statistics. Subjects having a score of 3 or more were considered having adequate knowledge. The subjects who were educated equal or less than 5thgrade were

considered uneducated. The study found that males and those with better education had a better knowledge of stroke (P<0.01) and also those with history of hypertension and diabetes (P<0.001) and household members affected with stroke (P<0.03).There was no statistically significant association between age and knowledge of stroke [Table 2] and [Table 3]. However when we tested the association between potential factors that influence the knowledge and adequate knowledge in a logistic regression analysis, the history of having either hypertension or diabetes and stroke in the family were the only significant determinant for adequate awareness when adjusted for education and gender. The gender or education was not significantly associated with adequate knowledge [Table 4].

Discussion

This population based study was done to understand the awareness among the rural men and women about stroke, its preventive measures and recent advances in treatment options in order to plan for community educational interventions. Only about 28% of the subjects were aware that the brain is the affected organ, which was much less compared to the 55% reported from the study done in Northwest India [1]. However the study done in Northwest India was a hospital based study and those attending the hospitals for health care will certainly be more aware than the general population.

About 30% of the people in the rural India were not aware of the disease stroke and its early signs and symptoms and this figure is comparable to the 23% reported from the study done in Northwest India and 32% from Korea [1,2].The awareness about the risk factors was still worse. About 40% were not able to mention even 1 risk factor of stroke which was double the 20.7% reported by the study from Northwest India [1]. Only half the population (56%) were aware of the preventive measures. Overall the knowledge about stroke found to be poor in this rural community compared to developed countries like Australia (73.4%), UK (74.7%) and Ireland (60.3%) [3-6]. In another study done in India among rural school children in 2010 showed very poor awareness regarding risk factors for non-communicable diseases. Only about less than 30% knew diabetes, hypertension and diabetes as risk factors for non-communicable diseases [15]. Kumar *et al* highlighted in an editorial published in 2012 that age-adjusted incidence rates of stroke is increasing

in both urban and rural areas in India and compared to developed countries, the onset of disease is earlier and as a result increased premature mortality is observed [16]. Therefore the poor awareness has major implications on preventive and promotive health care delivery system in the country in future. Any investments on risk reduction programme or advanced treatment initiatives will not be accessed optimally and will not be cost effective [7,8].

Most of our subjects said that they would take a stroke patient to a hospital and only 9% said they preferred native treatment. This finding was contrary to the belief that the rural population prefer native treatment to allopathic system of medicine especially for stroke and also to the reports from previous studies in India and Korea which shows 10.7% in India and 45.2% in South Korea prefers native treatment for stroke [1,2]. It was good to find that the majority of the subjects would take a stroke patient to a hospital immediately. However 20% of the study population were not sure or would not see a doctor for symptoms suggestive of TIA. So people need to have better awareness on early signs and symptoms of stroke and significance of symptoms and signs of transient ischemic attacks to encourage them to seek timely and appropriate treatment. Many of them had misconceptions about early signs and symptoms, preventive measures and none of them are aware of availability and use of endovascular thrombolysis in stroke.

The majority (98%) of our subjects felt that they were themselves responsible for prevention of stroke and no one recognized that healthcare providers and the government have significant role in prevention and treatment of stroke. This was undesirable because it showed weak political demand in stroke prevention and effective treatment. More serious efforts are needed towards the prevention of non-communicable diseases in our country [16].

Conclusion

There is certainly a need to increase the awareness of stroke among the people in rural India, especially awareness of symptoms, risk factors and available treatment. The public needs to be aware of the need to access tertiary care for appropriate care of stroke and the importance to utilize the local ambulance service for timely treatment. They need to realize that if treated appropriately and in time, complete cure and recovery from stroke is possible. Health campaigns to increase awareness of stroke could be

implemented. They were done in UK known as the Act FAST Campaign which lasted for 3 years, using advertising agencies and social media raising the awareness of clinical symptoms of stroke and importance to call 999 the emergency number immediately. Following the campaign, there is 55.5% increase in stroke calls to 999 although the long term effectiveness of this campaign was not known [3,9,10].

Recommendation

We would also like to recommend inclusion of basic knowledge of stroke in the Tamil Nadu education syllabus. Since around half our population does not know their diabetes and blood pressure status (which incidentally follows the "rule of half"), there is a need for widespread and effective health-screening programs to identify high risk patient with hypertension and Diabetes and thereby strengthening the National Programme on Prevention and Control of Cancer, Diabetes, CVD & Stroke(NPCDCS).

Authors Contribution

RI is the RUHSA programme director who has planned the community awareness assessment survey, helped in the development of survey tool, analysis of data and manuscript writing. KV, KL and SDM assisted in the development of questionnaire, supervised data collection and contributed to data analysis and manuscript writing. CEZ and SND analyzed the data and wrote the first draft.

Acknowledgement

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Tables

TABLE 1 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE PARTICIPANTS

Variables		Frequency n =174
Age		
	31-40	45 (25.9)
	41-50	72 (41.4)
	51-60	57 (32.8)
Sex		
	Male	87 (50.0)
	Female	87 (50.0)
Literacy		
	Illiterate	7 (4.0)
	Literate	167 (96.0)
Education		
	Nil	16 (9.2)
	1st-5thgrade	38(21.8)
	6th-8thgrade	44(25.3)
	9th-10thgrade	44(25.3)
	11th-12thgrade	31(17.8)
	Diploma degree	1 (0.6)
Occupation		
	Blue collar worker	97(55.7%)
	Home maker	51(29.3)
	Farmer	13(7.5)
	Unemployed	10(5.7)
	Business	3(1.7)
Housing by type of roof		
	Terraced	101 (58.0)
	Tiled	54(31.0)
	Thatched	17(9.8)
	Asbestos	2(1.2)

TABLE 2 AWARENESS ABOUT STROKE IN RELATION TO SOCIO-DEMOGRAPHIC CHARACTERISTICS

Characteristics		Heard the term Stroke		Organ affected		Symptom of stroke	
		Yes	No	Aware	Not Aware	Aware of 3 warning signs	Not Aware
Age							
	31-40	33(73.3%)	12(26.7%)	10 (22.2%)	35 (77.8%)	32(71.1%)	13(28.9%)
	41-50	43(59.7%)	29(40.3%)	23 (31.9%)	49 (68.1%)	43(59.7%)	29(40.3%)
	51-60	37(64.9%)	20(35.1%)	16 (28.1%)	41 (71.9%)	36(63.2%)	21(36.8%)
Sex							
	Male	67(77.0%)	20(23.0%)	32 (36.8%)	55 (63.2%)	65(74.7%)	22(25.3%)
	Fem	46(52.9%)	41(47.1%)†	17 (19.5%)	70 (80.5%)•	46(52.9%)	41(47.1%)‡
Education							
	<6th	20(37.0%)	34(63.0%)	5 (9.3%)	49 (90.7%)	20(37.0%)	34(63.0%)
	≥6th	93(77.5%)	27(22.5%)*	44(36.7%)	76(63.3%)*	29(24.2%)	91(75.8%)*

† P=0.001‡P=0.003*P<0.001 •<.01

TABLE 3 BIVARIATE ASSOCIATION BETWEEN POTENTIAL INFLUENCING FACTORS ADEQUATE KNOWLEDGE

Factors	Adequate knowledge Score ≥3	Inadequate knowledge Score <3	P value
Poor education			
<6th grade	15 (27.8%)	39 (72.2%)	0.000*
≥6th grade	82 (68.3%)	38 (31.7%)	
Age [mean (S.D)]	45.68 (7.6)	46.27 (8.2)	0.628
Sex			
Male	59 (67.8)	28 (32.2)	0.010*
Female	38 (43.7)	49 (56.3)	
Occupation Unemployed & homemakers	32 (53.3)	28 (46.7)	0.843
Diabetic	35 (79.5)	9 (20.5)	0.000*
Hypertensive	35 (77.8)	10 (22.2)	0.000*
h/o Stroke in the house	18 (72)	7 (28)	0.033*

TABLE 4 ASSESS THE ASSOCIATION BETWEEN RISK FACTORS AND ADEQUATE KNOWLEDGE

Influencing factor	Adjusted Odds ratio(95% CI)	p Value
Gender (male)	1.34 (.48 – 3.74)	0.58
Better education(≥6th grade)	2.18 (.77 – 6.16)	0.14
Having HTN or DM, family h/o stroke	0.14(0.06 -0.30)	0.000