



## An Epidemiological Study of Acute Ischemic Stroke at Tertiary Care Hospital, Kota, Rajasthan

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### Abstract

**Background:** *Acute ischemic stroke is one of the leading cause of death and major cause of morbidity and mortality throughout the world. The incidence of acute ischemic stroke is increasing with gradual increase in obesity, diabetes mellitus, hyperlipidemia, hypertension and other cardiac problem.*

**Methods:** *After obtaining approval from institutional ethical committee, a hospital based prospective and observational study was conducted on 100 patients of acute ischemic stroke admitted in Department of Medicine, Govt. Medical College & Associated M.B.S. Hospital, Kota from 2018 to 2020.*

**Results:** *In our study, stroke was predominant in the males (69%) and in the age group of 61-70 years (36%). Left hemiparesis was the main focal neurological deficit (48%) and MCA territory infarct (65%) was the most common CT scan/MRI finding. Hypertension was the most common risk factor (64%) followed by smoking (59%), hyperlipidemia (48%), diabetes mellitus (31%) and alcoholism (27%).*

**Conclusion:** *After studying the epidemiology, clinical presentation and various risk factors of acute ischemic stroke, it can be stated that the early recognition of risk factors and taking appropriate measures to prevent it is the only way to reduce the burden of this disabling disease.*

**Keywords:** *Acute ischemic stroke, epidemiology, hemiplegia.*

### Introduction

Stroke is one of the leading causes of morbidity and mortality worldwide.<sup>1</sup> Ischemic strokes account for 50-85% of all strokes worldwide.<sup>2</sup> Stroke case - fatality defined as the proportion of events that are fatal within 28 days post stroke averages around 30%.<sup>3</sup> Among the stroke survivors each year, 30% requires assistance with activities of daily living, 20% requires assistance with ambulation, and 16% requires institutional

care leading to serious long-term physical and mental disabilities among survivors.<sup>4</sup> Thus, it is apparent that stroke is a major public health problem and has high dependency rate.

Non modifiable risk factors for stroke include older age, male gender, ethnicity, family history, and prior history of stroke whereas modifiable risk factors may be subdivided into lifestyle and behavioral risk factors and non lifestyle factors. Modifiable lifestyle factors include lack of

physical activity, cigarette smoking, alcohol abuse and illicit drug use. Non lifestyle risk factors include arterial hypertension, dyslipidemia, heart disease (coronary artery disease, dilated cardiomyopathy, and valvular lesion), carotid artery disease and oral contraceptive use. Potentially modifiable risk factors (that have yet to be shown to decrease risk when modified) include diabetes mellitus (DM), hyperhomocysteinemia.<sup>5</sup>

Since, this disease is multifactorial; the present study was conducted in a tertiary care hospital of Kota to analyze the epidemiology and risk factors of acute ischemic stroke in this population.

### Materials and Methods

After obtaining approval from institutional ethical committee, a hospital based prospective and observational study was conducted on 100 patients of acute ischemic stroke admitted in Department of Medicine, Govt. Medical College & Associated M.B.S. Hospital, Kota from 2018 to 2020. All acute ischemic stroke patients who had symptom onset within 7 days and had given written informed consent to participate were included in our study whereas patients with hemorrhagic Stroke, venous sinus thrombosis, hepatic or renal disease, connective tissue disorders, autoimmune disease, sepsis, malignancy, psychiatric illness, moribund condition and unwillingness to participate in the study were excluded. The diagnosis of acute stroke was made on the basis of temporal profile of clinical syndrome, clinical examination and CT scan / MRI of brain. A detailed history taking and clinical examination, and routine lab investigations were done to identify ischemic stroke risk factors (non modifiable and modifiable).

### Statistical Analysis

Continuous variables were presented as mean $\pm$ SD, categorical variables were expressed in frequency and percentages. All data were analyzed by Epi-info software.

## Results

**Table No.-1.** Distribution of Subjects According to age and sex in acute Ischemic Stroke Patients

AGE GROUP (IN YEARS)	ACUTE ISCHEMIC STROKE PATIENTS		
	MALE	FEMALE	TOTAL
< 40	07	02	09 (09%)
41-50	16	02	18 (18%)
51-60	10	09	19 (19%)
61-70	24	12	36 (36%)
71-80	06	05	12 (12%)
>80	06	00	6 (6%)
Total	69	31	100 (100%)

Our study group consisted of more males as compared to females such that males were 69 and females were 31. The maximum no. of patients were in the range of 61 to 70 years of age group i.e. 36 cases (36%) in which 24 were males and 12 females, followed by 19 cases (19%) in 51 to 60 years of age group, 18 cases (18%) in 41 to 50 years of age group, 12 cases (12%) in 71 to 80 years of age group, 09 cases (09%) in  $\leq$  40 years of age group and only 06 cases (06%) in  $>$ 80 years of age group.

**Table No. 2.** Risk Factor

RISK FACTORS	CASES (%)
Hypertension	64%
Smoking	59%
Hyperlipidemia	48%
Diabetes mellitus	31%
Alcoholism	27%
Past H/o IHD	20%

In our study, hypertension was the most common risk factor (64%) followed by smoking (59%), hyperlipidemia (48%), diabetes mellitus (31%), alcoholism (27%) and prior H/o IHD (20%).

**Table No-3:** Distribution of Acute Ischemic Stroke Subjects according to CT/MRI Findings

ACUTE ISCHEMIC STROKE SUBJECTS	
CT/MRI findings	Number of Cases
MCA infarct	65 (65%)
PCA infarct	19 (19%)
ACA infarct	16 (16%)
Total	100 (100%)

When the patients were compared according to the arterial territory involved, middle cerebral artery was most commonly involved vessel. Maximum no of cases around 65(65%) out of 100 patients

had middle cerebral artery infarction in acute ischemic stroke subjects followed by posterior & anterior cerebral artery infarction in 19% & 16% of patients respectively

**Table No.-4** Distribution of Acute Ischemic Stroke Patients according to Focal Neurological Deficit at the Time of Admission

ACUTE ISCHEMIC STROKE SUBJECTS	
FOCAL NEUROLOGICAL DEFICIT	NUMBER OF CASES
Left hemiparesis with cranial nerve palsy	37(37%)
Right hemiparesis with cranial nerve palsy	24(24%)
Isolated Right hemiparesis	05 (05%)
Isolated Left hemiparesis	11 (11%)
No Weakness (vertigo, blurring of vision, In-coordination)	13 (13%)
TOTAL	100

When compared on the basis of focal neurological deficit, maximum number of patients had left hemiparesis with cranial nerve involvement amounting to 37% followed by right hemiparesis with cranial nerve involvement which was present in 24% of the patients. On the other hand isolated left hemiparesis and right hemiparesis were present in 11% and 05% respectively. Moreover, 13% of the patients presented with the features of posterior circulatory stroke like vertigo, blurring of vision, in-coordination etc.

### Discussion

In the present study, the role of non-modifiable risk factors like age and sex in acute ischemic stroke were studied and a male predominance among stroke patients has been found, which is supported by other studies<sup>3,4</sup>

The higher male preponderance in this study may be due to the fact, that women are neglected part of the society and they are not brought to hospital, if not otherwise seriously ill. Besides, smoking which is a risk factor for acute ischemic stroke is more common in men. Aging has cumulative effects on cardiovascular system and increased chances of acquiring various risk factors, ultimately leading to stroke and it is clear from

our study that acute ischemic stroke occur more commonly in elderly as majority of the sufferers were in the 61-70 age group. In our study, hypertension was the most common risk factor (64%) followed by smoking (59%), hyperlipidemia (48%), diabetes mellitus (31%) and alcoholism (27%). The result correlates with that of other studies where hypertension was found to be the most important risk factor<sup>5,6</sup> The negative impact of hypertension in a cerebrovascular auto regulation leads to a combination of the changes on the mechanical characteristics of cerebral blood vessels induced by remodeling, stiffening and effects on myogenic tone. These changes in auto regulation are damaging to the periventricular white matter, which is located at the boundary zone between different arterial territories and is thus more liable to hypoperfusion

In this study, maximum patients had stroke due to middle cerebral artery infarction (65%) followed by posterior cerebral artery and anterior cerebral artery infarction. This might be due to the reason that larger area of brain parenchyma is supplied by middle cerebral artery and so greater chances are there for it to get involved.

In terms of focal neurological deficit, left hemiparesis was the most common finding (48%) with or without cranial nerve involvement (37% and 11%) followed by right hemiparesis. This result also correlates with few studies.<sup>7-8</sup>

### Conclusion

Acute ischemic stroke, being one of the most common cerebrovascular diseases, has drawn attention of researchers all over the world. For better understanding of the pathogenesis and therapeutics of acute ischemic stroke, clinico-epidemiological aspects and risk factors associated with ischemic stroke remains important as ever. The burden of this disabling disease can be prevented by targeting the various risk factors of the acute ischemic stroke.

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