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STUDY ON ASSESSING THE PRESCRIBING PATTERN OF DRUGS, RISK FACTORS AND SYMPTOMS IN ISCHEMIC STROKE PATIENTS IN A TERTIARY CARE TEACHING HOSPITAL

Dr. Megha Mary Jose*, Nikitha Shaji, Shify Ann Varghese, Abicy Susan Biju and Alpha Elizabeth Rajeev

Department of Pharmacy Practice, Bapuji Pharmacy College, Davangere, Karnataka.

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***Corresponding Author**
Dr. Megha Mary Jose
Department of Pharmacy Practice, Bapuji Pharmacy College, Davangere, Karnataka.

ABSTRACT

Background: According to World Health Organisation stroke is defined as 'a clinical syndrome consisting of rapidly developing clinical signs of focal disturbance of cerebral function lasting more than 24 hours or leading to death with no apparent cause other than vascular origin'. Stroke is one of the major cause of mortality worldwide. **Objective**: The study focused to assess the prescribing pattern of drugs, risk factors and symptoms in ischemic stroke patients. **Materials and methods**: A prospective observational study was conducted in a tertiary care hospital over a period of six months. A total of 75 patients were included in the study. **Results**: In this study majority of the patients were treated with antiplatelets (90.6%) followed by antihypertensives (78.6.%). The most commonly prescribed monotherapy was mannitol (14.1%) and the most frequent combination therapy was aspirin +clopidogrel(23%). Right hemiparesis (36%) was the most predominant clinical manifestation. The common risk factors for ischemic stroke was found to be hypertension (78%), diabetes mellitus (26%) and smoking (22.6%). **Conclusion**: The findings in our study stress the need for early and appropriate management of stroke to prevent further complications. Pharmacists are in a key position to provide pharmaceutical care to stroke survivors, adequate patient education and initiate or recommended appropriate pharmacotherapy were indicated.

KEYWORDS: Ischemic stroke, Prescribing pattern, Drugs.

INTRODUCTION

Stroke is a major cause of mortality worldwide and commonly occurs in elderly patients. According to WHO, 15 million people worldwide suffer from stroke each year.[1] Annually, approximately 700,000 individuals in the United States experience a cerebral infarction, and approximately 160,000 will die as a result of the stroke. Of the 700,000 strokes annually, 500,000 are first-ever strokes and 200,000 are recurrent events. In India, incidence of stroke is 145/1,00,000 per year during 2003-06.[2] Stroke is a clinical syndrome divided into two broad categories that define its pathophysiology.

Ischemic strokes are caused by sudden occlusion of arteries supplying the brain, either due to a thrombus at the site of occlusion or formed in another part of the circulation. It accounts for 50%–85% of all strokes worldwide.[3] **Hemorrhagic strokes** account for 15% of strokes and include subarachnoid haemorrhage, intracerebral haemorrhage, and subdural hematomas.[4] Patients with stroke suffer from symptoms like weakness (unilateral weakness), upper motor neuron weakness of the face (facial palsy), motor and sensory losses in affected parts, speech disturbance (dysphasia, dysarthria), visual deficit, ataxia may be associated with diplopia and vertigo, headache, urinary incontinence, seizure, coma etc.[5] Several risk factors predispose a person to stroke. These risk factors can be broadly divided into modifiable and non-modifiable risk factors.

Non-modifiable -risk factors include age, sex, race/ethnicity, and family history.

Major **modifiable risk factors** include hypertension, cardiac disease, diabetes, hyperlipidemia, carotid stenosis, cigarette smoking, drinking, and sedentary life style.[6] Early diagnosis and treatment of a stroke enhance patient outcomes and learning the cause of an initial event is vital for the identification of the appropriate therapy to maximally decrease danger of recurrence. The physicians are often typically creating the choice on which drug to decide on during a patient-by-patient basis. The rationality is of utmost importance because the irrational use will cause misuse, underuse or overuse of medicines. The drug treatment strategy involved with 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.[7]

MATERIALS AND METHODS

The prospective observational study was conducted for a period of 6 months in the General medicine, Emergency and Neurology departments of a tertiary care teaching hospital. Before commencement of study, Ethical Committee clearance was obtained from Institutional Ethics Committee. A total of 75 patients were included in the study. All patients above 18 years of age, irrespective of gender, patients who are diagnosed and admitted with ischemic stroke and who are able to participate were included in the study. Patients with insufficient data in their records, c/o road traffic accidents, poisoning cases, pregnant and lactating women were excluded from the study. A specially designed data collection form was prepared which contains patient demographics (age, sex), past medical history, family history, risk factors, symptoms, name of the drugs, dosage regimen (dosage form, route and frequency).

RESULTS

Details of the gender of the patients

A total of 75 patient case sheets were analyzed during the study period, out of which 67% were males and the rest 33% were females.

Table 1: Distribution of patients based on gender n=75

GENDER	NUMBER OF PATIENTS	PERCENTAGE(%)
Male	50	67.0
Female	25	33.0
TOTAL	**75**	**100.0**

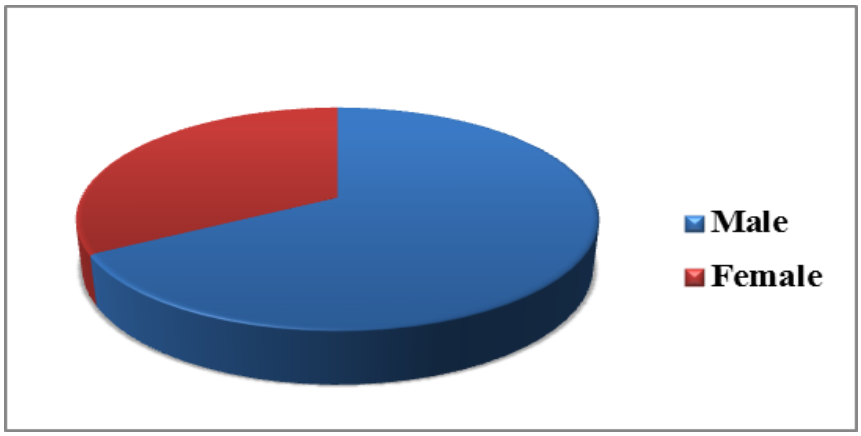

Figure 1: Distribution of patients based on gender.

Category of drugs prescribed

Among the drug categories, antiplatelets (90.6%) were the most commonly prescribed one, followed by antihypertensives (78.6%) and dyslipidemics (78.6%).

Table 2: Category of drugs prescribed. n=75

SL.NO	CLASS OF DRUGS	NO. OF PATIENTS	PERCENTAGE(%)
1	Antiplatelets	68	90.6
2	Antihypertensives	59	78.6
3	Dyslipidemics	59	78.6
4	Osmotic diuretics	47	62.6
5	Neurotonics	21	28
6	Antidiabetics	19	25.3
7	Anticonvulsants	18	24
8	Antioxidants	10	13.3
9	Anticoagulants	8	10.6
10	Antivertigo	7	9.3
11	Hypothyroid drugs	2	2.6

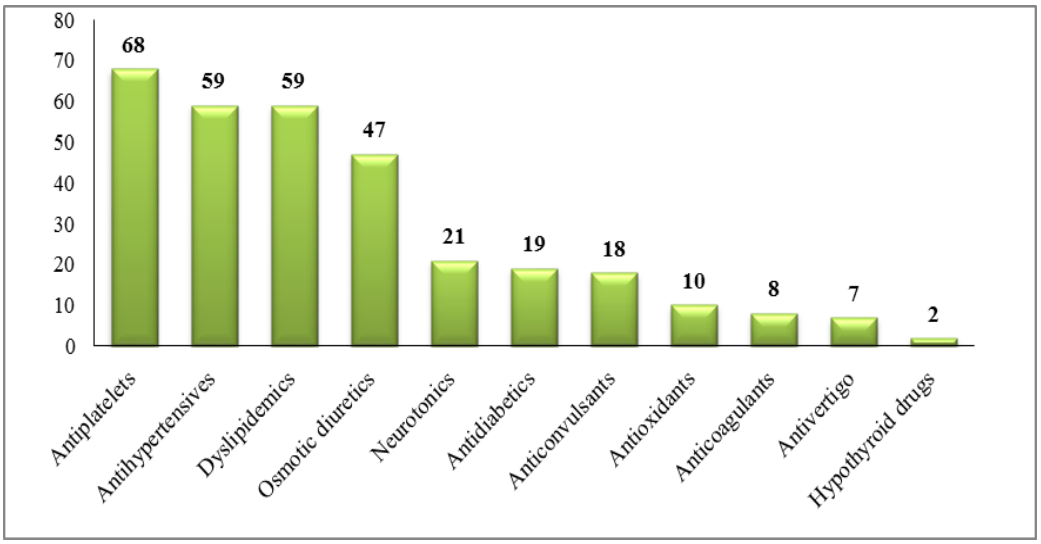

Figure 2: Category of drugs prescribed.

Mono Vs Combination therapy

A total of 401 drugs were prescribed, for the treatment of stroke out of which 340 were monotherapy and 61 were combination therapy.

Table 3: Mono Vs Combination therapy n=401.

SL.NO	TYPE OF THERAPY	NO OF DRUGS	PERCENTAGE(%)
1	Monotherapy	340	85%
2	Combination therapy	61	15%

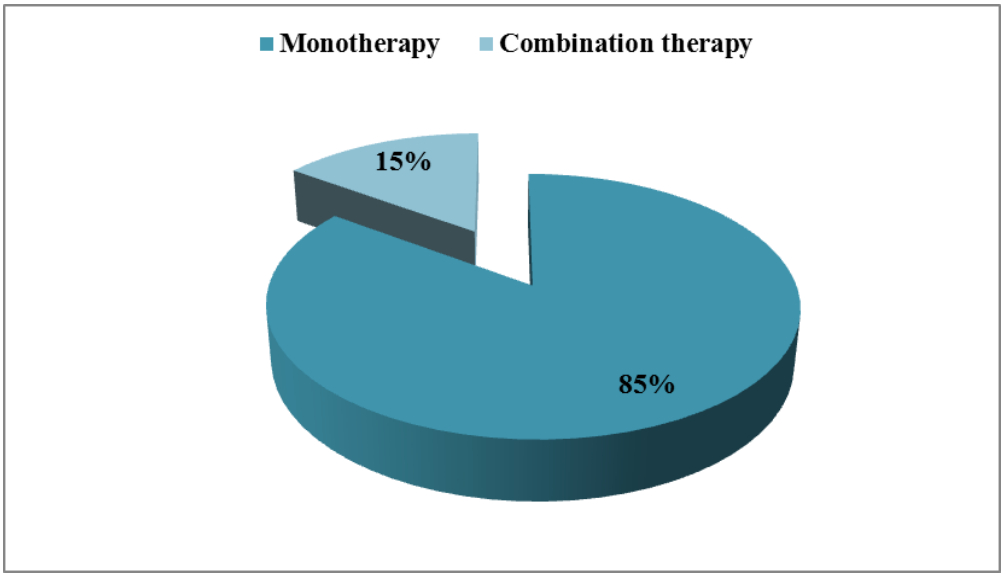

Figure 3: Mono Vs Combination therapy.

Commonly prescribed monotherapy

Table 7 shows the commonly prescribed monotherapy in patients. Mannitol, Atorvostatin, Aspirin were the most frequently used drugs in 48, 43, 40 patients respectively.

Table 4: Commonly prescribed monotherapy, n=340.

SL.NO.	DRUG	FREQUENCY	PERCENTAGE(%)
1	Mannitol	48	14.1
2	Atorvastatin	43	13.0
3	Aspirin	40	12.0
4	Amlodipine	39	11.4
5	Glycerol	19	6.0
6	Levetiracetam	16	5.0
7	Insulin	16	5.0
8	Metoprolol	11	3.2
9	Edaravone	11	3.2
10	Furosemide	10	3.0
11	Clopidogrel	9	2.6
12	Piracetam	8	2.3
13	Betahistine	7	2.0
14	Rosuvastatin	6	2.0
15	Citicoline	6	2.0
16	Nifedipine	5	1.4
17	Heparin	5	1.4
18	Telmisartan	5	1.4
19	Atenolol	3	0.8
20	Levothyroxine	3	0.8
21	Phenytoin	3	0.8
22	Labetolol	3	0.8
23	Metformin	2	0.5

24	Losartan	2	0.5
25	Ramipril	2	0.5
26	Lorazepam	2	0.5
27	Carvedilol	2	0.5
28	Propranolol	2	0.5
29	Warfarin	2	0.5
30	Valproic acid	1	0.2
31	Alprazolam	1	0.2
32	Olmesartan	1	0.2
33	Glimepride	1	0.2
34	Acenocoumarol	1	0.2
35	Prazosin	1	0.2
36	Clonidine	1	0.2
37	Clinidipine	1	0.2
38	Glicazide	1	0.2
39	Diltiazem	1	0.2
	TOTAL	340	100

Commonly prescribed combination therapies

Table 6 reveals that aspirin+ clopidogrel (23.0%) was the most commonly prescribed combination therapy followed by citicoline + piracetam (15.0%) and aspirin + atorvastatin (13.1%).

Table 8: Commonly prescribed combination therapies n=61

SL.NO	DRUG	FREQUENCY	PERCENTAGE(%)
1	Aspirin+Clopidogrel	14	23.0
2	Citicoline+Piracetam	9	15.0
3	Aspirin+Atorvastatin	8	13.1
4	Aspirin+Atorvastatin+Clopidogrel	7	11.4
5	Telmisartan+Amlodipine	3	5.0
6	Telmisartan+Hydrochlorothiazide	3	5.0
7	Amlodipine+Atenolol	2	3.2
8	Clopidogrel+Atorvastatin	2	3.2
9	Mannitol+Glycerol	2	3.2
10	Metformin+Glimepride	2	3.2
11	Losartan+Hydrochlorothiazide	2	3.2
12	Olmesartan+Amlodipine	1	1.6
13	Torsemide+Spironolactone	1	1.6
14	Piracetam+Betahistine+Gingko biloba+Vinpocetine	1	1.6
15	Rosuvastatin+Clopidogrel	1	1.6
16	Furosemide+Spironolactone	1	1.6
17	Telmisartan+Metoprolol	1	1.6
18	Amlodipine+Hydrochlorothiazide	1	1.6
	TOTAL	61	100

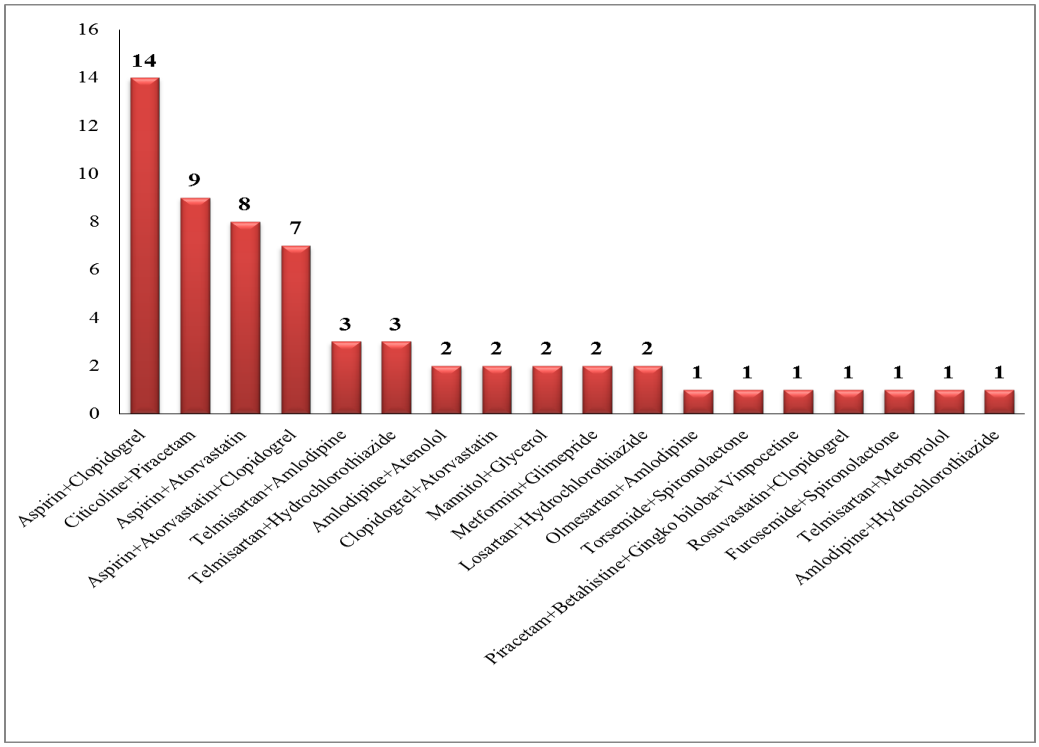

Figure 8.1: Commonly prescribed combination therapies

5.11. Distribution of drugs prescribed in a prescription

In the present study, majority (24%) of the patients were prescribed with 5 drugs.

Table 9: Number of drugs prescribed for stroke per prescription, n=75.

NO. OF DRUGS	NO. OF PRESCRIPTIONS	PERCENTAGE(%)
2	4	5.3
3	8	11.0
4	10	13.0
5	18	24.0
6	16	21.3
7	11	15.0
8	6	8.0
9	2	3.0

5.12. Details of prescription

The total number of drugs prescribed among 75 patients included in the study was 775. The average number of drugs per prescription was determined and found to be 10.3 and the percentage of drugs prescribed by generic name was only 12.25%.

Table 10: WHO prescribing indicators.

INDICATOR	VALUE
Average number of drugs per prescription	10.3
Percentage of drugs prescribed by generic name	12.25
Percentage of encounters with antibiotic prescribed	58.66
Percentage of encounters with an injection prescribed	97.33
Percentage of drugs prescribed from essential drug list	58.96

5.13. Distribution of patients based on symptoms

Majority of the patients presented with a chief complaint of inability to move one side of their body (right hemiparesis), which was seen in 36% of patients, slurred speech in 28% of patients.

Table 11: Distribution of patients based on symptoms n=75.

SL.NO	SYMPTOMS	NO. OF PATIENTS	PERCENTAGE (%)
1	Right hemiparesis	27	36.0
2	Slurred Speech	21	28.0
3	Weakness of upper limb	20	26.6
4	Giddiness	19	25.3
5	Aphasia	15	20.0
6	Ataxia	14	18.6
7	Droopy face	12	16.0
8	Weakness of lower limb	10	13.3
9	Altered sensorium	8	10.6
10	Left hemiparesis	8	10.6
11	Headache	6	8.0

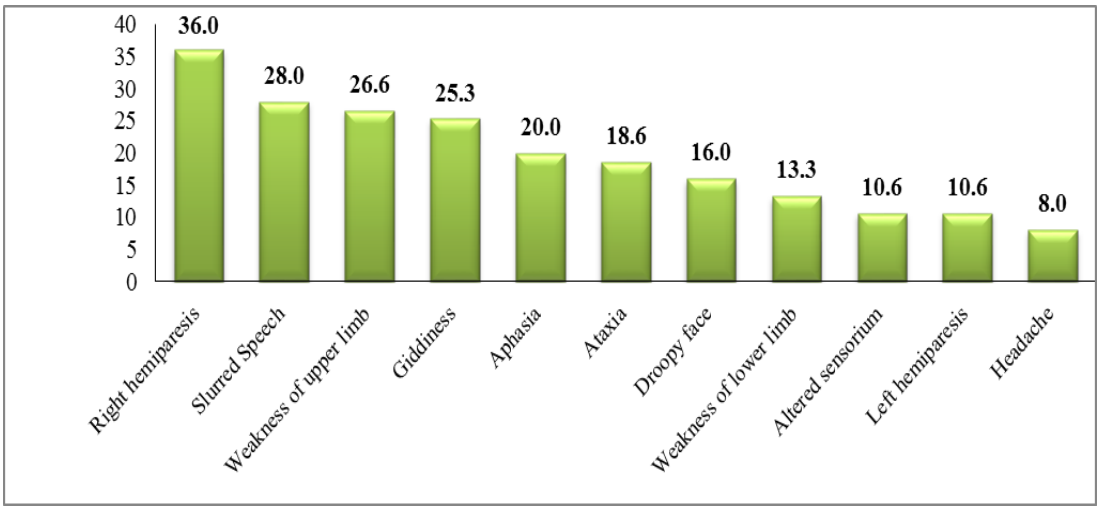

Figure 11.1: Distribution of patients based on symptoms.

5.14. Distribution of patients based on risk factors

In the total population, hypertension (78.6%) was found to be the most common risk factor followed by diabetes mellitus (36.0%), and smoking (22.6%).

Table 12: Distribution of patients based on risk factors n=75.

SL.NO	RISK FACTORS	NUMBER OF PATIENTS	PERCENTAGE (%)
1	Hypertension	59	78.6
2	Diabetes Mellitus	27	36.0
3	Smoking	17	22.6
4	Alcohol	16	21.3
5	Dyslipidemia	16	21.3
6	Recurrent Stroke	15	20.0
7	Seizure	9	12.0
8	IHD	6	8.0
9	Tobacco	5	6.6
10	Atrial Fibrillation	1	1.3

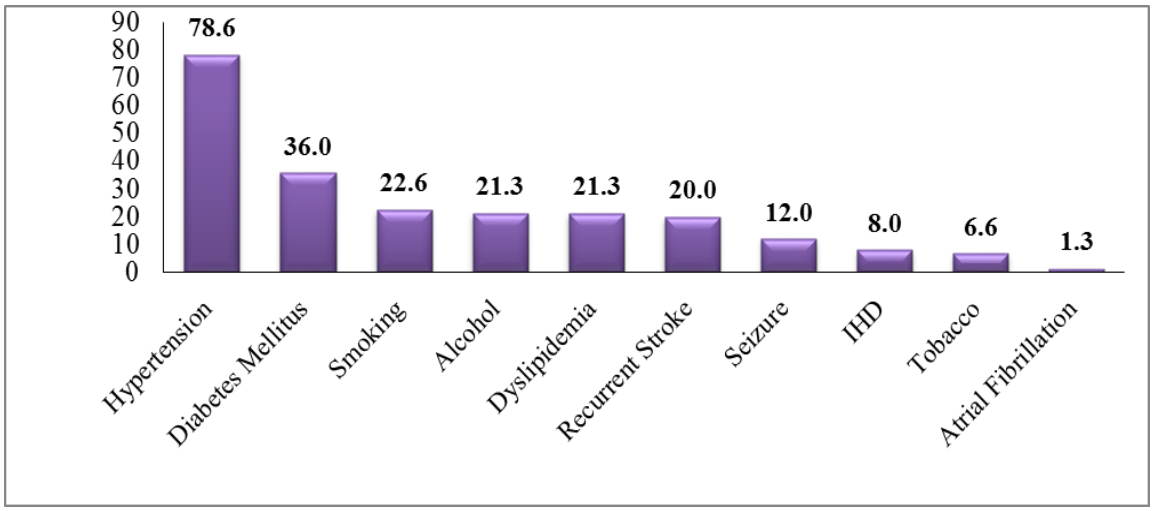

Figure 12.1: Distribution of drugs based on risk factors.

DISCUSSION

Our study was conducted in a tertiary care teaching hospital. During our study period, a total of 75 cases were enrolled and the prescribing pattern of drugs in ischemic stroke patients were assessed.

In our study, out of 75 patients 50 (67.0%) patients were males and 25(33.0%) were females. This study revealed a male predominance over female which was similar to the results of the study conducted by Dungavath et.al[8], Himaja J et.al.[9] This may be due to various risk factors like smoking, alcoholism etc compared to the female population.

The present study revealed that the patients belonging to the age group of 61-70 years were more predominant which is in compliance with the outcomes of the study conducted by Himaja J et.al.[9] Age is one of the non-modifiable risk factors for stroke and it enhances the probability of stroke even more. The mean age of the patients in this study was 60.4years (SD=12.8). This can be correlated with the observations of the study conducted by Bhatt V R et.al.[6]

In our study, hypertension(78.6%), diabetes mellitus (36.0%), dyslipidemia (21.3%), were the major co-morbidities among stroke patients. This was in accordance with the findings of the study conducted by Swetha K et.al.[10]

Most of the patients in our study presented with predominant symptoms like right hemiparesis (36.0%), followed by slurred speech(28.0%), weakness of upper limb(26.6%), giddiness(25.3%) etc. This results were in compliance with the outcomes of the study conducted by Dungavath et.al.[8]

Our study identified the most common risk factors associated with ischemic stroke as hypertension (78.6%), followed by diabetes mellitus(36.0%), smoking(22.6%), alcohol(21.3%) which coincides with the results of the study conducted by Konduru et.al.[11] Atrial fibrillation was the least observed risk factor which was similar to the outcomes of the study conducted by Temesgen TG et.al.[12] High blood pressure seems to be a major risk factor for stroke accounting for almost 35-50% of the risk. A reduction of 10 mmHg systolic or 5 mmHg diastolic blood pressure reduces the risk of stroke by ~40%. Lowering blood pressure has been conclusively shown to prevent both ischemic and haemorrhagic strokes.

In our study, 85% of the patients were newly diagnosed as having ischemic stroke whereas 15% had recurrent stroke.

In the present study, majority of the drugs were prescribed as monotherapy (84.7%), followed by combination therapies (two drug combination-13.46%, three drug combination-1.74%) Kumar SV et.al[13] also concluded similar results in their study.

The most common category of drugs prescribed in this study were antiplatelets, antihypertensives, and dyslipidemics in the number 68,59 and 59 patients respectively. The most frequently used drugs were mannitol(14.1%), atorvastatin (13.0%), aspirin(12.0%), and

amlodipine(11.4%). In the study by Himaja et. al, the most common combination therapy was aspirin+ clopidogrel which showed uniform results as that of the present study.[9]

In our study, the cerebrovascular accident was a common diagnosis of stroke but it can varies from region to region which was similar to the outcome of the study conducted by Wagle et. al.[14]

In the present study, total 401 stroke drugs were prescribed in 75 prescriptions and most of the patients were prescribed with 5 drugs. Similar findings were found by Kuriakose C et.al[1] in their study. The average number of drugs per patient is 10.3 which were in accordance with the Wagle et.al[14] findings. The percentage of drugs prescribed by generic name is 12.25%. The present and previous studies have shown much variation in the percentage of drugs used by generic name.

CONCLUSION

Stroke is a major public health problem, affecting millions of people in both developed and developing countries. The study showed the prescribing pattern of drugs, various symptoms, and risk factors in ischemic stroke patients. In the present study, ischemic stroke was more common in males compared to females. The most commonly affected age group was 61-70 years. Hypertension was the most significant risk factor and right hemiparesis was the most common symptom. In the present study, the most commonly prescribed drug classes were antihypertensive drugs and osmotic diuretics. The most commonly prescribed monotherapy was mannitol and combination therapy was Aspirin and clopidogrel. The current prescribing trend was in accordance with the AHA/ASA and ISA guidelines for ischemic stroke. Very few drugs were prescribed by generic name. The study of prescribing pattern will help improve patient management by rationalizing prescribing practices and cost-effective medical care. Despite recent advances in the treatment of acute ischemic stroke, the number of effective and feasible treatments remains limited. For this reason, prevention of ischemic stroke, particularly secondary prevention, is a major clinical and public health issue. Proper management reduces the incidence and progression of the disease. Finally, we conclude that proper risk factor management and following the guidelines in the treatment reduces the severity, thereby the prognostic factors will be good. Early identification of risk factors and pattern of therapy plays a crucial role in qualitative patient care. The study points out a need for improved patient education on adherence to therapy. Counselling and educating the

patient on how to spot a stroke, risk factor management & the importance of diet and exercise in the management of ischemic stroke are of vital importance.

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