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A PROSPECTIVE OBSERVATIONAL STUDY ON RISK FACTORS AND PRESCRIBING PATTERN OF DRUGS USED IN STROKE PATIENTS AT A TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT

Stroke is a neurological insufficiency marked by an acute focal injury to the central nervous system due to vascular causes which also includes cerebral infarction, intracranial hemorrhage along subarachnoid hemorrhage. The study's main aim is to identify the risk factors and prescribing patterns of stroke by carefully observing the management of stroke patients. A prospective observational study was carried out for six months in the inpatient medicine department.160 case reports of patients with stroke were reviewed, and details such as demographics and the prescribed drug were recorded. Out of 160 patients, the majority of the patients diagnosed with stroke were male (65%), and the distribution of disease was higher in the age group between 60 to 79 years (61.87%). Ischemic stroke was the most commonly diagnosed. Hypertension was the most observed comorbid condition. The most frequently prescribed monotherapy was Aspirin (12.23%) and the combination therapy was Aspirin and clopidogrel (49.29%). The current prescribing pattern was per AHA/ASA Guidelines. CT/MRI, a standard test for stroke diagnosis, was performed in this study, according to AHA/ASA guidelines. The study of Prescription patterns will help to improve patient management by rationalizing prescribing practice. The majority of the prescriptions were rational (75%) and were under AHA /ASA guidelines. The information leaflet has a significant impact on patients with stroke and other comorbidities towards disease management showing the usefulness of PILLS.

KEYWORDS: *Stroke, prescription pattern, Hypertension.*

INTRODUCTION

Stroke is defined by the WHO as a clinical syndrome consisting of rapidly developing clinical signs of focal (global case of coma) disturbance of cerebral function lasting more than 24 hours or leading to death with no apparent cause other than a vascular origin.[1] Stroke is a major cause of death and disability in India. The estimated adjusted prevalence rate of stroke ranges, 84- 262/100,000 in rural and 334-424/100,000 in urban areas. The incidence rate is 119-145/100,000 based on the recent population-based studies.[2]

The second leading global cause of death behind heart disease was stroke, accounting for around 11.13%. A recent systematic review reported that the incidence of stroke has increased in low to middle-income countries and in high-income countries the stroke incidence has decreased in the last four decades.[3] There are three primary types of strokes.

Ischemic stroke: An ischemic stroke occurs when a blood clot keeps blood from flowing to the brain. The blood clot is often due to atherosclerosis, which is a buildup of fatty deposits on the inner lining of a blood vessel.

Hemorrhagic stroke: A hemorrhagic stroke results when a blood vessel in the brain ruptures or breaks, spilling blood into the surrounding tissues.

Transient ischemic attack: Transient ischemic attack TIA is a warning or mini-stroke. Anything that temporarily blocks blood flow to the brain causes a TIA. The blood clot and TIA symptoms last for a short period.[4]

A risk factor is a characteristic, condition, or behavior that increases the likelihood of getting a disease or injury. Risk factors of stroke can be classified into two types.

Modifiable: Risk factors you can control treat and improve include hypertension, smoking, alcohol consumption, diabetes, diet, physical inactivity, obesity, high blood cholesterol carotid heart disease other heart disease.

Non-modifiable: Risk factors not within control which include age, family history, race, prior stroke, TIA, and heart attack.[5]

Pharmacists are in a key position to provide pharmaceutical care to stroke survivors and to spot, stop, and resolve drug-related problems. Pharmacists are in a perfect position to review a patient's risk factors for stroke and to initiate or advocate applicable pharmacotherapy wherever indicated. Therefore, incorporation of the role of pharmacists within the management of stroke is incredibly crucial and improves outcomes for the patients. With the rapid increase in the burden of stroke in coming years and the restricted accessibility of stroke care in India, it might be better to review stroke preventive ways. The present study aims to provide a comprehensive review of sex differences in stroke, with specific stress on the demographics, clinical presentation, and medical aid. The objective of this study was to work out the prevalence of stroke symptoms, risk factors, clinical parameters, and medicines prescription patterns in stroke patients.[6]

The physicians are often typically creating the choice on which drug to decide on during a patient-by-patient basis. In the present study, we have assessed the prescribing patterns of Neuro-physicians to identify the selection of a drug over another and what changes are made once a stroke happens in these patients. The rationality is of utmost importance because the irrational use will cause misuse, underuse, or overuse of medicines. The drug treatment strategy involved choosing medication like Thrombolytics, Anticoagulants, Antihypertensive (Angiotensin Changing Enzyme-Inhibitors, Angiotensin II receptor blockers, and Diuretics), Blood Lipid Lowering Agents (Statins), Antiplatelet Medication (Aspirin and Clopidogrel), and Cerebral Activators. It's also suggested to select a route and dosage form of medication to own the best therapeutic effects to manage stroke. Primary prevention of stroke includes Anti-platelet drugs like Aspirin, Lipid-lowering medication like Statins, and Blood pressure management. Secondary prevention with artery excision, artery surgical operation, and Anticoagulant medication like Warfarin and Heparin is beneficial.[6] One of the most important complications within the acute part of the stroke is infection. Post-stroke, infections are strongly related to poor outcomes. Preventive antibiotic therapy within the acute part of the stroke could reduce infections and improve useful outcomes. Effective prevention and treatment of infections ought to thus be a very important element in any strategy aiming to reduce the impact of stroke.[6]

CT/MRI which is a standard test for the diagnosis of stroke was performed in this study, according to AHA/ASA guidelines. MRI can distinguish between the hemorrhagic transformation of infarct and primary hemorrhage. MRI can detect underlying causes of

secondary hemorrhages, such as vascular malformations, including cavernomas, tumors, and cerebral vein thrombosis.[1,7]

MATERIALS AND METHODS

STUDY SITE: The study was conducted at the General Medicine inpatient department of Chigateri District Hospital Davangere, Karnataka over six months.

STUDY DESIGN: Prospective Observational Study.

SAMPLE SIZE: The study was conducted over 160 inpatients of the General Medicine Department.

STUDY CRITERIA: The study was carried out by considering the following inclusion and exclusion criteria.

INCLUSION CRITERIA

- Patients with both genders aged above 18 years
- Patients with a history of stroke

EXCLUSION CRITERIA

- Children below 18 years
- Patients having missing or insufficient data
- Outpatients

STUDY PROCEDURE

A prospective observational study was conducted on inpatients in the medical ward of Chigateri District Hospital Davangere over six months. The study received approval from the Institutional Ethical Committee of SCS College of Pharmacy. A specifically designed data collection form was created to gather information, which encompasses, the patient's demographic details, medical history, personal history, comorbid condition, social and family history as well as the medications prescribed for each individual and the patients were with the patient information leaflet for improving quality of life.

RESULTS

A total of 160 patients assessed were found eligible as per our inclusion criteria. The collected cases were included in the suitable data collection form and risk factors and prescribing patterns were conducted in patients with CVA.

1. Gender-wise distribution of patients

The study shows that a high proportion of CVAs were found in males.

Gender	No. of patients (N=160)	Percentage (%)
Male	104	65%
Female	56	35%
Total	**160**	**100%**

2. Age-wise distribution of patients

In the age distribution of the patients, it was found that the incidence of stroke was maximum in the age group 60-79 years which comprised (61.87%) of patients followed by the age group 40-59 years which comprised (25%) of the entire study population as shown in the table.

Age group	No. of male patients	No. of female patients	Total No. of patients (N=160)	Percentage (%)
18-39	2	1	3	1.87%
40-59	29	11	40	25%
60-79	66	33	99	61.87%
80+	7	11	18	11.25%

3. Types of CVA

Out of the study population, 88.75% of patients were diagnosed as an ischemic stroke, 6.87% were diagnosed with hemorrhagic stroke and 4.37% were diagnosed as TIA.

Types	No. of patients	Percentage (%)
Ischemic	142	88.75%
Hemorrhagic	11	6.87%
TIA	7	4.37%
Total	**160**	**100%**

4. Distribution based on prior and newly diagnosed stroke

The study shows that 43.75% were priorly diagnosed with stroke and 56.25% were newly diagnosed with stroke.

	No. Of patients	Percentage (%)
RECURRENT	70	43.75%
NEW	90	56.25%
Total	**160**	**100%**

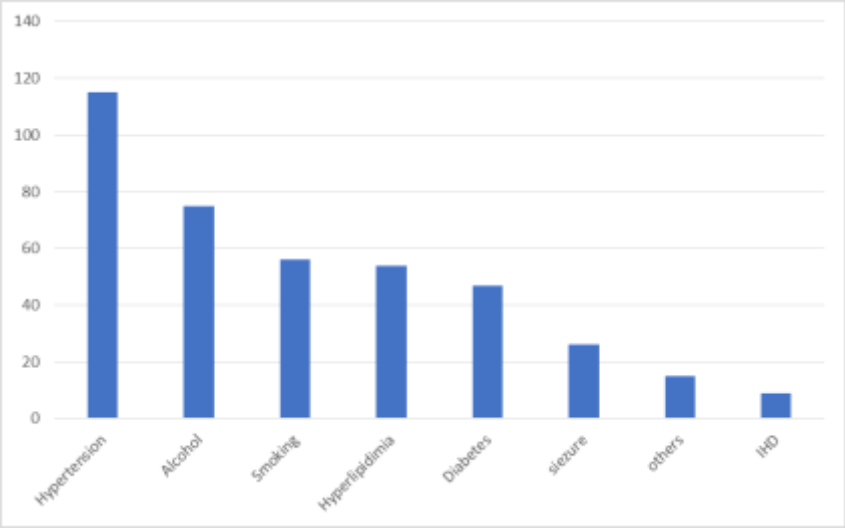
5. Distribution of family history in stroke patients

Out of 160 patients 120 (75%) were positive with a family history and 40 (25%) had a negative family history.

	No. of patient	Percentage (%)
Negative	40	25%
Positive	120	75%
Total	**160**	**100%**

6. Risk factors and co-morbidities associated with the stroke patients

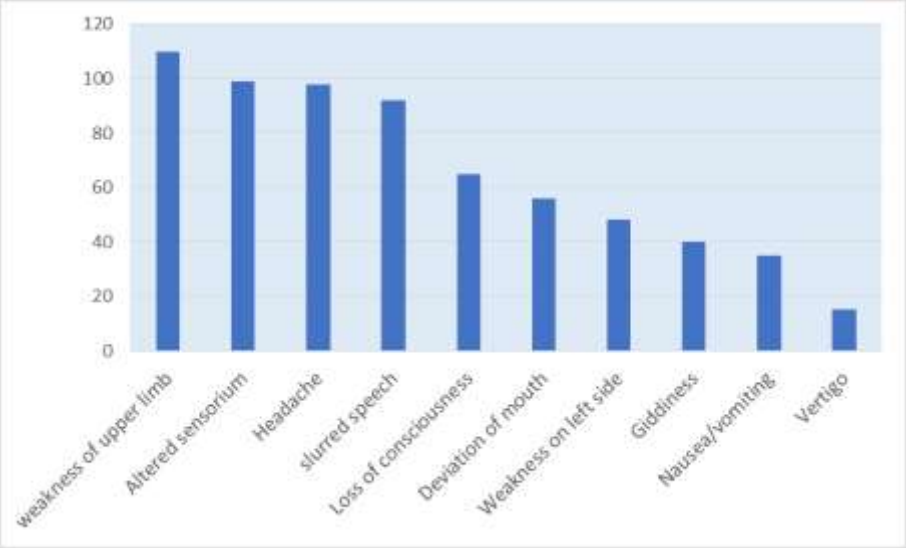
Out of the total study population, the majority of the subjects had risk factors of hypertension, followed by alcohol, smoking, hyperlipidemia, and diabetes.



Various risk factors and co-morbidities associated with stroke patients

7. PATTERN OF SYMPTOMS AMONG STROKE PATIENTS

Out of 160 patients, the majority of patients presented with Weakness of the upper limb (16.34%) followed by altered sensorium (14.71%), and headache (14.56%).



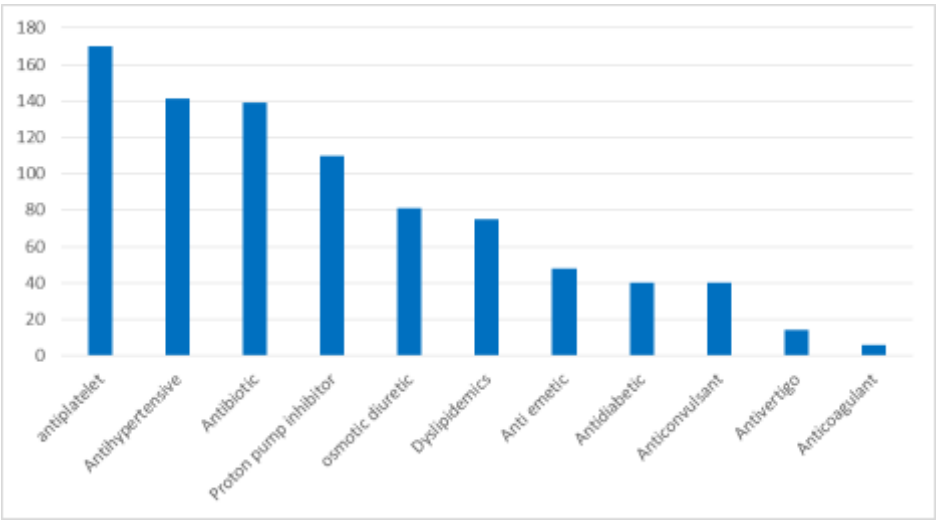
8. Hemiplagia vs Hemiparesis

Out of 160 patients, 28 were seen as hemiparesis and 15 were seen as hemiplegia.

	No.of patients	Percentage (%)
Hemiplegia	15	34.88
Hemiparesis	28	65.11

9. Category of drugs prescribed.

Among the drug categories Antiplatelets (19.67%) were the most commonly prescribed drug followed by Antihypertensive (16.31), Antibiotics (16.08%), and Proton Pump Inhibitor (12.76%).



Category of drug prescribed.

10. MONO VS COMBINATION THERAPY

A total of 1391 drugs were prescribed for the treatment of stroke, out of which 1251 were Monotherapy and 140 were combination therapy.

Type of Therapy	No. of drugs	Percentage (%)
Mono	1251	90%
Combination	140	10%
Total	**1391**	**100%**

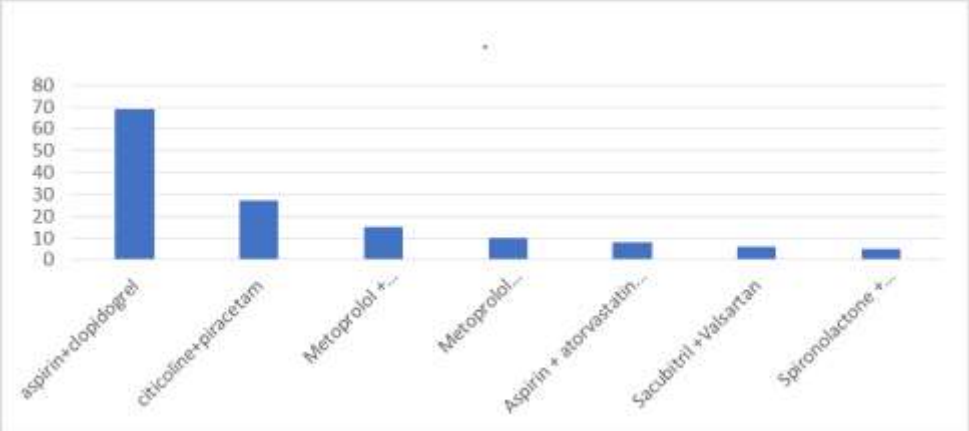
11. Commonly prescribed Monotherapy

The table shows the commonly prescribed Monotherapy in patients. Aspirin, Ceftriaxone, Mannitol, and Atorvastatin were the most frequently prescribed drugs.

Sl No.	Drugs	Frequency	Percentage (%)
1	Aspirin	153	12.23
2	Ceftriaxone	139	11.11
3	Mannitol	135	10.79
4	Atorvastatin	127	10.15
5	Pantoprazole	90	7.19
6	Clopidogrel	77	6.15
7	Amlodipine	57	4.55
8	Optineuron	51	4.07
9	Atenolol	48	3.83
10	Ondansetron	48	3.83
11	Metformin	47	3.75
12	Enoxaparin	45	3.59
13	Piracetam	38	3.03
14	Telmisartan	35	2.79
15	Citicoline	30	2.39
16	Phenytoin	26	2.07
17	H. Actrapid	22	1.75
18	Furosemide	22	1.75
19	Valproic acid	20	1.59
20	Carvedilol	15	1.19
21	Vertin	14	1.18
22	Heparin	12	0.95

12. Commonly Prescribed Combination Therapy

The table shows that the majority of prescribed combination therapy is Aspirin + Clopidogrel and the least prescribed combination therapy is Spironolactone + Torsemide.

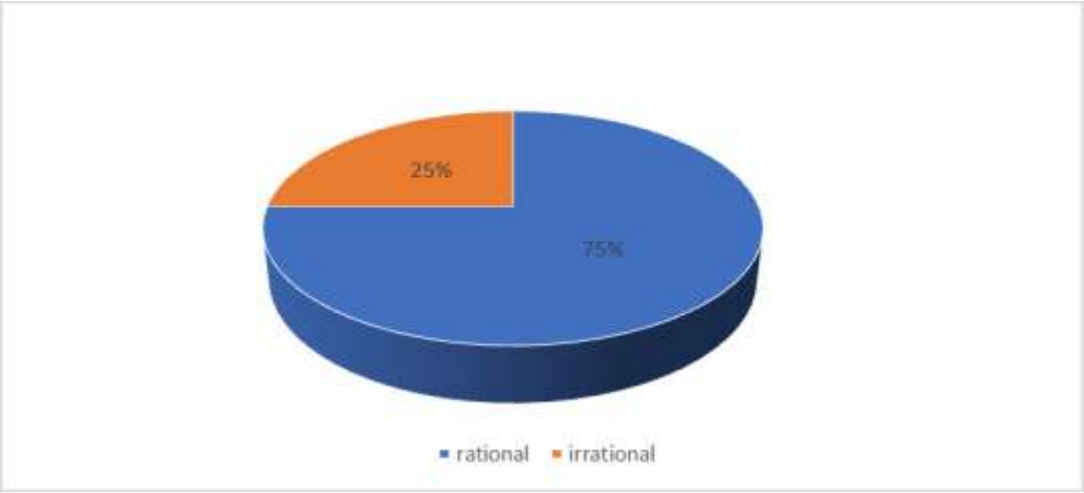


13. WHO PRESCRIBING INDICATORS

SL NO.	INDICATORS	VALUES
1	Number of cases reviewed	160
2	Total number of drugs prescribed	1391
3	Average of drugs prescribed per prescription	8.6
4	Drugs prescribed by generic name	372
5	Percentage of Monotherapy prescribed	90%
6	Percentage of combination therapy prescribed	10%
7	Total number antibiotics prescribed	139
8	Total number of injections prescribed	600
9	Percentage of drug prescribed from WHO essential drug list	98.8%

14. Rationality of the prescription

Out of total 160 prescriptions the majority of prescriptions were rational (75%) and the remaining were irrational (25%) as shown in table 14.



Rationality of the prescription.

DISCUSSION

A prospective observational study was carried out on risk factors and prescribing patterns of drugs used in stroke patients. Out of 160 stroke patients, 104 (65%) were male and 56 (35%) were females which is similar to the previous study conducted by Mahila Fathima *et.al.*[1]

The incidence of stroke was high among the Group of 60-79 years (61.87%) followed by 40-59 (25%) years of age which is similar to the study conducted by Hussainy Syed Areefulla *et.al.,* (2020) stating that stroke is more common among the age group of 60-79 years.[2]

After examining the subjects based on the types was found that the majority of the patients suffered from Ischemic Stroke (88.75%) followed by hemorrhagic stroke (6.87%) and TIA (4.37%) which is similar to the previous study conducted by Lavanya S *et.al.,* (2021) stating that the most of the patients suffered an ischemic stroke.[4] The present study revealed that the majority of the patients have newly diagnosed stroke (56.25%).

Out of 160 study populations based on family histories 120 (75%) were found to have a positive family history of stroke and 40 (25%) were found to have a negative family history of stroke, which is similar to the study conducted by Tyagi Shubam Singh *et.al.*[9]

In the present study, it was found that most of the subjects were hypertensives (71.87%) which is a major risk factor for the development and progression of stroke followed by alcoholics (46.87%) smoking (35%) and hyperlipaemia (33.45%) which is following other study conducted by Spurthi *et.al.,* stating that most of the subjects with stroke are hypertensive.[10]

The majority of the patients present with symptoms of weakness of the upper limb (16.3%) followed by altered sensorium (14.7%), and headache. This was following the study conducted by Sridhar Srimath Tirumala Konduru *et.al.*[11] The present study states that out of 150 patients, 28 were having. hemiparesis and 15 have hemiplegia.

Among the drug categories, Antiplatelets (19.67%) were the most commonly prescribed followed by Antihypertensives (16-31%). These results followed the outcomes of the study conducted by Basheer Sayyed *et.al.*[12]

In the present study, the majority of the drugs were prescribed as monotherapy (90%) followed by combination therapies (10%) Subash Vijaya Kumar *et.al.*, also concluded similar results in their studies.[13]

The most commonly prescribed drugs in monotherapy were Aspirin (12.23%) followed by ceftriaxone (11.11%) mannitol (10.79%) and atorvastatin (10.15%). According to K Soumya Lakshmi *et.al.*, Atorvastatin, Aspirin, and clopidogrel was the most commonly used monotherapy.[14]

In the study, the most commonly used combination therapy was Aspirin and Clopidogrel (49.29%) followed by Citicoline & Piracetam (19.28%) which resembles the study conducted by Dr. Megha Mary Jose *et.al.*[15]

CONCLUSION

Stroke is a major public health problem, affecting millions of people in both developed and developing countries. The study showed the prescribing patterns of drugs, various symptoms, and risk factors in stroke patients. In the present study, most of the subjects were admitted with ischemic stroke. In our study, we observed that the incidence of stroke was more common in males than in females. The most commonly affected age group was 60-79 years. In this study, we observed that 65% patients were suffering from hemiparesis, and 34.8% were having hemiplegia. Hypertension was the most significant risk factor and weakness of the upper limb was the most common symptom. In the present study, the most commonly prescribed drug classes were Antiplatelets and Antihypertensives. The most commonly prescribed Monotherapy was aspirin and combination therapy was Aspirin + Clopidogrel. The current prescribing pattern was under AHA/ASA Guidelines. CT/MRI, a standard test for stroke diagnosis, was performed in this study, according to AHA/ASA guidelines. Around very few drugs were prescribed by generic names. The study of prescription patterns will help to improve patient management by rationalizing prescribing practice. The majority of the prescriptions were rational (75%) and were following AHA /ASA guidelines. Finally, we conclude that proper risk factor management and following the guidelines in the treatment reduces the severity thereby prognostic factors will be good.

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AUTHOR'S CONTRIBUTION

All the authors have contributed equally.

CONFLICT OF INTEREST

All authors declare that there are no conflicts of interest.

ETHICS DECLARATION

The Institutional Ethics Committee at SCS College of Pharmacy approved the protocol. All residents in the hospital provided informed consent.

CONSENT FOR PUBLICATION

All authors have consented to the publication of their work.

COMPETING INTERESTS

The authors hereby declare that they did not obtain any financial support from any source for the writing, or publication of this article.

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