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Original Research Article

A small step towards empowering communities: assessing and educating stroke symptoms, risk factors and treatment access: a cross-sectional study in two villages of South India

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ABSTRACT

Background: Stroke is a major preventable cause for disability and death. It has a host of modifiable risk factors. Management of stroke is getting revolutionised. The benefits of these recent advances are not passed to the public more so to the rural folks because there is lack of awareness of stroke symptoms and therapeutic options available for them.
Methods: In a door-to-door survey, subjects were randomly selected to take a questionnaire based on the stroke awareness questionnaire published in the literature. Measures were taken to prevent group answering. Subsequently all subjects in small groups were explained details of stroke symptoms, related risk factors and the various treatment options available to them in the vicinity. The data so acquired was tabulated and analysed statistically.
Results: Most of the subjects were aware of stroke symptoms and risk factors associated with it. But they preferred local native medicines and were not aware of recent treatment modalities.
Conclusions: Most of subjects in the rural area were unaware of recent treatment modalities for stroke in spite of being aware of its manifestations and associated risk factors. There is strong need to educate rural population about stroke treatment.

Keywords: Stroke awareness, Limb weakness, Facial weakness, Speech disturbance, Risk factors, Hypertension, Diabetes, Smoking, Thrombolysis, Thrombectomy, Rural

INTRODUCTION

Stroke is the second leading cause death after cardiovascular disease as per World Stroke Organisation Global Stroke Fact Sheet 2025.[1] It is also a major cause for disability.[2] The prevalence rate reported from Rural India is 55 to 388/100,000 persons.[3] The incidence rate varies from 33 to 123/100,000 population.[4] The National Stroke Registry Program of National Centre for Disease Informatics and Research (NCDIR) of India reported the incidence of 119-145/ 100,000 population and 1.44 to 1.66 million new stroke cases per year.[5] Approximately 80% of strokes are ischemic in nature.[6] Stroke is often associated with warning symptoms like difficulty in speaking, drooping of angle of mouth, weakness/numbness of one side of body, difficulty in balancing, headache, dizziness or confusion. Stroke is associated with a variety of modifiable risk factors e.g., hypertension, diabetes, dyslipidaemia, smoking, alcoholism, physical inactivity, obesity and stress.[7] In recent years the stroke management is getting revolutionised.[8] Intravenous thrombolysis and mechanical thrombectomy is being done at tertiary stroke centres all over India. The window period is ever increasing allowing more patients to avail this modality of treatment.[9] There are many studies reflecting lack

awareness of stroke symptoms, various treatment options available among people.[10-13]

Aims

The aim of this study was to assess awareness of stroke symptoms, associated risk factors and treatment options in residents of two villages of Medak district of Telangana and to educate the target population about these aspects of stroke.

METHODS

This was a population based prospective cross-sectional observational study conducted from June 2023 to August 2023 by the interns of the department of Social and Preventive Medicine of Malla Reddy Institute of Medical Sciences, Suraram in two villages of Telangana state.

Ethical considerations

Ethical approval for the study was obtained from the Institutional Ethics Committee of Malla Reddy Institute of Medical Sciences, Suraram, Hyderabad. Written informed consent was taken from all participants after explaining the purpose and procedures of the study. Confidentiality and the right to withdraw at any point were ensured.

Inclusion criteria

Residents of two villages Shapur and Gummadidala of Medak district of Telanagana, aged between 18 and 60 years were included in the study.

Exclusion criteria

Stroke survivors, their immediate relatives and subjects with cognitive impairment were excluded.

A survey questionnaire was prepared based on the Stroke Awareness Questionnaire (SAQ) published by Hickey et al.[14] This questionnaire was tested in a pilot study and validated in local Telugu language.

Authors explained the questionnaire to subjects and collected the data from door-to-door survey. If more than one person was available to take questionnaire, the co-author was engaged to avoid group answering. After collecting data from each subject, a small group of 4-5 subjects were shown charts and cartoons to educate them about the manifestations, the associated risk factors and the treatment modalities including free thrombolysis available near them. Demographic variables like age, sex, and educational status were noted. Subjects were categorised as uneducated who did not receive any formal education, primary education for those who received up to 5th class. Middle school for those who studied 6th to 10th class, intermediate education for those who studied 11th and 12th class and higher education for those who did degree and beyond.

Assessment tools

A set of nine questions were asked. What they understood by stroke? What are the risk factors associated with it? What are the warning symptoms? How serious is the disease? The first thing they would do when they notice stroke symptoms? Whether they have seen any advertisements on television or radio about stroke? What are the medications or other options of treatment for stroke? What they feel of recurrence of the disease? Whether stroke recurrence can be prevented by medication?

When the subject was not able answer spontaneously, options were given to be selected. Responses so gathered were recorded for statistical analysis.

Statistical analysis

Mean and standard deviation were calculated for continuous variables and percentages were calculated for categorical variables, mean values were compared by t test and associations were performed by Chi square test. Odds ratios were done for risk estimates through logistic regression. Level of significance was considered as 0.05. IBM SSS windows version 24 (Armonk, NY) was used for all statistical analysis.

RESULTS

Total of 124 subjects were analysed. Male:female ratio was 1:1, the educational background showed: illiterates 26.6% (n=33), primary/secondary education 22.6% (n=28), SSC/10th class/intermediate education 30.6% (n=38), graduation and above, 20.2% (n=25). Occupation profile showed housewives 33.1% (n=41), farmers 35.5% (n=44) (others like students and some kind of employment 31.5% (n=39).

When the subjects were asked about stroke, only 23.4% (n=29) of them were ignorant of the condition. Analysis of the subjects who responded affirmatively, reported brain is the organ of involvement in 76.6% (n=96), clot in the brain in 15.3% (n=19), some issue in the circulation of the brain in 14.4% (n=18) and bleeding in the brain 2.4% (n=3).

The next question was asked about their awareness of risk factors associated with stroke. Ten risk factors were narrated to them and were asked to tick as many they felt correct. Hypertension was identified in 61.3% (n=76), high cholesterol was in 29% (n=36), diabetes in 25.8% (n=32), stress in 25.8% (n=32), smoking in 20.2% (n=25), obesity in 11.3% (n=14), old age in 8.1% (n=10), looked upon as familial disease in 4% (n=5) and lack of exercise was seen only in 2.4% (n=3). These findings suggest that hypertension ($p \leq 0.020$) and high cholesterol ($p < 0.001$) are the most strongly recognised risk factors among aware group. The other variables did not reach statistical significance (Table 1).

Table 1: Risk factors awareness in two groups: unaware/aware with p values.

S. no.	Variables	Unaware (n=48)	Aware (n=76)	P value
		N (%)	N (%)	
1.	Hypertension	13 (43.3)	63 (67)	0.020
2.	S. cholesterol	1 (3.3)	35 (37.2)	0.001
3.	Smoking	3 (10)	22 (23.4)	0.111
4.	Diabetes	10 (33.3)	22 (23.4)	0.279
5.	Obesity	3 (10)	11 (11.7)	0.798
6.	Alcoholism	6 (20)	23 (24.5)	0.165
7.	Lack of exercise	1 (3.3)	2 (2.1)	0.708
8.	Ageing	3 (10)	7 (7.4)	0.655
9.	Hereditary	0 (0)	5 5.3)	0.197
10.	Stress	7 (23.3)	25 (26.6)	0.722

Table 2: First manifestation of stroke.

S. no.	Symptoms	Percentage	Number
1.	Limb weakness	77.4	96
2.	Facial weakness	48.4	60
3.	Speech	33.1	41
4.	Numbness half of body	23.4	29
5.	Confusion	12.9	16
6.	FAST (Face Arm Speech Time)	12	15
7.	Visual loss	9.7	12
8.	Headache	8.9	11
9.	Dizziness	4.8	6
10.	Shortness of breath	0.8	1

Table 3: Stepwise multiple logistic regression model of awareness stroke with various variables.

S. no.	Variables	Categories	Odds ratio	95% CI lower	Upper	P value
1.	Recurrence stroke	Unlikely	1.0			
		Most likely	0.042	0.009	0.212	0.042
2.	Age groups	>=51	1.0			
		18-35	0.016	0.002	0.480	0.000
		35-50	0.075	0.012	0.0480	0.006
3.	Cholesterol	Aware	1.0			
		Not Aware	101.596	5.878	1755.950	0.001
4.	Facial weakness	Yes	1.0			
		No	9.540	2.091	43.533	0.004
5.	Advertisement in TV	No	1.0			
		Yes	0.001	0.000		
6.	Seeing doctor	Yes	1.0			
		No	7.570	1.345	42.619	0.022

Table 4: Stroke risk factors: comparative analysis of various studies.

Parameters	Present study (%)	Deepti et al (%)	Sirisha et al(%)	Lawrence et al (%)	Puneet et al (%)	Kurmi et al (%)	Hickey et al (%)
HTN	67	77.7	67.5	25.7	81	25.7	75
Cholesterol	37.2	32.4	38.2	14.3	36	14.3	40
Smoking	23.4	20.9	33	2.9	27	NA*	30
DM	23.4	21.7	33.9	28.6	35	28.6	11
Obesity	11.7	25.6	35.9	NA*	NA*	2.9	30

Continued.

Parameters	Present study (%)	Deepti et al (%)	Sirisha et al(%)	Lawrence et al (%)	Puneet et al (%)	Kurmi et al (%)	Hickey et al (%)
Alcoholism	24.5	18.6	33.4	14.3	26	3	10
Lack of exercise	2.1	27	23.7	NA*	NA*	NA*	18
Ageing	7.4	NA*	21.4	NA*	22	NA*	NA*
Hereditary	5.3	NA*	21.5	NA*	27	NA*	NA*
Stress	26.6	NA*	64.2	2.9	NA*	2.9	NA*

*Not available.

Table 5: Stroke manifestations: comparative analysis of various studies.

Parameters	Present study (%)	Deepti et al (%)	Sirisha et al (%)	Lawrence et al (%)	Puneet et al (%)	Kurmi et al (%)	Hickey et al (%)
Limb weakness	77.4	54 (limb + face)	47.9	53.3	62 (limb + face)	64 (limb + face)	38
Facial weakness	48.4	-	22.7	20			NA*
Speech	33.1	59.4	41.9	16.2	54	2	54
Numbness-half of body	23.4	52	44.3		29	NA*	41
Confusion	12.9	NA*	25.1	NA*	48	NA*	18
FAST	12	NA*	NA*	NA*	NA*	NA*	NA*
Visual symptoms	9.7	25.4	18.7	NA*	7	NA*	20
Headache	8.9	38.6 (HA+ dizziness)	25.5	NA*	24	32 (HA+ dizziness)	29
Dizziness	4.8		30.6	NA*	12	NA*	12

*Not available.

The subjects were asked what they considered the first manifestation of stroke and were allowed to tick multiple answers. Limb weakness was considered as first warning symptom of stroke (77.4%) followed by facial weakness (48.4%), speech disturbance (33%) and numbness of one half of body (23.4%) (Table 2).

The following were the responses when they were asked, what they would do when they noticed stroke in themselves or their relative. Most of them preferred to consult a doctor (75%), go to a hospital (9.7%), call an ambulance (8.1%) or tell someone for help (6.5%).

The subjects were presented with various treatment options and assessed on their level of awareness about each modality. Majority of the subjects opted for local natural therapy 45.96% (n=57). Others felt reduction of Blood Pressure 16.41% (n=11), taking aspirin 3% (n=2) would help them, and only one subject was aware of thrombolysis or surgical intervention.

Sixty two percent were cognisant of recurrence of this disease, 17% felt this disease does not recur and 21% did not know whether stroke recurs or not. When they were asked about the need for secondary prophylaxis 67.7% felt there is a need for it, 11.3% felt there is no need and 21% were not aware of secondary prophylaxis at all.

The subjects were asked to rate the seriousness of the condition on a scale of 1 to 5, the former being not very serious and the latter being the worst condition. Majority of the them felt that stroke is a disease of serious concern.

DISCUSSION

Most our subjects particularly those between the age group of 18 to 55 years of these two villages of Medak district were cognisant of stroke and were aware of brain as the organ of involvement. Higher the education, the better was the understanding about stroke, however it did not reach statistical significance. Among the risk factors, dyslipidaemia (high cholesterol) and hypertension reached statistical significance. Awareness of hypertension, high cholesterol and smoking was comparable with other studies except Lawrence et al and Kurmi et al who reported less in their series (Table 3). Other risk factors rated were stress, alcoholism, smoking and diabetes were consistent with other publications.[15] Lawrence et al found less awareness of smoking among their subjects.[16] Comparative analysis of risk factors as reported by other studies is depicted in Table 4. Over 80% of our subjects were cognisant of more than two risk factors.

Majority of participants demonstrated awareness that stroke manifestations are typically unilateral, most often

presenting as weakness or numbness affecting the limbs or face. Speech disturbance was reported by one third of subjects, slightly lesser when compared to previous studies more clearly defined in Table-5.[17,18] Our subjects rated visual disturbances, dizziness and headache as common manifestation of stroke. Nearly 85% of subjects were aware of more than two warning symptoms. Three fourths of the participants reported that their first response upon suspecting a stroke would be to consult a local physician. Almost every one (93.6%) felt stroke is a serious disease. More than two third felt that stroke is a recurrent disease and need to take prophylaxis to prevent it. Nearly half of them were not aware of various treatment options available to them. Despite of awareness of stroke manifestations and its risk factors, nearly half of them still believed in natural therapies, which is not unexpected in this geographical area. Only one subject was aware of thrombolysis and felt the cost is formidable. Eighty percent of subjects admit that they have not seen any advertisement on television or radio about stroke.

During the pilot study of authentication of vernacular Telugu version of the study questionnaire, the authors realised there is a need to educate the people about stroke. Cartoons and charts depicting the manifestations, risk factors and various treatment options were downloaded from the web and small groups of 4 to 5 subjects were taken up by the authors to educate them about changing perspectives of stroke management.

Strength of the study

The credibility of this study was its well-structured design. Previous publications have explored stroke awareness, most recruited participants who were either stroke patients, their relatives, or individuals attending medical or neurology outpatient clinics for follow up. In contrast, this study deliberately excluded even the relatives of stroke patients to minimize prior exposure and potential bias. The authors took this opportunity to teach participants about stroke, sharing simple but important details about its signs and how it can be treated with advanced techniques.

Limitations of the study

Small sample size and follow up questionnaire could have been done to check the percentage of effectiveness of the education done.

CONCLUSION

The findings of this study revealed that most participants possessed a basic awareness of stroke, including its major manifestations, risk factors, and clinical seriousness. However, a significant barrier existed for timely and effective treatment in this geographical region. Despite the availability of advanced interventions such as thrombolysis within the therapeutic window at nearby government teaching hospital, many residents remain deprived of these options due to a strong cultural reliance on native healing practices. This belief system posed a substantial challenge to the delivery of evidence-based stroke care. Given the preventable nature of stroke and the critical importance of early intervention, there was an urgent need for comprehensive public awareness initiatives by the government bodies and voluntary organizations.

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