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A CROSS-SECTIONAL STUDY ON THE IDENTIFICATION OF RISK FACTORS ASSOCIATED WITH STROKE

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Abstract

Stroke is a major neurological disorder and one of the leading causes of morbidity and mortality worldwide. It occurs due to an interruption of blood supply to the brain, resulting in impaired neurological function. The present cross-sectional study was conducted to identify the major risk factors associated with stroke among patients admitted to the Department of Neurology. A total of 60 confirmed stroke patients, diagnosed through CT or MRI, were included in the study over a period of six months. Data were collected from both inpatient and outpatient departments and analyzed based on age, gender, risk factors, and types of stroke. The study revealed that stroke incidence was higher in males compared to females. A greater proportion of cases were observed in patients above 50 years of age, indicating advancing age as a significant risk factor. Hypertension, diabetes mellitus, dyslipidemia, smoking, alcohol consumption, and cardiovascular diseases were identified as the predominant risk factors. Ischemic stroke was found to be more common than hemorrhagic stroke. The analysis also showed that younger adults below 50 years were increasingly affected due to lifestyle modifications, sedentary habits, and early onset of vascular risk factors. Early identification and management of these modifiable risk factors may significantly reduce stroke occurrence and improve patient outcomes. The study emphasizes the importance of preventive strategies, awareness programs, and timely interventions to minimize the burden of stroke in the community.

Keywords: Stroke, Risk Factors, Hypertension, Diabetes Mellitus, Ischemic Stroke, Hemorrhagic Stroke, Cross-Sectional Study.

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INTRODUCTION

Stroke is a sudden neurological deficit caused by an interruption of blood supply to the brain, resulting in loss of brain function and potential long-term disability or death. It is recognised as one of the leading causes of morbidity and mortality worldwide and imposes a significant socioeconomic burden on healthcare systems [1]. According to the World Health Organisation, stroke is the second leading cause of death globally and a major contributor to disability-adjusted life years (DALYs) [2]. The burden of stroke is rapidly increasing, especially in low- and middle-income countries, due to population ageing, urbanisation, and lifestyle transitions.

Stroke is broadly classified into two major types: ischemic stroke and hemorrhagic stroke. Ischemic stroke accounts for approximately 80–85% of all stroke cases and occurs due to blockage of cerebral blood vessels, while hemorrhagic stroke results from rupture of blood vessels within the brain [3]. The pathophysiology of stroke involves complex vascular, inflammatory, and neuronal mechanisms leading to irreversible brain damage if not managed promptly [4].

Several modifiable and non-modifiable risk factors have been associated with stroke. Non-modifiable factors include age, gender, genetic predisposition, and ethnicity, whereas modifiable risk factors include hypertension, diabetes mellitus, dyslipidemia, smoking, obesity, alcohol consumption, and cardiovascular disorders [5,6]. Among these, hypertension remains the most significant risk factor, contributing to nearly 50% of stroke cases globally [7]. Diabetes mellitus is another major contributor, as chronic hyperglycemia accelerates atherosclerosis and vascular injury [8]. Recent evidence suggests that stroke is increasingly affecting younger populations due to sedentary lifestyles, unhealthy dietary habits, stress, and the rising prevalence of metabolic disorders [9]. Early identification of risk factors is crucial for implementing preventive measures and reducing stroke incidence. Cross-sectional studies play an important role in understanding the prevalence and distribution of these risk factors in specific populations [10-14].

Therefore, the present study was undertaken to identify and analyse the major risk factors associated with stroke among patients attending a tertiary care hospital. Understanding these factors may help in designing targeted prevention strategies and improving clinical outcomes.

MATERIALS AND METHODS

Study Design

The present study was designed as a prospective observational study to evaluate the clinical outcomes and therapeutic management of patients diagnosed with Stroke.

Study Site

The study was carried out at Gleneagles Hospitals, Lakdikapul, Hyderabad.

Study Duration

The study was conducted over a period of six months (July to December).

Sample Size

A total of 60 patients diagnosed with stroke were included in the study.

Source of Data Collection

Data were collected from various sources, including:

- Patient data collection forms
- Patient case notes and prescriptions (inpatient and outpatient)
- Laboratory investigation reports
- Patient medication history

Inclusion Criteria

Patients fulfilling the following criteria were included in the study:

- Patients of all age groups
- Patients with confirmed diagnosis of stroke
- Conscious and cooperative patients
- Patients willing to provide informed consent

Exclusion Criteria

The following patients were excluded:

- Unconscious and non-cooperative patients
- Pregnant and lactating women

Study Procedure

Eligible patients were enrolled after obtaining informed consent. Baseline demographic details, clinical history, laboratory findings, and medication history were documented. Patients were monitored during the study period to assess treatment patterns, therapeutic outcomes, and clinical progression [15-18].

Statistical Analysis

The collected data were analysed using appropriate statistical methods and expressed in the form of frequencies, percentages, and mean values [19, 20].

Ethical Consideration

The study was conducted after obtaining approval from the Institutional Ethics Committee of the hospital, and all patient data were handled confidentially according to ethical guidelines.

RESULTS AND DISCUSSION

Distribution of Patients Based on Age (<50 years and >50 years)

The age-wise distribution showed that out of 60 patients, 20 patients (33%) were below 50 years and 40 patients (67%) were above 50 years, as shown in Table 01. This indicates that stroke was more prevalent in the elderly population, which may be due to increased vascular degeneration and associated co-morbidities with advancing age.

Table 01: Distribution of patients based on age (<50 years and >50 years)

Age Group	Number of Patients	Percentage (%)
Below 50 years	20	33
Above 50 years	40	67

Distribution of Patients Based on Various Risk Factors

The analysis of risk factors revealed that hypertension (43 patients) was the most common risk factor, followed by smoking (35 patients) and alcohol consumption (33 patients), as represented in Table 02 and Figure 01. Older patients (>50 years) showed a higher prevalence of multiple risk factors compared to younger patients, suggesting cumulative vascular risk with age.

Table 02: Distribution of patients based on various risk factors

Risk Factors	Total Patients	Below 50	Above 50
Hypertension	43	10	33
Diabetes Mellitus	24	7	17
Dyslipidemia	20	7	13
Smoking	35	8	27
Alcohol	33	8	25
De novo Hypertension	6	6	0
Cardiovascular Disease	15	3	12
De novo DM	1	1	0

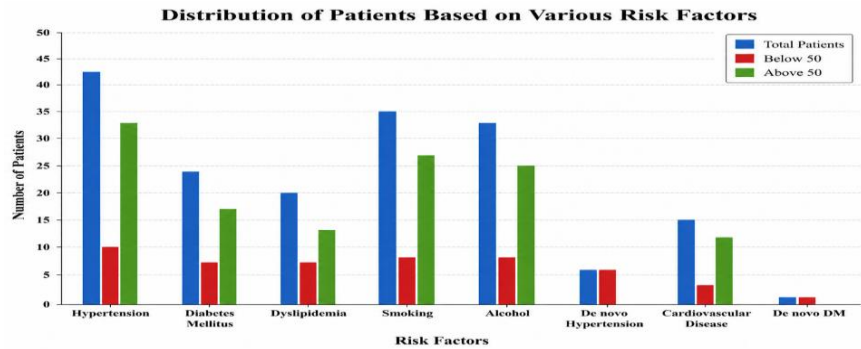


Figure 01: Distribution of Stroke Patients Based on Various Risk Factors across Age Groups

Risk Factors in Young Adults

Among younger stroke patients, hypertension (80%) was the most predominant risk factor, followed by diabetes mellitus, smoking, and alcohol use (40% each), as shown in Table 03 and Figure 02. This finding indicates that lifestyle-related factors significantly contribute to early-onset stroke.

Table 03: Risk factors in young adults

Risk Factors	Number of Patients	Percentage (%)
Hypertension	16	80
Diabetes Mellitus	8	40
Dyslipidemia	7	35
Smoking	8	40
Alcohol	8	40
Cardiovascular Disease	3	15

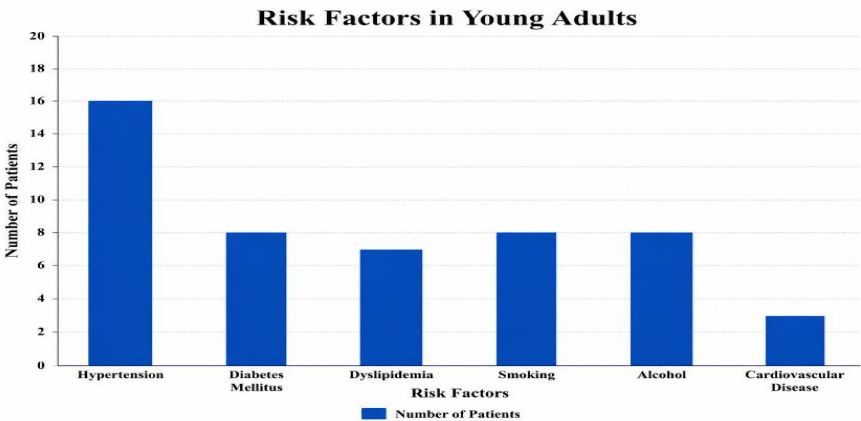


Figure 02: Distribution of major risk factors associated with stroke among young adults.

Gender-wise Distribution

Out of 60 patients, 43 (72%) were male and 17 (28%) were female, as shown in Table 04. The higher male predominance may be attributed to increased exposure to modifiable risk factors such as smoking, alcohol, and hypertension.

Table 04: Gender-wise distribution of patients

Gender	Total Number of Patients	Percentage (%)
Male	43	72
Female	17	28

Distribution of Patients According to Risk Factors

The study revealed that 55 patients (91.6%) had at least one risk factor, while only 5 patients (8.4%) had no risk factors, as presented in Table 5. This strongly supports the role of co-existing risk factors in stroke occurrence.

Table 05: Distribution of patients according to risk factors

Category	Total Number of Patients	Percentage (%)
With risk factors	55	91.6
Without risk factors	5	8.4

Gender Distribution Based on Age

The age and gender distribution showed that the highest number of male patients were in the 61–70 years age group (14 cases), whereas female patients were mostly concentrated in the 51–60 years age group (6 cases), as shown in Table 6 and Figure 3. This indicates increased stroke incidence in older males.

Table 06: Gender distribution based on age

Age Group	Males	Females
21–30 years	2	2
31–40 years	5	3
41–50 years	7	1
51–60 years	11	6
61–70 years	14	2
71–80 years	6	0
91–100 years	0	1

Gender Distribution Based on Age

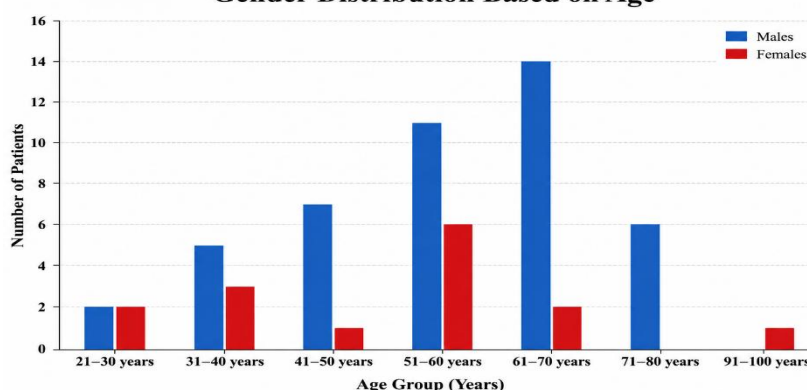


Figure 03: Gender-wise Distribution of Stroke Patients across Different Age Groups

Distribution Based on Types of Strokes

Among the 60 patients, 51 patients (85%) were diagnosed with ischemic stroke, while 9 patients (15%) had hemorrhagic stroke. This indicates that ischemic stroke remains the predominant type of stroke in the study population.

Age-wise Distribution of Stroke Patients

The majority of stroke patients belonged to the 51–60 years (28.3%) and 61–70 years (26.6%) age groups, as shown in Table 7 and Figure 4. This suggests that stroke incidence increases significantly with advancing age.

Table 07: Age-wise distribution of patients

Age Group	Number of Patients	Percentage (%)
21–30 years	4	6.6
31–40 years	8	13.3
41–50 years	8	13.3
51–60 years	17	28.3
61–70 years	16	26.6
71–80 years	6	10
91–100 years	1	1.6

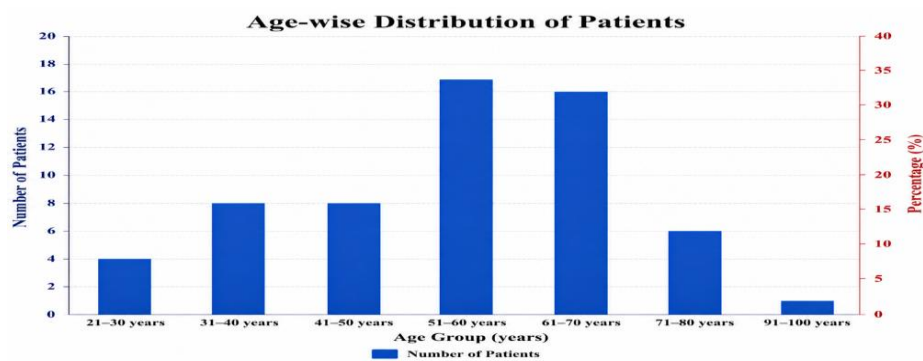


Figure 04: Age-wise distribution of stroke patients included in the study population.

Age-wise Distribution Based on Risk Factors

Age-wise risk factor distribution showed that the highest number of patients with risk factors was in the 51–60 years (17 cases) and 61–70 years (15 cases) age groups, as shown in Table 08 and Figure 05. This indicates a strong association between age-related risk factors and stroke incidence.

Table 08: Age-wise distribution based on risk factors

Age Group	With Risk Factors	Without Risk Factors
21–30 years	1	3
31–40 years	7	1
41–50 years	8	0
51–60 years	17	0
61–70 years	15	1
71–80 years	6	0
91–100 years	1	0

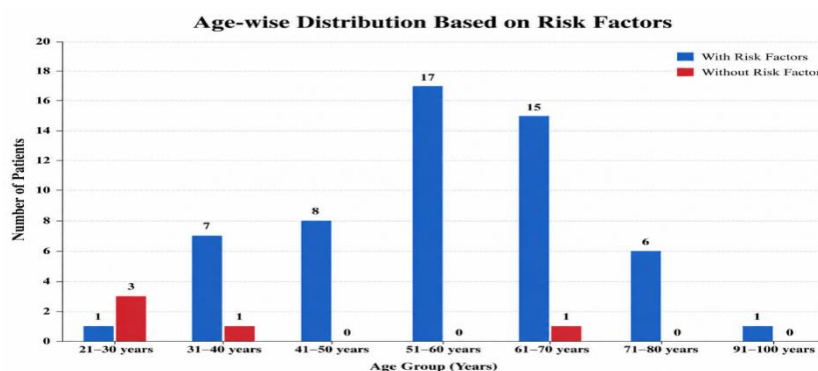


Figure 05: Age-wise Distribution of Stroke Patients Based on Presence of Risk Factors

CONCLUSION

The present study concludes that stroke remains a serious public health concern, predominantly affecting individuals above 50 years of age, although younger adults are also increasingly at risk. Hypertension, diabetes mellitus, smoking, alcohol intake, dyslipidemia, and cardiovascular disorders were identified as the major contributing factors. Among the different types, ischemic stroke was more prevalent than hemorrhagic stroke. The findings highlight the significance of early diagnosis, regular screening, and effective management of modifiable risk factors to reduce stroke incidence. Public awareness regarding healthy lifestyle practices, dietary modifications, and routine medical check-ups can play a crucial role in stroke prevention. Overall, timely intervention and risk factor control can significantly improve patient prognosis and reduce stroke-related morbidity and mortality.

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Nil

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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AUTHOR CONTRIBUTIONS

V. Anudeep conceived and designed the study. Ch. Anusha, MD. Muntaz Ahmed, and M. Keerthi contributed to data collection, data analysis, literature review, manuscript preparation, and critical revision. All authors read and approved the final version of the manuscript.

ETHICAL STATEMENT

The ethical committee clearance was obtained from Gleneagles Global Hospital before initiating the study. Reference number: AIPS/ 04/ IEC/05

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