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PROSPECTIVE OBSERVATIONAL STUDY ON ASSESSMENT OF CLINICAL PROFILE, PREVALENCE, SEVERITY AND DRUGS USED TO TREAT STROKE

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ABSTRACT

Introduction: Stroke is the second most prevalent cause of mortality worldwide after ischemic heart disease, it is the most prevalent neurological illness that is life-threatening worldwide, the primary cause of impairment among the aged, and has an impact on people, their families, and society as a whole. The current study's objectives include figuring out the prevalence of stroke, examining the clinical and radiological profile of stroke, figuring out how severe a stroke is, figuring out the risk factor profile, and enhancing stroke care. **Methodology:** 170 stroke patients participated in the current cross-sectional observational study, which was carried out in a tertiary care hospital. Both IP and OP patients were taken into this study. Prevalence of stroke and its types were assessed. Demographic details, clinical profile, severity assessment was done among 170 patients with stroke. **Results:** In this study, among the study population 170, 90 were females and 80 were males, which shows that stroke was more prevalent in females followed by males. In this study, Stroke was more in the age group 61 to 70, followed by >=71, 51-60, 41-50 and less than 40 year age groups. In this study, majority of the patients have ischemic stroke followed by hemorrhagic stroke and TIA. As per this study, prevalence of ischemic stroke is high followed by hemorrhagic stroke and TIA. Majority of the patients were unable to move their limbs followed by mouth deviation, slurred speech, loss of vision, altered sensorium, convulsions, headache, vomiting and loss of consciousness. In this study, National Institutes of Health Stroke Scale was used to assess severity of stroke in patients. Most of the patients had minor stroke followed by moderate, moderate to severe and severe stroke. In this study multiple risk factors were observed among the stroke patients. Most of the patients had hypertension followed by diabetes, smoking, alcohol, history of stroke, hyperlipidemia, obesity, family history of stroke, heart diseases, physical inactivity and chronic kidney disease. **Conclusion:** Our study demonstrates that the prevalence of stroke is rising and gets worse as people get older. The age range of more than 61 to 70 was where the great majority of patients with stroke belonged. Prevalence of stroke is high in females. Hemiplegia, or the inability of most patients to move both their upper and lower limbs, was the most frequent clinical symptom. Other symptoms included mouth deviation, slurred speech, loss of eyesight, altered sensorium, convulsions, headache, vomiting, and loss of consciousness. In summary, our research on patients with stroke indicates that ischemic brain stroke is more common than hemorrhagic brain stroke, and that females are more likely than males to get an ischemic brain stroke.

KEYWORDS: *Stroke, Ischemic Stroke, Hemorrhagic Stroke, Coronary Artery Disease, Hypertension, Cerebrovascular Accident.*

INTRODUCTION

The brain is the physical part that is the most intelligent and complicated. It is in charge of regulating almost all bodily processes, including respiration, heartbeat, cognition, and emotions. The brain is made up of billions of neurons, which work together to form a massive network of connections that enable us to sense our environment, interact with others, and perform challenging tasks. Processing sensory information from the environment is one of the brain's most crucial jobs. This encompasses information received through the five senses: taste, smell, touch, hearing, and sight. The brain takes in this data and utilises it to build a mental picture of the environment. Another critical function of the brain is to control movement.[1]

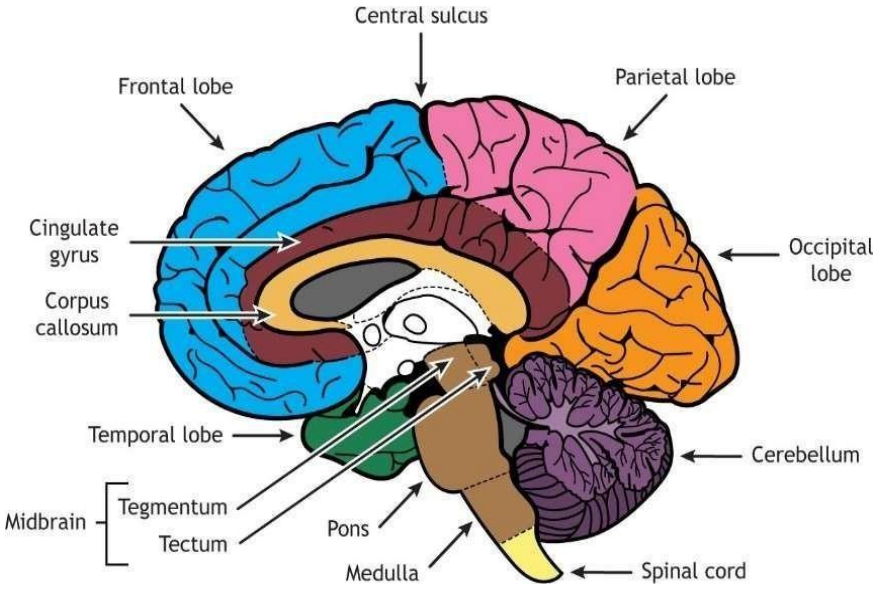


Fig 1.1: Structure of Brain.

Movement regulation is another crucial brain function. Reaching for an item or walking are examples of voluntary motions that are initiated and coordinated by the brain. Moreover, it controls uncontrollable actions like breathing and pulse. The motor cortex, which is found in the frontal lobe of the brain, facilitates this. The temporal lobe which is important for both the storage and recall of memories. The frontal lobe's prefrontal cortex is in charge of executive abilities including planning, judgment, and problem-solving.[2]

Stroke

When blood supply to a part of the brain is interrupted, a medical emergency known as a cerebrovascular accident—also known as a brain stroke—occurs. This decrease in blood flow may damage brain tissue, result in permanent disability, or even be fatal. The three main types of stroke are transient ischemic attack (TIA), hemorrhagic stroke, and ischemic stroke.).[5]

Ischemic strokes are brought on by blockages in the blood arteries that supply the brain, which reduces the amount of blood and oxygen reaching the brain's cells. Ischemic strokes can be divided into two categories:

- Thrombotic stroke: A thrombus forms in one of the arteries feeding the brain, resulting in a thrombotic stroke. This kind of stroke typically happens in regions of the brain like the carotid artery that are at high risk for atherosclerosis (the development of plaque in the arteries).
- Embolic stroke: An embolic stroke is brought on when a blood clot or other piece of debris passes from the heart to the brain. Usually, this kind of stroke affects the brain's tiny blood veins.

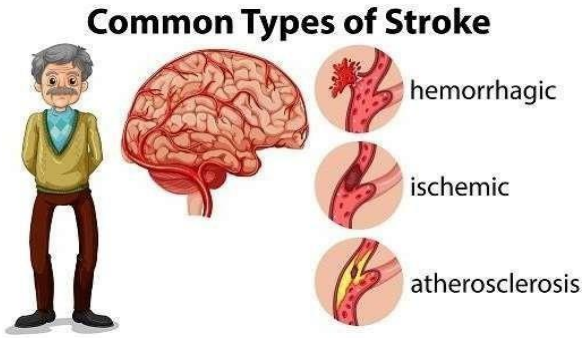


Fig. 1.2: Types of Stroke.

The rupture of a blood vessel in the brain causes hemorrhagic stroke.

- Intracerebral hemorrhage: This type of bleeding takes place inside the brain's actual tissue. High blood pressure or other underlying disorders that weaken the blood arteries in the brain frequently cause this type of stroke
- Subarachnoid hemorrhage: This type of bleeding takes place when there is a hole between the brain and the skull. This kind of stroke is frequently brought on by the rupture of an aneurysm in the brain, which is a bulge in the blood artery wall.

A Trans Ischemic Attack (TIA) is a brief interruption in blood flow to the brain that resolves on its own in a matter of minutes to hours. It is sometimes referred to as a mini-stroke. TIAs should be addressed seriously since they frequently signal an oncoming stroke.[6,7]

Epidemiology

Stroke is the main cause of mortality and disability in India, according to the Indian Stroke Association. In India, there are 1.8 million stroke victims annually, and around one-third of them pass away within the first month. In India, the prevalence of stroke is rising, and it is predicted that by 2030, there will be 3.6 million stroke

cases annually. [8] The high incidence of stroke in India is a result of the high prevalence of certain risk factors. For instance, it is estimated that diabetes affects 7.8% of Indians and that hypertension affects about 29% of Indians.[9]

Etiology[12,13,14,15]

- Hypertension.
- Smoking.
- Obesity.
- Diabetes

Pathogenesis

A stroke, often referred to as a cerebrovascular accident (CVA), is a medical disorder that happens when the blood supply to a specific area of the brain is interrupted. A blood artery

Blockage or brain hemorrhage may be to blame for this. A complicated interaction of various elements involved in the pathophysiology of stroke eventually results in the loss of brain cells and neurological impairments. The ischemic cascade occurs in the afflicted region of the brain minutes after the blockage or hemorrhage. This entails a number of biochemical and physiological processes, including as cell death, oxidative stress, and inflammation, which can further harm the brain tissue.

Brain cells begin to die in a number of ways after the blood supply has been cut off. Initially, the infarcted tissues reduced blood supply causes nearby penumbra tissue to necrotize and cellular metabolism to slow down. Second, when the sodium/potassium pump fails due to reduced adenosine 5′-triphosphate synthesis, the depolarization of the cell permits calcium to enter, which triggers cell death via the intrinsic route. In this situation, oxygen depletion and blood flow reduction cause neuroelectric activity to almost immediately stop and ion homeostasis to be lost. This ultimately reduces the energy reserves by reducing the generation of adenosine triphosphate (through mitochondrial dysfunction), which causes the sodium- potassium pump to malfunction. When the cell's ion gradient is harmed, hazardous levels of glutamate and aspartate are released more often. Calcium influx and overload are brought on by the inotropic receptors being activated as a result of the increased glutamate release. This eventually results in cellular damage, neural over excitation, and finally cell death.[20,21]

Symptoms

- Face Drooping
- Arm Weakness
- Speech Difficulties
- Time to call (the hospital)

Risk Factors[26,27,28]

- Age
- High blood pressure
- Diabetes
- Elevated cholesterol
- Smoking
- Obesity
- Family history
- Sedentary living
- Excessive alcohol intake
- Sleep apnea

Diagnosis[29,30,31,32]

- Computed Tomography (CT) scan
- Magnetic Resonance Imaging (MRI)
- Carotid ultrasound
- The electroencephalogram (EEG)
- Cerebral angiography
- Blood tests

Treatment

The goal of ischemic stroke therapy is to immediately re-establish blood flow to the afflicted region of the brain. Acute therapy and long-term management are two categories into which the available treatments can be separated.

Tissue plasminogen activator, a clot-busting medication, is frequently administered intravenously as the first step in the treatment of acute ischemic stroke (tPA). In order to restore blood flow to the brain and lower the danger of brain injury, this medicine dissolves the blood clot that is obstructing it. To be successful, tPA must be given within a few hours after the beginning of stroke symptoms.

Mechanical thrombectomy, which includes inserting a catheter to remove the blood clot from the blocked artery, is another option for treating acute ischemic stroke. tPA is often used in combination with this technique, or it may be used instead when tPA is unsafe or ineffective. The risk of impairment and mortality can be significantly decreased and blood supply to the brain can be restored using mechanical thrombectomy, according to research.

Several therapies may be used in addition to thrombolytic therapy to alleviate the side effects of an ischemic stroke. It is possible to take anticoagulant drugs like heparin and warfarin to stop blood clots from forming and lower the chance of having another stroke. To stop blood clots from developing, doctors may also prescribe antiplatelet medications like aspirin.[33,34,35,36,37]

Prevention[44,45]

- Maintain healthy blood pressure
- Stop using tobacco products
- Controlling hyperglycemia
- Keeping a healthy weight in mind
- Daily exercise
- Consume a nutritious diet.
- Minimize your alcohol intake.

- Frequent use of drugs

National Institute of Health Stroke Scale (NIHSS)

A popular method for determining the severity of a stroke is the National Institute of Health Stroke Scale (NIHSS). The 15-item NIHSS measures a variety of brain processes, including awareness, language, sensation, motor control, and vision. Each item on the scale receives a value between 0 and 4, with a maximum score of 42. The stroke is deemed to be more severe the higher the score. The NIHSS is given by a qualified healthcare professional, usually a doctor or nurse, and takes 5 to 10 minutes to complete. This enables medical professionals to gauge neurological impairments objectively and monitor long-term changes in a patient's condition. Choosing whether to deliver thrombolytic therapy or transfer a patient to a higher level of care is just one example of how the NIHSS might be utilised to inform treatment decisions.[46,47,48]

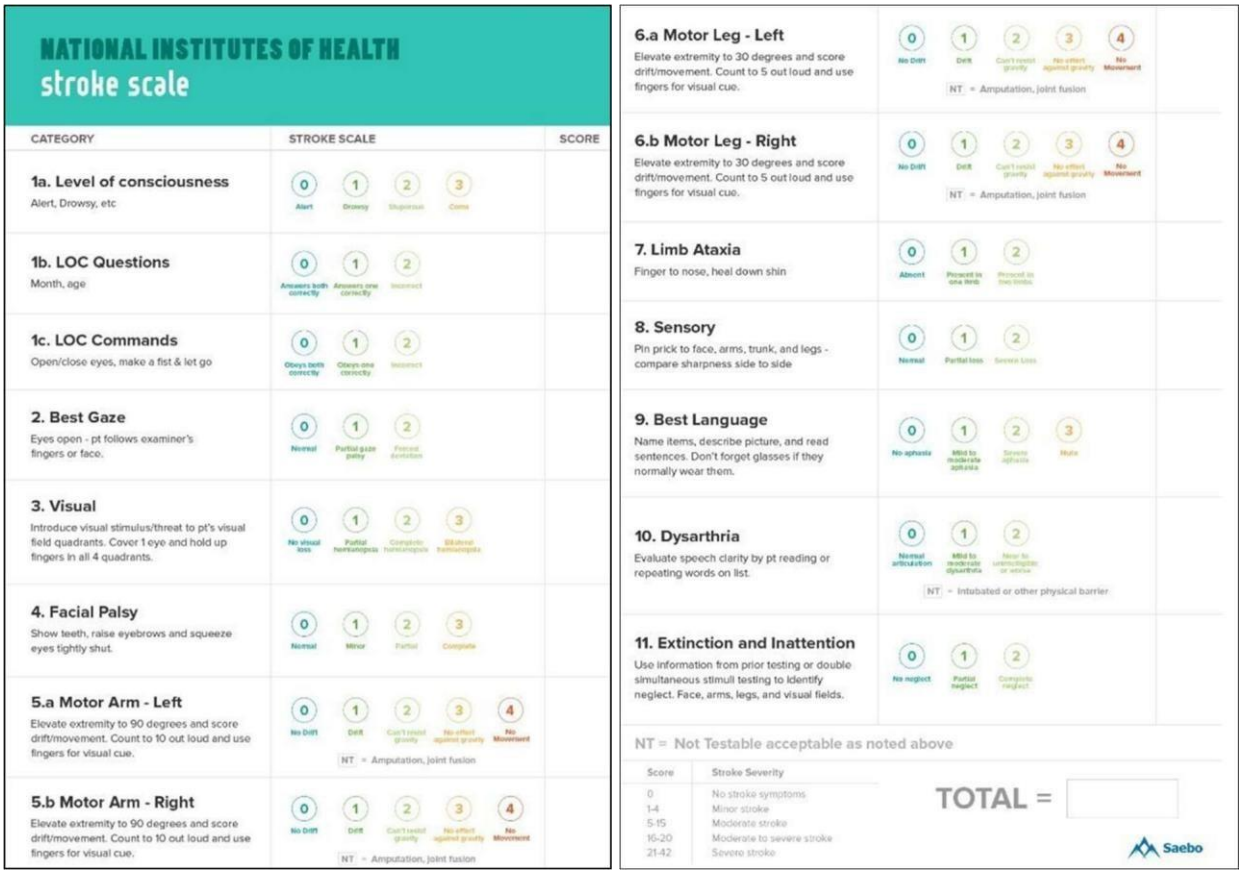


Fig. 1.3: NIHSS Scale.

AIMS AND OBJECTIVE

- To identify the stroke patients' demographic information
- To figure out the types and prevalence of stroke types
- To investigate and identify the topographic distribution of stroke patients
- To use the National Institute of Health Stroke Scale (NIHSS) to assess the severity of a stroke.
- To analyze the medication regimen used to treat stroke victims.

Materials and Methods Study Design

An Observational and Cross-sectional Study.

Inclusion Criteria

- Patients of either gender, age greater than 18 years with stroke
- Both inpatients and outpatients with stroke are eligible
- Patients who are interested to participate in this study
- Patients with or without different comorbidities

Exclusion Criteria

- Patients age below 18 years
- Patients who are not willing to participate in this study
- Pregnancy and lactating women

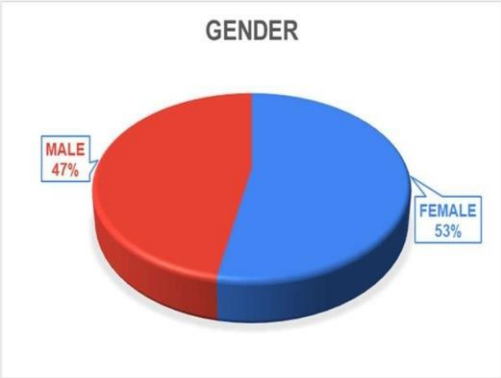
Data Collection and Assessment of Study Observations

- To collect data from patients and medical records, a valid and reliable form tailored to each patient was developed.
- Student investigators constructed the profile form, which was validated through many standard publications.

RESULTS

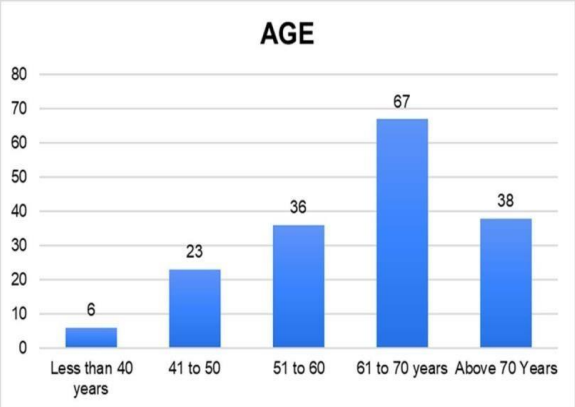
Result 1: Distribution according to gender.

Gender	No of Patients	Percentage
Female	90	52.9
Male	80	47.1



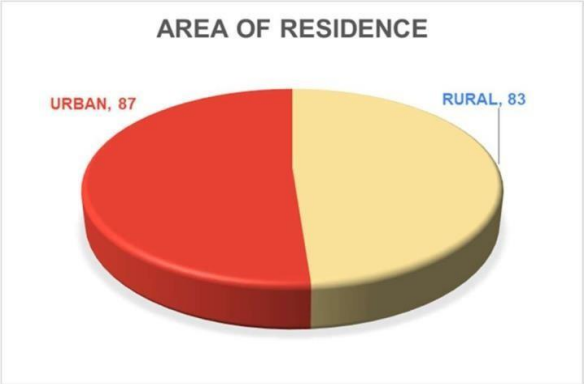
Result 2: Distribution according to age.

Age	No of Patients	Percentage
Less than 40 years	6	3.5
41-50 years	23	13.5
51-60 years	36	21.2
61-70 years	67	39.4
Above 70 years	38	22.4



Result 3: Distribution according to area of residence.

Area of Residence	No of Patients	Percentage
Rural	83	48.8
Urban	87	51.2

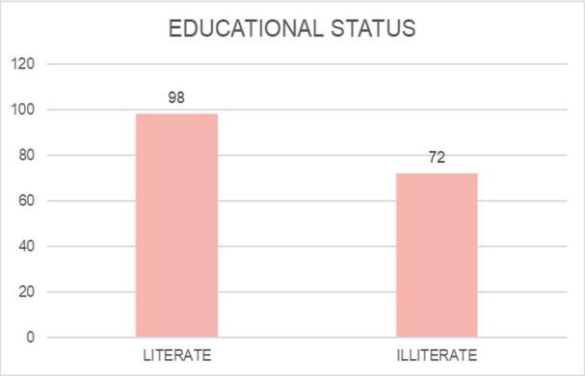


Result 4: Distribution according to marital status.

Marital Status	No of Patients	Percentage
Married	167	98.2
Unmarried	3	1.8

Result 5: Distribution according to educational status.

Educational Status	No of Patients	Percentage
Literate	98	57.6
Illiterate	72	42.4



Result 6: Distribution according to occupational status.

Occupational Status	No of Patients	Percentage
Employed	33	19.4
Farmer	13	7.6
Housewife	32	18.8
Unemployed	30	17.6
Retired	32	18.8
Self Employed	30	17.6

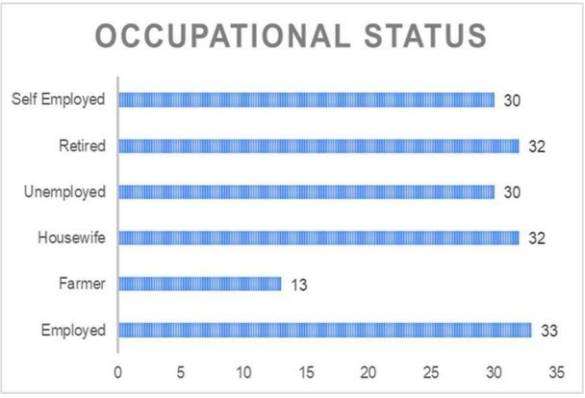
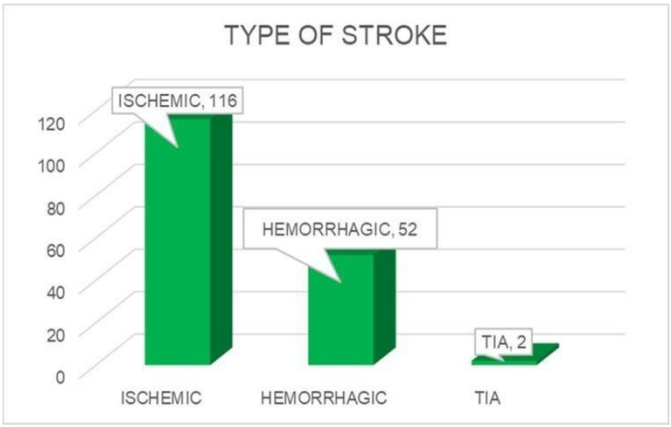


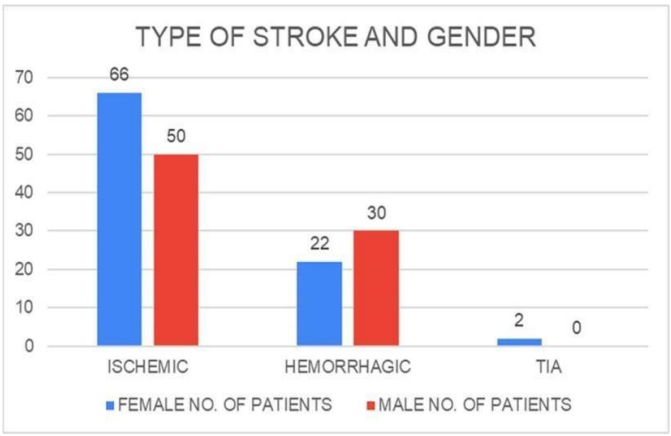
Table 5.7: Distribution According to the type of Stroke.

Type of Stroke	No of Patients	Percentage
Ischemic	116	68.2
Haemorrhagic	52	30.6
TIA	2	1.2



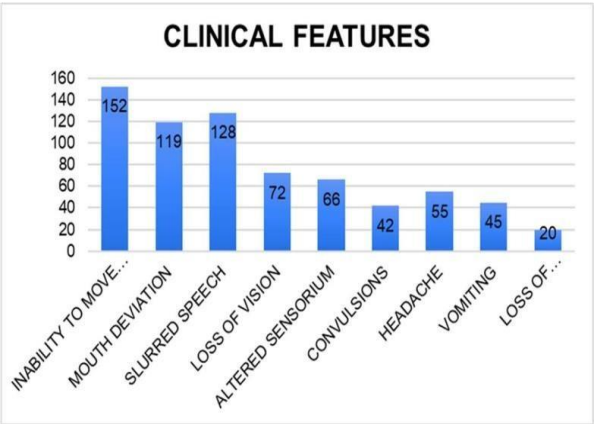
Result 8: Distribution according to type of stroke and gender.

Type of Stroke	Female		Male	
	No of Patients	Percentage	No of Patients	Percentage
Ischemic	66	38.8	50	29.4
Haemorrhagic	22	12.9	30	17.6
TIA	2	1.2	0	0



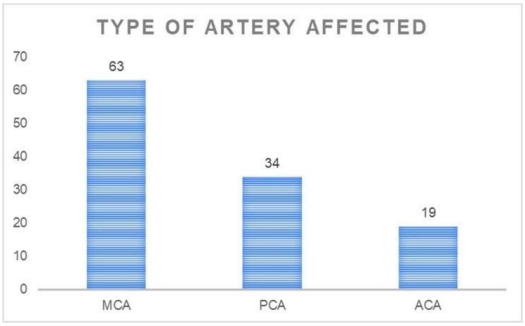
Result 9: Distribution according to the clinical features.

Clinical Features	No of Patients	Percentage
Inability to move limbs	152	89.4
Mouth Deviation	119	70.0
Slurred Speech	128	75.3
Loss of Vision	72	42.4
Altered Sensorium	66	38.8
Convulsions	42	24.7
Headache	55	32.4
Vomiting	45	26.5
Loss of Consciousness	20	11.8



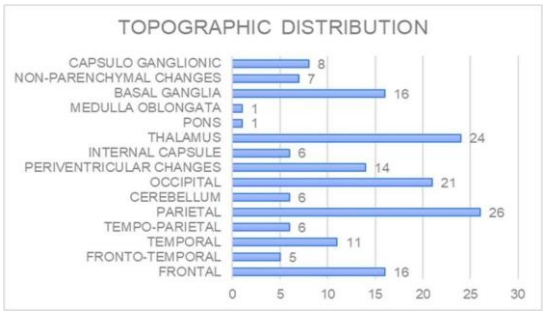
Result 10: Distribution according to type of artery affected.

Type of Artery	No of Patients	Percentage
MCA	63	37.1
PCA	34	20.0
ACA	19	11.2



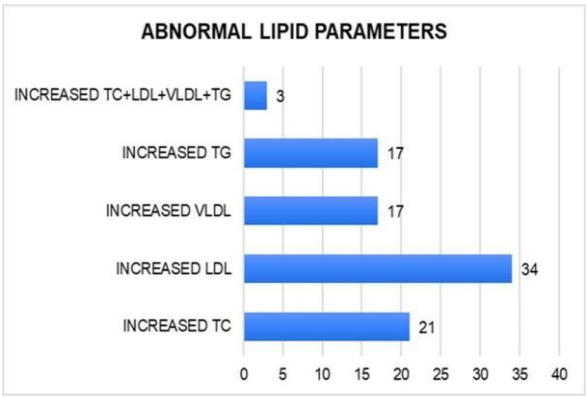
Result 11: Topographical distribution of Stroke.

Affected Region in Brain	No of Patients	Percentage
Frontal	16	9.4
Fronto-Temporal	5	2.9
Temporal	11	6.5
Tempo-Parietal	6	3.5
Parietal	26	15.3
Cerebellum	6	3.5
Occipital	21	12.4
Periventricular Changes	14	8.2
Internal Capsule	6	3.5
Thalamus	24	14.8
Pons	1	0.6
Medulla Oblongata	1	0.6
Basal Ganglia	16	9.4
Non-Parenchymal Changes	7	4.1
Capsulo Ganglionic	8	4.7



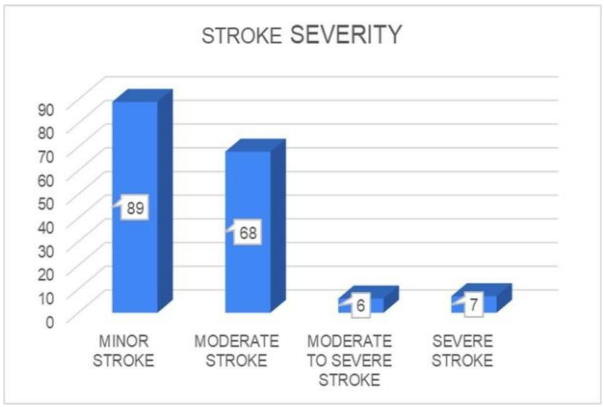
Result 12: Distribution according to abnormal lipid profile.

Abnormal Lipid Parameters	No of Patients	Percentage
Increased TC	21	12.4
Increased LDL	34	20.0
Increased VLDL	17	10.0
Increased TG	17	10.0
Increased TC+LDL+VLDL+TG	3	1.8



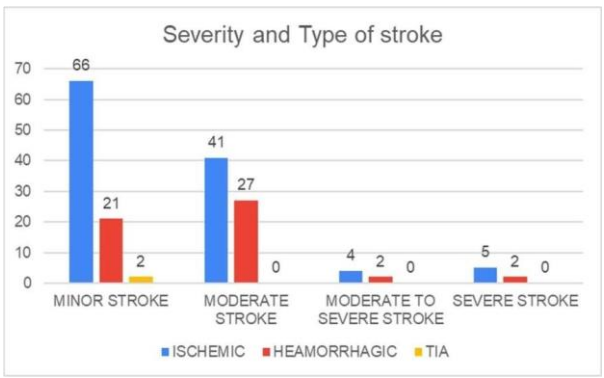
Result 13: Distribution of patients according to stroke severity.

Score	Stroke Severity	No of Patients	Percentage
1 to 4	Minor	89	52.4
5 to 15	Moderate	68	40.0
16 to 20	Moderate to Severe	6	3.5
21 to 42	Severe	7	4.1



Result 14: Distribution of patients according to stroke severity and type of stroke.

Stroke Severity	Ischemic	Haemorrhagic	TIA
Minor	66	21	2
Moderate	41	27	0
Moderate to Severe	4	2	0
Severe	5	2	0



Result 15: Distribution according to risk factors.

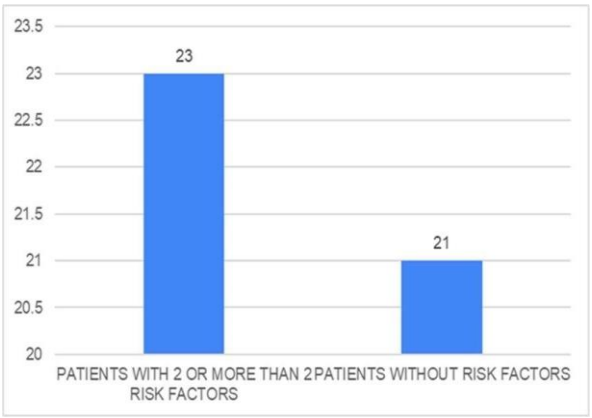
Risk Factors	No of Patients	Percentage
Hypertension	48	28.2
Diabetes Mellitus	17	10.0
Smoking	18	10.6
Alcohol	14	8.2
History of Stroke	13	7.6
Hyperlipidemia	16	9.4
Family History	4	2.4
Obesity	5	2.9
Heart Disease	13	7.6
Physical Inactivity	12	7.1
Chronic Kidney Disease	1	0.6

Result 16: Total number of patients having 2 or more than 2 risk factors.

Patients with 2 or more than 2 Risk Factors	Percentage
23	13.5

Result 17: Total number of patients without risk factors.

Patients without Risk Factors	Percentage
21	12.4



Result 18: Drugs used to treat stroke and other conditions.

Category of Drug	No of Patients
Anticoagulant Drugs	
Heparin	27
Antidiabetic Drugs	
Glimepiride	6
Glipizide	3
Metformin	8
Beta Blockers	
Propranolol	3
Atenolol	10
Calcium Channel Blockers	
Amlodipine	8
Nifedipine	2
Osmotic Diuretic	
Mannitol	55

DISCUSSION

Gender: In this study, among the study population females are more than males, which shows that stroke was more prevalent in males followed by females.

Age: In this study, Stroke was more in the age group 61 to 70, followed by >=71, 51-60 years and 41-50 years and less than 40 year age groups.

Area of residence: In this study, most of the patients were from urban area, followed by rural area, which indicates that stroke was more prevalent in urban area.

Marital status: In this study, most of the patients are married followed by unmarried, which indicated stroke was more prevalent in married patients.

Educational status: In this study, most of the patients are literates followed by illiterates, which indicated stroke was more prevalent in literate patients.

Occupational status: In this study, most of the patients are employed followed by self-employed and others, which indicated that stroke was more prevalent in employed patients.

Stroke type: In this study, majority of the patients have ischemic stroke followed by hemorrhagic stroke and TIA. As per this study, Prevalence of ischemic stroke is high followed by hemorrhagic stroke and TIA.

Clinical Features: In this study, Patients were presented with multiple clinical features. Majority of the patients were unable to move their limbs followed by mouth deviation, slurred speech, loss of vision, altered sensorium, convulsions, headache, vomiting and loss of consciousness.

Type of artery affected: The middle cerebral artery was the most common arterial territory involved in this study.

Topographic distribution: In this study, the most common site of infarction in brain was Parietal region followed by Thalamus, Occipital, Frontal, Periventricular changes, Temporal, Tempo- parietal, Capsuloganglonic region, Basal ganglia, Cerebellum, Fronto-Temporal, Nonparenchymal changes, Internal capsule, Pons and Medulla oblongata.

Abnormal lipid profile: In this study, among the patients having abnormal lipid profile, increased LDL was seen in most of the patients, followed by increased total cholesterol, increased triglycerides and increased VLDL.

Stroke severity: In this study, National Institutes of Health Stroke Scale was used to assess severity of stroke in patients. Most of the patients had minor stroke followed by moderate stroke, moderate to severe stroke and severe stroke.

Risk factors: In this study multiple risk factors were observed among the stroke patients. Most of the patients had hypertension followed by diabetes, smoking, and alcohol, history of stroke, and hyperlipidemia, and obesity, family history of stroke, heart diseases, physical inactivity and chronic kidney disease.

Drugs used to treat Stroke: In this study multiple drugs were used to treat stroke and other comorbid conditions. Classes of drugs include Antiplateletics, anticoagulants, Nooptropics, antihypertensive drugs, anti-hyperglycemic, hypolipidemic, osmotic diuretic etc. Drugs Include heparin, aspirin, clopidogrel, piracetam, citicholine, atorvastatin, rosuvastatin, multivitamins, etc to treat stroke and other comorbid conditions.

CONCLUSION

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