

# Risk factor assessment of stroke and its awareness among stroke survivors: A prospective study

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## Abstract

**Background:** Stroke is the second most common cause of death and major cause of disability worldwide. The objective of this study is to identify the major risk factors and assess the awareness among the stroke survivors.

**Materials and Methods:** A prospective study was conducted at super specialty hospital, from December 2010 to July 2011. All the stroke patients of the age >25 years with either sex admitted in the hospital were included in the study. In order to assess the awareness among the stroke survivors, questionnaire established on the risk factors for stroke from the previously published studies.

**Results:** A total of 100 patients with stroke or cerebrovascular accident were included in the study. Of 100 patients, 73% patients had ischemic stroke and 26% patients had hemorrhagic stroke. The mean age of the patients was 50 years and the incidence of stroke was predominant in males 73%, followed by females 27. It was observed that 70% of patients were hypertensives, 28% were diabetics, 27% were alcoholics, and 24% of patients had a habit of smoking, followed by others. The knowledge of the risk factors for stroke in stroke survivors was also very low, and the knowledge was varied among the subjects according to their level of educational status.

**Conclusion:** This study reveals that hypertension is the most common risk factor for stroke followed by diabetes, smoking, and dyslipidemia. The awareness of risk factor among stroke survivors was poor.

**Key Words:** Risk factor assessment, stroke, stroke survivors

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## INTRODUCTION

Stroke is the most common, life threatening disease and is the major cause of morbidity and mortality worldwide especially in South Asian subcontinent.<sup>[1,2]</sup> According to the survey conducted by the Indian council of research in 2006, it was found that the prevalence of stroke varies from 40 to 270 in 100,000 populations in different regions in India and most of the population effected are <40 years of age.<sup>[3]</sup> According World Health Organization, stroke is "a rapidly developed clinical sign

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of focal disturbance of cerebral function of presumed vascular origin and of more than 24 h<sup>7</sup>.<sup>[4]</sup> The risk factors for stroke are may be nonmodifiable (race, age, sex, low birth weight), modifiable (hypertension, dyslipidemia, diabetes, tobacco smoking, atrial fibrillation, cardiac disorder, sickle cell disease, diet and body mass index) and potential risk factors (metabolic syndrome, alcohol, drug abuse, sleep apnea, migraines, oral contraceptive use) and other environmental factors include lower education, poor economic status, tobacco, infections, body mass index (obesity, body mass index >30 kg/m<sup>2</sup>) exercise and diet etc.<sup>[5]</sup> The objective of the study is to identify the major risk factors and assess the awareness among the stroke survivors.

## MATERIALS AND METHODS

A prospective observational study was conducted in the inpatient department of neurology at Super specialty hospital, Telangana State, Warangal. The duration of the study was 9 months (December 2010–August 2011). The study was approved by the hospital ethics committee prior to the initial of the study. All the stroke patients of the age >25 years and the patients of either gender admitted in the hospital were included in the study after obtaining written informed consent. The patients who admitted with transient ischemic stroke and patients who were passed away during the stay of the hospital were excluded from the study. The data were collected from the case records of the each patients such as demographic details (age, gender, signs and symptoms on admission, history of hypertension, diabetes, hyperlipidemia, type of stroke [ischemic or hemorrhagic], cardiovascular disorders, family history of stroke, or cardiovascular disease, smoking history, and alcohol abuse.) The knowledge of risk factors in stroke survivors and their care givers were assessed by a questionnaire established on the risk factors for stroke from the previously published studies. The identified risk factors includes: Hypertension, smoking, diabetes, heavy alcohol consumption and dyslipidemia. Spontaneous responses were investigated first. Then leading questions were asked to obtain responses.

### Statistical analysis

Analysis of data were carried out by univariate logistic regression analysis and odds ratio (OR), and the 95% confidence interval (CI) was calculated by using standard statistical techniques. Any value of  $P < 0.05$  was considered as significant. Statistical Package for Social Sciences software version 15, Bangalore was used for analysis.

## RESULTS

A total of 100 stroke patients were enrolled during

the study period. The mean age of the patients was 50 years. The incidence of stroke was predominant in males 73% (mean age 60.16) followed by females 27 (mean age 54.79) and most of the patients were in the group of 55–65 years. Out of 100 patients, 73% patients had ischemic stroke and 26% patients had hemorrhagic stroke. Age and gender wise distribution of the stroke patients are summarized in Table 1.

It was observed that 70% of patients were hypertensives, 28% of patients were diabetics, 27% of patients were alcoholics, 24% of patients had a habit of smoking and dyslipidemia, and 11% patients had cerebrovascular accident (CVA). Fifteen percent of the patients had a previous history of cardiovascular disorder. The incidents of cardiovascular disorders were coronary artery disease in 10% patients, congestive heart failure in 1% patient, and myocardial infarction in 4% patients. The results of risk factors and type of stroke patients are summarized in Table 2. The univariate logistic regression analysis and OR were done to access the contribution of various risk factors in the incidence of stroke. Based on OR, hypertension was associated with 14 times risk (OR = 14.08) for stroke. Diabetes increased the risk of stroke by 3 fold (OR = 3.08). Female gender, headache, and previous history of CVA were not significant risk factors. The results of univariate logistic regression analysis of risk factors are summarized in Table 3.

The knowledge of the risk factors for stroke in stroke survivors was very low, and the knowledge varied among the subjects according to their level of educational status. Some patients could easily identify hypertension, smoking, and excessive alcohol consumption as risk factors of the stroke, but had little idea about other risk factors. The detailed results of awareness of warning symptoms of stroke patients are showed in Table 4.

## DISCUSSION

Stroke is a medical emergency condition, which needs immediate hospitalization to treat and save lives. A silent stroke does not have any outward symptoms and causes damage to the brain and places the patient

**Table 1: Age and gender distribution of the stroke patients**

Age in years	Males (%) (n=73)	Females (%) (n=27)
25-35	3 (4.10)	2 (7.4)
35-45	7 (9.58)	4 (14.8)
45-55	17 (23.28)	6 (22.2)
55-65	21 (28.76)	12 (44.4)
65-75	19 (26.02)	2 (7.4)
>75	6 (8.21)	1 (3.7)

**Table 2: Risk factors and type of stroke patients**

Risk factor	Number of patients of ischemic stroke and percentage (n=74)	Number of patients of hemorrhagic stroke and percentage (n=26)
Hypertension	46 (62.16)	24 (92.3)
Diabetes	25 (35.15)	2 (7.69)
Smoking	18 (24.32)	6 (23.07)
Dyslipidemia	18 (24.32)	4 (15.38)
Past history of cardiac disorders	12 (16.21)	3 (11.53)
Past history of CVA	10 (13.51)	1 (3.84)
Alcohol	12 (16.21)	8 (30.76)

CVA: Cerebrovascular accident

**Table 3: Univariate logistic regression analysis of risk factors**

Risk factors	OR	95% CI		P
		Lower	Upper	
Gender	1.0053	0.196	2.807	0.0035**
Age	1.6102	0.3753	3.189	0.000***
Hypertension	14.0870	5.6549	9.292	0.0401*
Diabetes	3.0870	1.0217	2.769	0.0024**
Alcohol	1.5502	0.860	3.854	0.2758
Smoking	0.8975	1.074	9.393	0.0124*
Dyslipidemia	0.5048	0.272	5.130	0.0418*
Heart disease	0.0753	3.648	36.982	0.6034
Headache	1.4792	0.7530	17.177	0.4379
Past history of CVA	1.666	0.609	4.557	0.302

\*P&lt;0.05 is significant, \*\*P&lt;0.01 is considered significant, \*\*\*P&lt;0.001 is highly significant. OR: Odds ratio, CI: Confidence interval, CVA: Cerebrovascular accident

**Table 4: Awareness of warning symptoms**

Patients (n=100)	Illiterates		Educated	
	Males (%) (n=56)	Females (%) (n=20)	Male (%) (n=17)	Females (%) (n=07)
Hypertension	1 (1.78)	1 (5)	3 (17.64)	2 (28.57)
Smoking	1 (1.78)	2 (10)	4 (23.52)	2 (28.57)
Diabetes	1 (1.78)	1 (5)	3 (17.64)	3 (42.85)
Alcohol	2 (3.57)	2 (10)	4 (23.52)	4 (57.14)
Hyperlipidemia	-	-	2 (11.7)	2 (28.57)
Heart disease	-	-	-	-

at increased risk for both transient ischemic attack and major stroke in the future.<sup>[5]</sup> In this prospective study, it was found that the major risk factor of stroke, which was hypertension as well as awareness among the stroke patients, which was poor. Diabetes and hypertension are considered as traditional risk factors for stroke and its subtypes.<sup>[6,7]</sup> The risk of stroke in hypertensive patients is substantially increased by smoking, diabetes, obesity, coronary heart disease, transient ischemic attack, and atrial fibrillations. Our results were consistent with other published studies.<sup>[8-10]</sup>

In the present study, smoking is the well documented major risk factor for stroke, which was supported by other studies.<sup>[11,12]</sup> Smoker with history if hypertension,

the risk of stroke was increased when compared with those having only hypertension or only smoking. Alcohol is also one of the important risk factor for stroke. However, the risk of stroke associated with alcohol was not significant in our study. Even though, heavy alcohol consumption was found to be one of the risk factor for stroke but moderation moderate consumption of alcohol (no more than 2 units/day) could be effective means of improving blood pressure (BP) control in treated hypertensive's.<sup>[13,14]</sup> However, the risk of stroke has been found to be increased in hypertensive patients who were also heavy drinkers.<sup>[15,16]</sup>

Diabetes and atrial fibrillation<sup>[17]</sup> are well-known risk factors for stroke. Diabetes did not have a statistically significant impact on stroke in our study, whereas atrial fibrillations, myocardial infarction, angina has been found to be associated with increasing stroke risk. Headache (i.e., migraine) has been suggested as a relatively weak risk factor for stroke.<sup>[11]</sup> There was no independent relationship between migraine and risk of stroke found in our study. Dyslipidemia is one of the well-established risk factor for cardiovascular disease as blood cholesterol,<sup>[17]</sup> whereas its relationship with fatal stroke is more controversial.<sup>[18]</sup> In a meta-analysis of prospective cohort studies conducted in the Asia-Pacific region, which confirmed the strong independent association between triglyceride levels and cardiovascular disease previously reported,<sup>[16]</sup> showed a positive association with ischemic stroke but not with hemorrhagic stroke. The risk of stroke associated with dyslipidemia was found to be significant in our study.

The present study showed that stroke survivors have very poor knowledge or awareness of the risk factors of stroke. Most of the patients did not think of their stroke as a serious illness. A lack of knowledge about stroke was one of the reasons for the delay in the arrival. In developed countries, such as USA, 57–76% of the general population could name spontaneously, at least two risk factors for stroke.<sup>[19]</sup> A similar finding was made in Australia. In that study, it was observed that the general population, 32% males, and 28% females had more than one stroke risk factor, but consultation with a local doctor or health professional was reported by only 6% of males and 3% of females. In comparison to the other published studies, the awareness of risk factors among stroke survivors and their care givers was poor because most of our study population was from the rural background and not much higher educational status. Poor awareness of stroke contributes to a delay in arrival of patients for immediate effective treatment. Therefore, few programs regarding stroke such as

printed information, audiovisual programs, and stroke service are to be introduced to create awareness.

## CONCLUSION

The study revealed that age, gender, hypertension, diabetes, smoking and dyslipidemia are the most common risk factor for the stroke. Regular and moderate degree of physical activity and tight control of hypertension, dyslipidemia and diabetes prevents a substantial proportion of stroke incidence. A fundamental principle in disease prevention is that a large number of people exposed to a relatively low risk are likely to produce more cases than a small number of people exposed to a higher risk. The number of people exposed to hypertension is enormous, which is the largest single factor for stroke. Public health campaigns to encourage primary prevention of hypertension should be the first target by stopping smoking, reducing salt intake, moderate physical exercise, healthy lifestyles, etc. Those people with hypertension should also be targeted. Every effort should not only make to encourage these patients to follow healthy life styles but also perhaps to persuade them to own their BP and its control, taking medication as necessary.

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