

## Original Research Article

# Awareness of stroke warning signs, risk factors and response to stroke: a hospital based survey

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## ABSTRACT

**Background:** Stroke is the third most common cause of mortality and a significant cause of disability in India. Knowledge about stroke risk factors, warning signs and appropriate response to stroke are important to reduce the morbidity. Aim was to evaluate the awareness and response to stroke among the public.

**Methods:** In this prospective, observational study, stroke awareness questionnaire was administered to 105 participants, who were relatives of patients without history of stroke attending the outpatient department of a tertiary care hospital.

**Results:** The mean age of the study participants was  $49.7 \pm 11.9$  years (range 24-69 years) with 46 (44%) women. Thirty six percent of the subjects recognized brain as the affected organ in stroke. The common risk factors identified by the participants were diabetes mellitus in 30 (28.6%), hypertension in 27 (25.7%), high cholesterol in 15 (14.3%). Commonly identified warning signs were paralysis of one side of the body (56; 53%), deviation of mouth (21; 20%), speech impairment (17; 16%). On having/seeing a warning sign, 27 (25.7%) replied the appropriate response of rushing to emergency department of a hospital. Eleven (10.5%) were aware of clot lysis as the treatment for stroke and 9 (8.7%) the availability of this treatment at free of cost in Government hospitals in Tamil Nadu. Five (4.8%) participants responded that they should rush to hospital within the golden hour.

**Conclusions:** Knowledge about organ involved, etiology, and response to stroke warning signs are lacking and continuous education programs are necessary to improve the public awareness.

**Keywords:** Risk factors, Stroke awareness, Warning signs

## INTRODUCTION

Stroke is one of the leading causes of death and disability worldwide, more so in low- and middle-income countries.<sup>1</sup> The prevalence rate of stroke for total population in India, varied from 44.54 to 150/100000. For the urban population it was 45 to 487/100000 and 55 to 388.4/100000 for rural population.<sup>2</sup>

Stroke can be prevented by proper management of risk factors including diabetes mellitus, hypertension,

hypercholesterolemia, smoking, alcoholism and drug abuse.<sup>3</sup> The mortality and morbidity following stroke can be reduced by early identification of the warning signs and early access to health care.<sup>4</sup> Reports from India suggest that many people who experience a stroke do not access hospital services for multiple reasons including limited awareness of stroke symptoms or stroke being an emergency.<sup>5</sup> Hence an attempt was made to determine the awareness of warning signs, risk factors of stroke and knowledge about golden hour among the public.

The aim of this study was to determine the public awareness of risk factors, warning signs, and early treatment options available for stroke especially thrombolysis, and its window period.

## METHODS

This was a prospective hospital-based survey conducted at the Neurology outpatient department of SRM Medical College and Research Institute, a tertiary care hospital in Tamil Nadu, South India between June 2022 and August 2022. Relatives of patients attending the Neurology outpatient department of the hospital formed the study population.

### Inclusion criteria

Individuals more than 18 years of age accompanying patients attending the neurology outpatient department who consented were included in the study.

### Exclusion criteria

Relatives of patients who had current or previous stroke or they themselves had stroke earlier were excluded.

The study questionnaire contained three sections having 13 questions altogether. The first section gathered demographic data of the participants. Second section elicited participants awareness about stroke, warning signs and risk factors. The third section detailed the awareness about the treatment of stroke and the concept of golden hour in the treatment of stroke. The questions in the second and third sections were open ended with multiple responses.

The questions were asked by the investigator during a one-to-one interview in the local vernacular language (Tamil). The interviewer intervened only to clarify a question, if required. No attempt was made to prompt the respondents by suggesting answers directly.

Statistical analysis was performed using Epi Info™ 7 statistical software (developed by Centers for Disease Control and Prevention [CDC] in Atlanta, GA, US). Frequency was calculated as number (n) and percentage (%).

## RESULTS

Out of one hundred and twenty relatives approached and interviewed, one hundred and five completed the questioner. The mean age of the study participants was 49.7±11.9 years with a range 24-69 years. Twelve (11.4%) belonged to 18-30 years, 34 (32.4%) to 31-40 years, 20 (19%) to 41-50 years, 27 (25.7%) to 51-60 years, and 12 (11.4%) to 61-70 years age group. The male female ratio was 1.3:1. The demographic details are depicted in Table 1.

**Table 1: Demographic information of the study population.**

Variables	Number (%)
<b>Age group</b>	
18-30 years	12 (11.4)
31-40 years	34 (32.4)
41-50 years	20 (19)
51-60 years	27 (25.7)
61-70 years	12 (11.4)
<b>Gender</b>	
Male	59 (56.2)
Female	46 (43.8)
<b>Place of living</b>	
Urban	45 (42.9)
Rural	60 (57.1)
<b>Educational status</b>	
School level	68 (64.8)
College level	14 (13.3)
Illiterate	23 (21.9)
<b>Occupation</b>	
Skilled	44 (41.9)
Unskilled	26 (24.8)
Home maker	25 (23.8)
Professional	6 (5.7)
Unemployed	4 (3.8)

Thirty-eight (36.2%) respondents recognized the organ affected in stroke was brain, 30 (28.6%) considered heart as the affected organ, 18 (17.1%) as kidney and 19 (18%) did not know the answer. Of the 38 respondents who recognized brain as the affected organ, 22 (20.9%) identified blood clot as the reason for stroke, 8 (7.6%) as bleeding inside brain and another eight (7.6%) thought as some problem in the brain. Knowledge among the participants about the warning signs of stroke has been described in Table 2.

**Table 2: Knowledge about the warning signs.**

Variables	Number (%)
<b>Weakness of arm/leg</b>	56 (53.3)
<b>Face drooping</b>	21 (20)
<b>Trouble speaking</b>	17 (16.2)
<b>Difficulty in balancing</b>	25 (23.8)
<b>One warning sign</b>	24 (22.8)
<b>Two warning signs</b>	18 (17.1)
<b>Three warning signs</b>	12 (11.4)
<b>All four warning signs</b>	6 (5.7)
<b>Warning signs not known</b>	45 (42.8)

Among the 105 participants, 66 (62.9%) were ignorant about any risk factor for stroke, whereas the remaining 39 (37.1%) identified one or more risk factors. The common risk factors recognized by the respondents is shown in Table 3.

**Table 3: Risk factors for stroke identified by the study population.**

Variables	Number (%)
Diabetes	30 (28.6)
Hypertension	27 (25.7)
Hyper cholesterolemia	15 (14.3)
Alcoholism	15 (14.3)
Stress	3 (2.9)
Obesity	3 (2.9)
Coronary artery disease	3 (2.9)
Single risk factor	8 (7.6)
Two risk factors	18 (17.1)
Three risk factors	12 (11.4)
Four risk factors	11 (10.5)
Don't know any risk factor	56 (53.3)

On having/seeing a warning sign, 27 (25.7%) replied the appropriate response of rushing to emergency department of a hospital, and 11 (10.5%) would take the patient to the hospital.

Eleven (10.5%) were aware of clot lysis as the treatment for stroke and 9(8.7%) the availability of this treatment at free of cost in Government hospitals in Tamil Nadu. Five (4.8%) participants responded that they should rush to hospital within the golden hour.

## DISCUSSION

We have analyzed the responses of the accompanying relatives of patients who represent a cohort of the public about their awareness about stroke. Males predominated the study which is in agreement with earlier studies.<sup>6,7</sup> One third of the respondents recognized brain as the affected organ in stroke, which corresponds to the findings by Kurmi et al (36%) and Menon et al (35%).<sup>8,9</sup> However, Deepthi et al have reported a higher percentage of 56.7% which could be due to a higher literacy rate in Kerala.<sup>6</sup>

Weakness of the limbs was the commonest symptom identified by the participants, which is in accordance with other studies as well. Difficulty in balancing, drooping of face and trouble speaking were the other symptoms identified. Weakness of one side of the body was consistently the most common symptom recognized by the participants from earlier studies as well.<sup>6-11</sup> Nearly 43% of the participants did not know any of the warning signs, which is similar to the findings of a study from Assam (45.9%) and North India (46%), but much higher to the study from Kerala (3%) and Odisha(6.1%) reflecting regional differences.<sup>7,11,6,12</sup> Awareness about the warning signs is crucial for early recognition of stroke to seek medical advice.

Diabetes and hypertension were the two most common risk factors noted by our cohort followed by hyperlipidemia, smoking, alcoholism, stress and obesity.

These two diseases are the commonly recognized risk factors in other studies as well.<sup>6-11</sup> However, nearly two thirds were ignorant about any risk factor for stroke. Studies from Assam and Andhra Pradesh have recorded that half of their study population were unaware of any of the risk factors.<sup>8,9</sup> But Pandian et al have recorded that one fifth of their cohort did not know a single risk factor.<sup>13</sup> Knowledge about the risk factor profile and its management is an important step in the prevention of any disease.

On identifying a warning sign, only one fourth would respond by rushing the patient to emergency department of a hospital reflecting that majority did not know that stroke needs emergency treatment. This concern had been raised by Deepthi et al also.<sup>6</sup> Seventy percent of their cohort preferred to take the patient to a nearby doctor rather than to the emergency department for immediate care. However, Pandian et al have reported that 71% of the study subjects would visit a hospital emergency department if they or one of their relatives experienced symptoms suggesting a stroke.<sup>13</sup>

Treatment of acute ischemic stroke with thrombolytics can reverse the acute paralysis in many patients.<sup>14</sup> Knowledge about the availability of such treatment modality is essential to minimize the morbidity associated with stroke. Only a tenth of the study population knew that clot lysis as the treatment for stroke and less than 5% participants had the concept of golden hour or the window period for such interventions.

Gupta et al have reported a much higher percentage (41.2%) of their population were aware of thrombolytic therapy.<sup>11</sup> Most of the studies in literature did not address the issue of knowledge about the treatment. Only a few knew the availability of this treatment at free of cost in Government hospitals in Tamilnadu. Knowledge about the treatment, availability of stroke services, the window period before which the patient had to be brought to the hospital is crucial for better management of stroke patients.

This study has some limitations. As this study was a hospital-based survey, it might not reflect the knowledge about stroke among the public at large. The findings from the study could not be generalized to the entire Indian population.

## CONCLUSION

Knowledge about organ involved, warning signs, risk factors, and response to stroke warning signs, concept of window period is lacking and stroke awareness programs are necessary to improve the public awareness.

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