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COMPARATIVE STUDY BETWEEN ISCHEMIC AND HEMORRHAGIC STROKE BASED ON RISK FACTORS

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ABSTRACT

Background: Stroke is the second leading cause of death worldwide, and the leading cause of acquired disability in adults in most regions. Countries of low‐ and middle‐income have the largest burden of stroke, accounting for more than 85% of stroke mortality worldwide. Aim: The aim of this study was to compare between haemorrhagic stroke (HS) and ischaemic stroke (IS) stroke in relation to risk factors and clinical presentation among stroke patients admitted to a tertiary care teaching hospital. Method: A Retrospective Cross-Sectional study was conducted in FIMS, Kadapa, a 300 bedded tertiary care teaching hospital. The sources of data was collected from patient document forms. The data collected from the prescriptions was entered in data collection forms for evaluation. Result: 60 stroke patients were categorized based on age, gender, occupation and risk factors like(hypertension, diabetes mellitus, smoking, alcohol etc) Out of 60 stroke cases, 43(71.6%) patients have hypertension as a risk factor(25- ischemic and 18- haemorrhagic), 21(35%) patients have diabetes mellitus as a risk factor(17- ischemic and 4- haemorrhagic), 19(31.6%) patients have smoking as a risk factor (12- ischemic and 7- haemorrhagic), 16 (26.6%)patients have alcohol as a risk factor (11- ischemic and 5- haemorrhagic). Conclusion: We concluded that, old age, diabetes mellitus and smoking were more frequent among Ischemic stroke than hemorrhagic stroke patients. While Hypertension and smoking were found to be major risk factors in hemorrhagic stroke than ischemic stroke patients. Impaired consciousness including coma and in‐hospital fatality was more among HS than in IS patients.

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INTRODUCTION

Stroke is the second leading cause of death worldwide, and the leading cause of acquired disability in adults in most regions. Countries of low- and middle- income have the largest burden of stroke, accounting for more than 85% of stroke mortality worldwide. Few reliable data are available to identify risk factors for stroke in most of these regions, particularly for haemorrhagic stroke (HS). Stroke has many risk factors such as age, male sex, hypertension, diabetes, cardiac diseases, transient ischaemic attacks (TIA) smoking, hyperlipidaemia and previous attacks of stroke. Although ischaemic stroke (IS) is more common than HS.[6- 8] The latter is the most devastating pathological type of stroke and accounting for 9%–22% of total strokes among Western populations. In some developing countries, HS recorded higher frequencies.

Epidemiology

Stroke is the fifth leading cause of death in the US. The incidence of stroke is around 800,000 people annually. Stroke is the leading cause of disability. The incidence of stroke has declined, but the morbidity has increased. Due to longer life expectancy, the lifetime risk of stroke is higher in women. Globally, at least 5 million people die from strokes and millions of others remain disabled.

Type of Stroke:

The type of stroke you have affects treatment and recovery. The three main types of stroke are:

1. **Ischemic stroke.**
2. **Hemorrhagic stroke.**

Another condition that's similar to a stroke is a transient ischemic attack (TIA). It's sometimes called a "mini-stroke." TIAs happen when the blood supply to the brain is blocked for a short time.

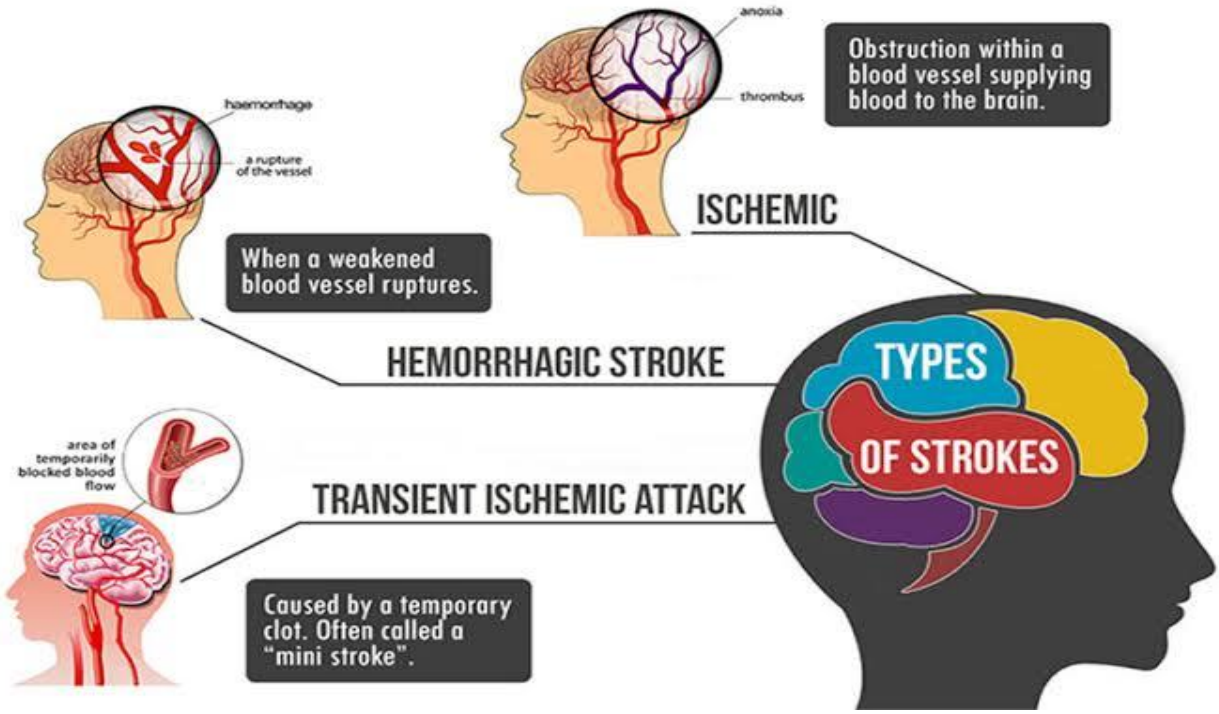

Fig no; 01 Types of stroke.

Ischemic Stroke:

Most strokes (87%) are ischemic strokes. An ischemic stroke happens when blood flow through the artery that supplies oxygen-rich blood to the brain becomes blocked.

Symptoms of ischemic stroke:

The symptoms depend on which parts of brain are affected.
They can include :

- Sudden numbness or weakness of face, arm, or leg, often on one side of the body
- Confusion
- Aphasia
- Dizziness, loss of balance or coordination, or trouble walking
- Vision loss or double vision etc.

Etiology of ischemic stroke:

- Atherosclerosis
- Atrial fibrillation
- Heart attack
- Injury to blood vessels in neck
- Blood clotting problem

Hemorrhagic Stroke:

A hemorrhagic stroke happens when an artery in the brain leaks blood or ruptures (breaks open). The leaked blood puts too much pressure on brain cells, which damages them.High blood pressure and aneurysms—balloon-like bulges in an artery that can stretch and burst—are examples of conditions that can cause a hemorrhagic stroke.

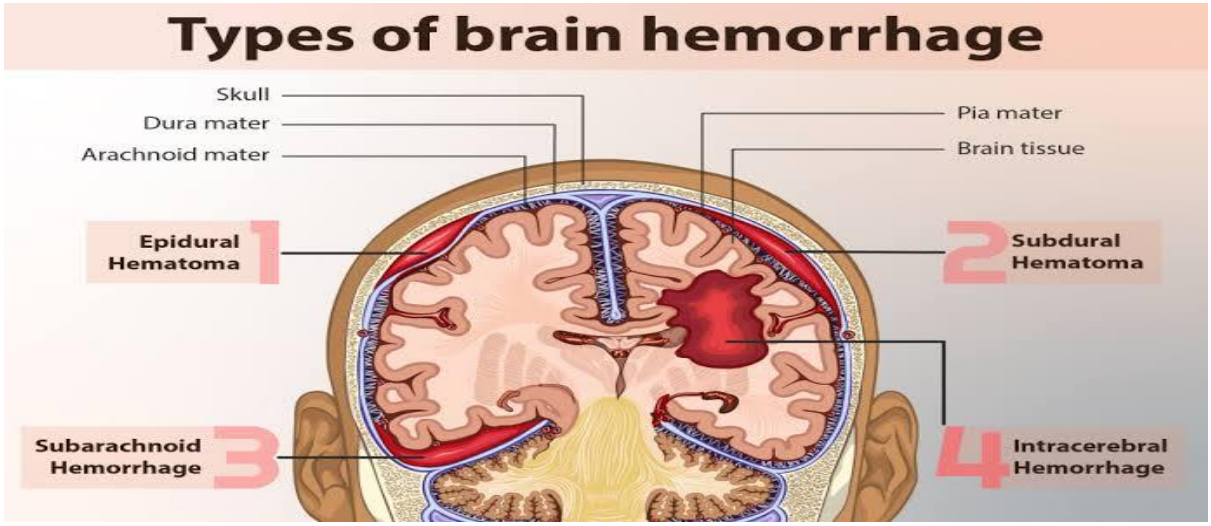

Fig no: 02 Types of hemorrhagic stroke.

Symptoms:

- Hemiplegia or hemiparesis
- Aphasia
- Sudden trouble seeing in one or both eyes
- Sudden trouble walking, dizziness or loss of balance or coordination
- Sudden severe headache.

Etiology:

- Aneurysms
- Arterio venous malformation
- Vasculitis
- Pituitary apoplexy
- Cerebral amyloid angiopathy
- Tumors (Glioblastoma, lymphoma, meningioma, pituitary adenoma.)

Aim Of The Study:

The aim of this study was to compare between haemorrhagic stroke (HS) and ischaemic stroke (IS) stroke in relation to risk factors and clinical presentation among stroke patients admitted to a tertiary teaching hospital

Need Of The Study :

- Stroke is the second leading cause of death worldwide, and the leading cause of acquired disability in adults.
- Risk factors in both the type of strokes are common but mortality will be higher in HS when to IS
- The stroke incidence rate in India is much higher than in other developing countries with approximately 1.8 million Indians out of a population of 1.2 billion suffering from stroke every year.
- India has been experiencing significant demographic, economic and epidemiological transition during the past two decades.

Objectives:

- To study & evaluate the differences between haemorrhagic stroke (HS) and ischaemic stroke (IS) stroke in relation to risk factors.
- To study prevalence of strokes in respect to co morbidities.
- To Study the clinical management of stroke in improving life expectancy.

METHODOLOGY

Study design: A retrospective cross-sectional study.
Study site: Neurology Department, FIMS, Kadapa
Study duration: 6 months.
Sample size: 20 - 30 patients of each type approx.

Inclusion Criteria:

- Patients who are willing to participate in the study.
- Patients who have diagnosed with either the type of Stroke

Exclusion Criteria:

- Patients who are not willing to participate in the study.
- Patients who are having stroke due to accidental traumas.

Materials Of The Study:

- Biomedical literatures.
- Inform consent form
- Data collection form.

Study Method :

A Retrospective Cross-Sectional study was conducted in FIMS, Kadapa, a 300 bedded tertiary care teaching hospital. The sources of data was collected from patient document forms.

Statistical Analysis :

Data was processed and Chi‑square test was used to compare age, gender, risk factors, clinical presentations and outcome. Data was estimated for odds ratio (OR) and 95% confidence interval (CI) for risk factors. The results obtained from the above methods are represented in the form of tables and graphs.

RESULTS

This study involved all stroke patients admitted to the medical department of FIMS between december 2020 – may 2021. This hospital is considered as a tertiary‑level hospital providing medical care to patients from Kadapa Dist. region .

During this period 60 stroke patients were admitted in the medical department and these patients are categorized based on age, gender, occupation and risk factors like(hypertension, diabetes mellitus, smoking, alcohol etc)

Table No 1: AGE DISTRIBUTION IN STROKE PATIENTS- COMPARATIVE STUDY.

AGE DISTRIBUTION	NO OF PATIENTS	
	ISCHEMIC STROKE	HAEMORRHAGIC STROKE
10-20	0	1
21-30	0	0
31-40	3	2
41-50	8	4
51-60	8	4
61-70	13	6
71-80	3	3
81-90	1	4

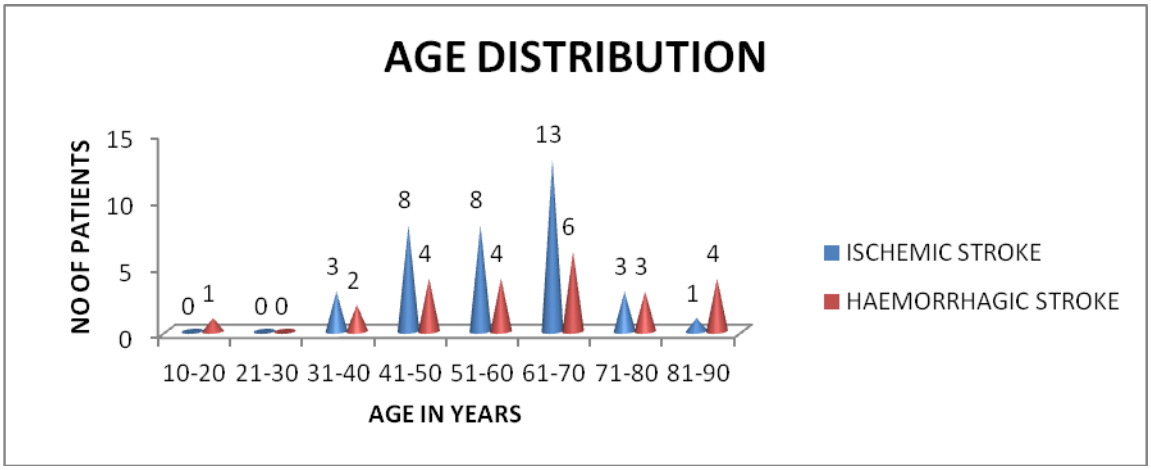

Fig No: 03 Age distribution in stroke patients –comparative study.

In total number of 60 stroke cases, incidence of stroke in the age group of 61-70years (13-ischemic stroke, 6-haemorrhagic stroke) was more and incidence of stroke in the age group of 10-20 and 21-30 years was found to be less.

Table No :2 GENDER DISTRIBUTION IN STROKE PATIENTS.

GENDER DISTRIBUTION	NO OF PATIENTS	
	ISCHEMIC	HAEMORRHAGIC
MALE	26	17
FEMALE	10	7

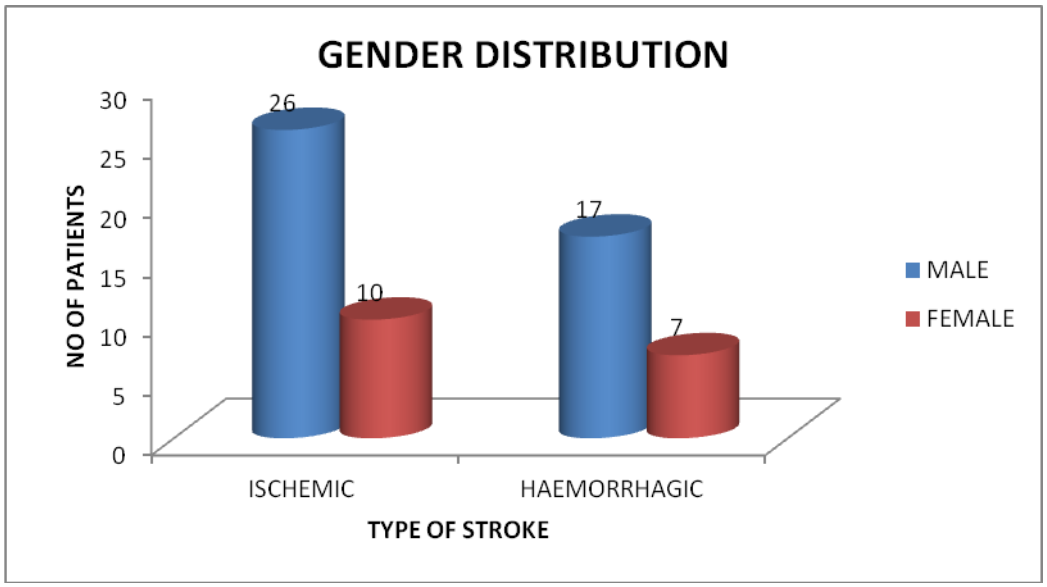

Fig No:04 GENDER SIDTRIBUTION IN STROKE PATIENTS.

From all the 60 stroke cases, 43 stroke cases(71.6%) are found to be in Males (26-ischemic stroke and 17-haemorrhagic stroke) and 17 cases(28.3%) are found to be in Females(10-ischemic stroke and 7-haemorrhagic stroke).

Table No:3 DISTRIBUTION BASED ON HYPERTENSION AS A RISK FACTOR.

HYPERTENSION	NO OF PATIENTS	
	ISCHEMIC STROKE	HAEMORRHAGIC STROKE
YES	25	18
NO	11	6

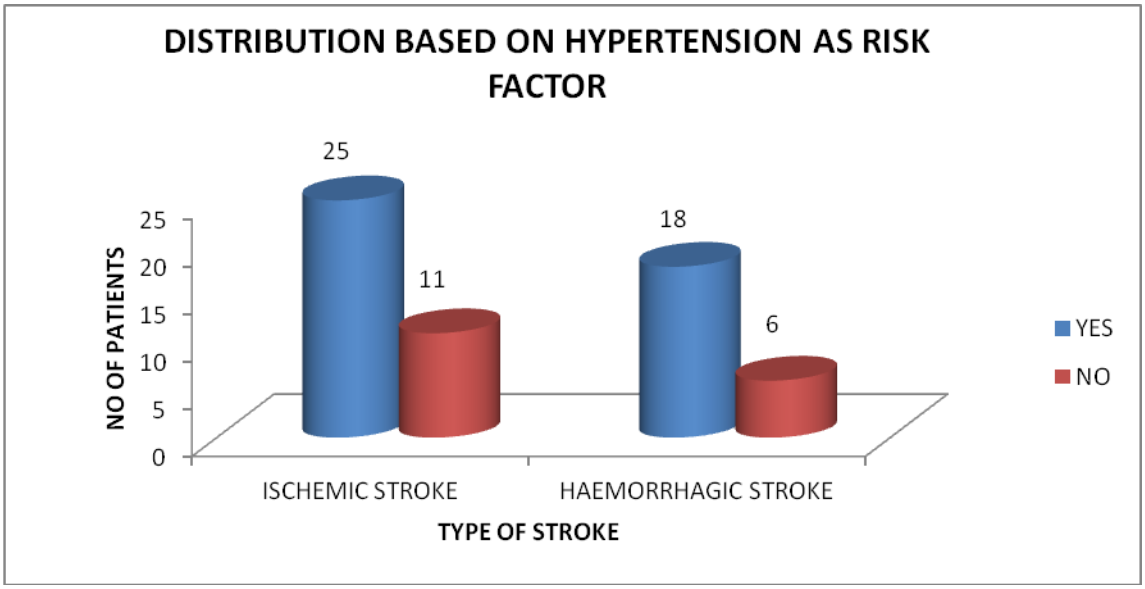

Fig No:05 COMPARISION BASED ON HYPERTENSION AS RISK FACTOR.

Out of 60 stroke cases , 43(71.6%)stroke patients are found to have hypertension(25-ischemic and 18-haemorrhagic) and 17(28.3%) stroke patients does not have hypertension (11-ischemic and 6- haemorrhagic.

Table No:4 DISTRIBUTION BASED ON DIABETES AS RISK FACTOR.

DIABETES MELLITUS	ISCHEMIC STROKE	HAEMORRHAGIC STROKE
YES	17	4
NO	19	20

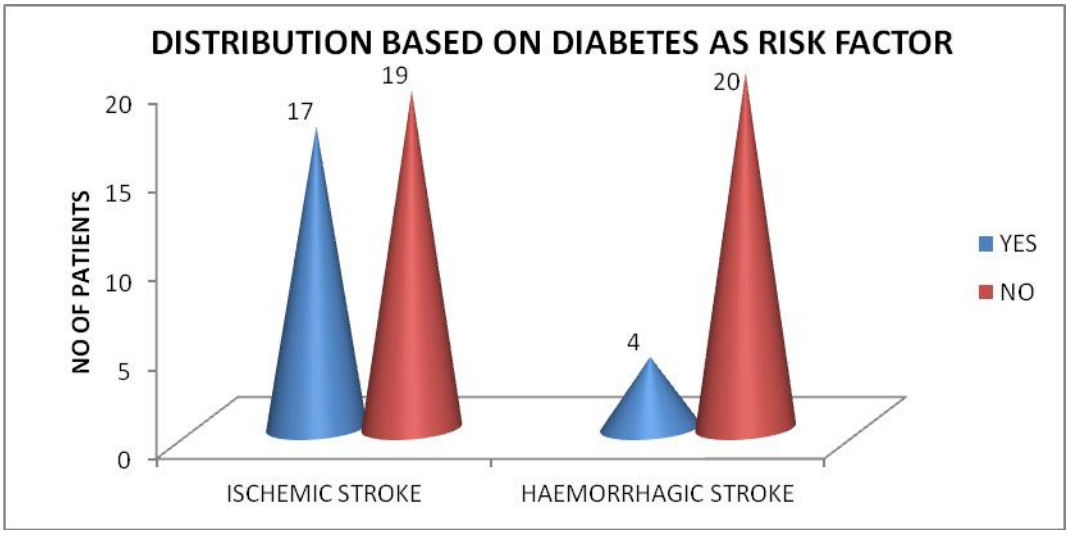

Fig No:06 COMPARISION BASED ON DM AS A RISK FACTOR.

Out of all 60 stroke cases, 21(35%) stroke patients are found to have diabetes mellitus(17-ischemic and 4- haemorrhagic) and 39 (65%) stroke patients does not to have diabetes mellitus (19- ischemic and 20- haemorrhagic).

Table No:5 DISTRIBUTION BASED ON SMOKING AS RISK FACTOR.

SMOKING	NO OF PATIENTS	
	ISCHEMIC STROKE	HAEMORRHAGIC STROKE
YES	12	7
NO	24	17

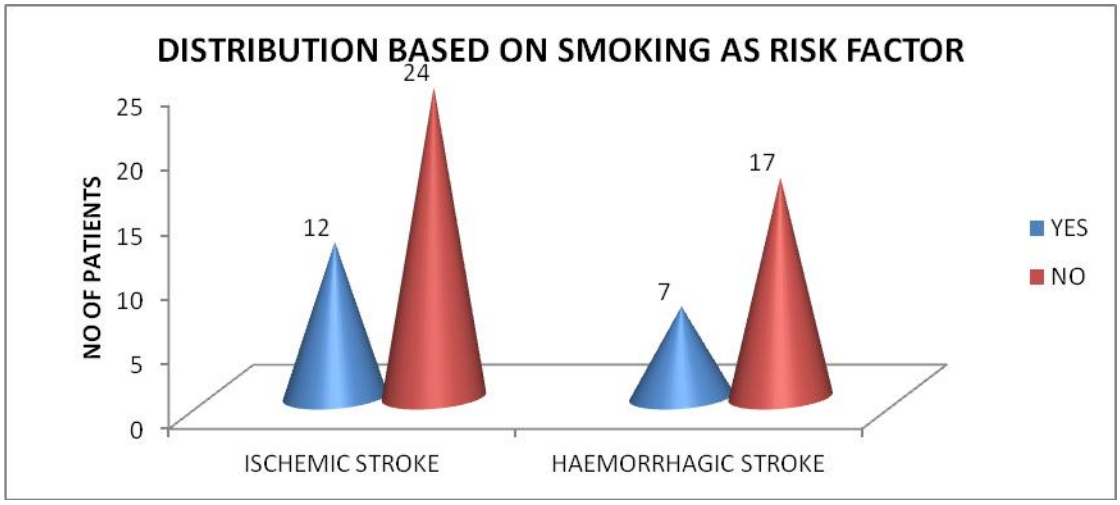

Fig No:07 COMPARISION BASED ON SMOKING AS A RISK FACTOR.

Out of 60 stroke patients , 19 (31.6%)stroke patients was found to have a smoking addiction(12-ischemic and 7-haemorrhagic) and 41(68.3%) stroke patients does not have smoking habit(24- ischemic and 17-haemorrhagic)

Table No: 6 DISTRIBUTION BASED ON ALCOHOL AS RISK FACTOR.

	NO OF PATIENTS	
ALCOHOL	ISCHEMIC STROKE	HAEMORRHAGIC STROKE
YES	11	5
NO	25	19

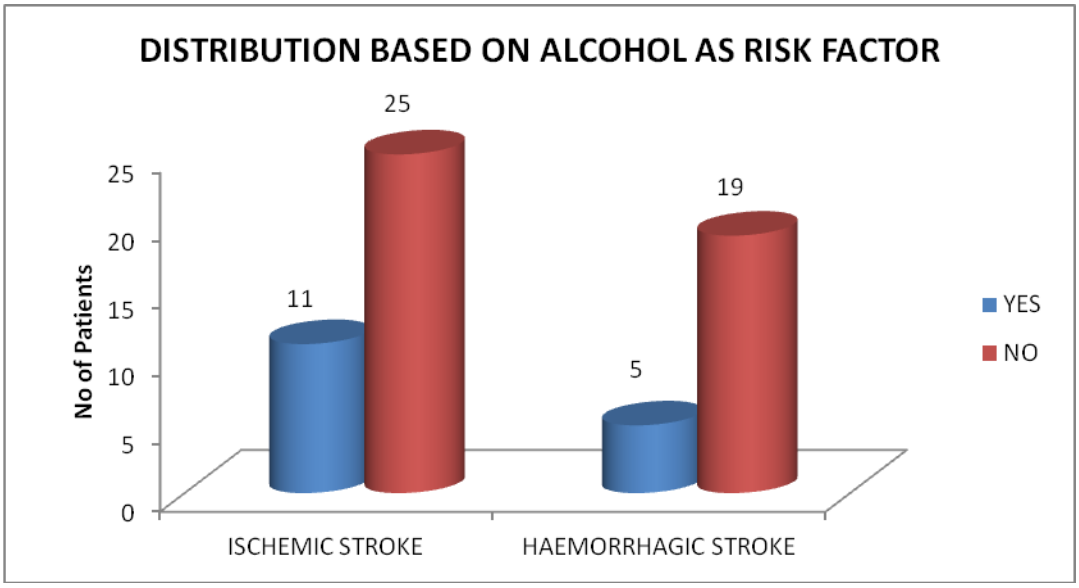

Fig No:08 COMPARISION BASED ON ALCOHOL AS A RISK FACTOR.

Out of 60 stroke patients , 16 (26.6%)stroke patients have a history of alcohol addiction(11-ischemic and 5- haemorrhagic) and 44(73.3%) stroke patients does not have a history of alcohol addiction(25-ischemic and 19-haemorrhagic) .

Table No:7 DISTRIBUTION BASED ON TYPE OF RISK FACTOR – A COMPARATIVE STUDY.

TYPE OF RISK FACTOR	ISCHEMIC STROKE	HAEMORRHAGIC STROKE
HYPERTENSION	25	18
DIABETES	17	4
SMOKING	12	7
ALCOHOLIC	11	5

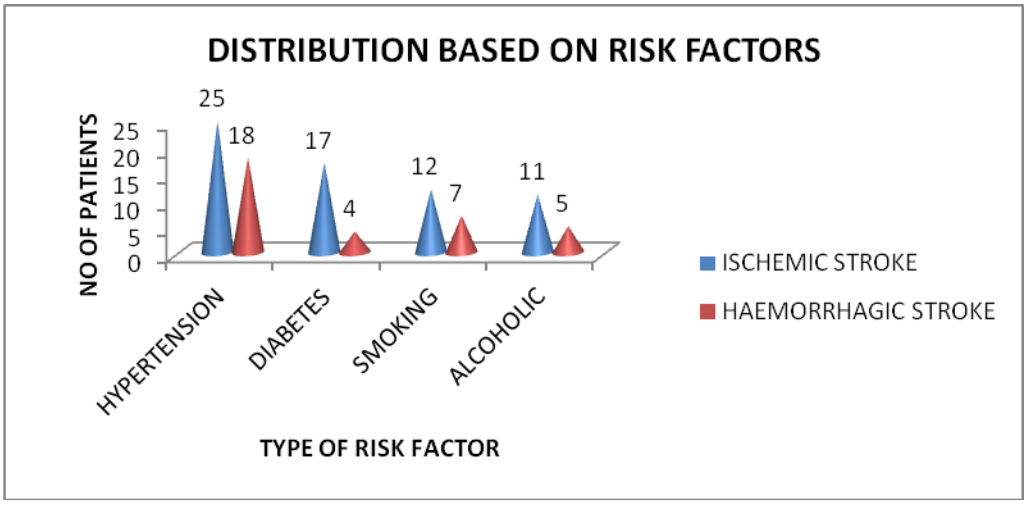

Fig No:09 DISTRIBUTION BASED ON RISK FACTORS- COMPARITIVE STUDY.

Out of 60 stroke cases, 43(71.6%) patients have hypertension as a risk factor(25- ischemic and 18- haemorrhagic), 21(35%) patients have diabetes mellitus as a risk factor(17- ischemic and 4- haemorrhagic), 19(31.6%) patients have smoking as a risk factor (12- ischemic and 7- haemorrhagic), 16 (26.6%)patients have alcohol as a risk factor (11- ischemic and 5- haemorrhagic).

DISCUSSION

There were many studies for stroke carried out, but limited studies which compared between Haemorrhagic stroke and Ischemic stroke.

The World Health Organization (WHO) definition of stroke is: "rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin". By applying this definition transient ischemic attack (TIA), which is defined to last less than 24 hours, and patients with stroke symptoms caused by subdural hemorrhage, tumors, poisoning, or trauma are excluded.

In demographically developed countries, the average age at which stroke occurs is around 60-70 years reflecting the older age structure of these countries.

Stroke is the fifth leading cause of death in the US. The incidence of stroke is around 800,000 people annually. Stroke is the leading cause of disability. The incidence of stroke has declined, but the morbidity has increased. Due to longer life expectancy, the lifetime risk of stroke is higher in women. Globally, at least 5 million people die from strokes and millions of others remain disabled Stroke patients are at highest risk of death depending on type, severity, age, comorbidity and effectiveness of treatment. Patients who survive maybe left with no disability or with mild, moderate or severe disability. Considerable spontaneous recovery occurs up to about six months. However, patients with a history of stroke are at risk of a subsequent event of around 10% in the first year and 5% per year thereafter.

According to our study, age group of 61-70 years are found to be affected by stroke more than any other age group. Risk factors like Hypertension and smoking found to be the major risk factor among stroke patients. Out of 60 stroke cases, 43(71.6%) patients have hypertension as a risk factor(25- ischemic and 18- haemorrhagic), 21(35%) patients have diabetes mellitus as a risk factor(17- ischemic and 4- haemorrhagic), 19(31.6%) patients have smoking as a risk factor (12- ischemic and 7- haemorrhagic), 16 (26.6%)patients have alcohol as a risk factor (11- ischemic and 5- hemorrhagic).

CONCLUSION

We concluded that,' old age, diabetes mellitus and smoking were more frequent among Ischemic stroke than hemorrhagic stroke patients. While Hypertension and smoking were found to be major risk factors in hemorrhagic stroke than ischemic stroke patients. Impaired consciousness including coma and in- hospital fatality was more among HS than in IS patients' . According to this study ,major risk factors of stroke can be avoided by making life style changes so that incidence of stroke will be decreased .It is expected in the future that comparative studies of risk factors of stroke will significantly contributes to the medical sciences.

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AUTHORS STATEMENTS

No conflict of interest

ABBREVIATIONS

HTN	-	Hypertension
DM	-	Diabetes mellitus
IS	-	Ischemic stroke
HS	-	Hemorrhagic stroke
TIA	-	Transient ischemic attack
CVA	-	Cerebro-vascular accident
AVM	-	Arterio-venous malformation
RtPA	-	Recombinant tissue plasminogen activator
WHO	-	World health organization
BP	-	Blood Pressure
NIHSS	-	National Institutes of Health Stroke Scale
JNC8	-	The eighth joint national committee
NIH	-	National institute of neurological disorders and stroke
MRI	-	Magnetic resonance imaging
US	-	United states
ANS	-	Autonomic Nervous System
HR	-	Heart rate

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