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A REVIEW STUDY ON PRESCRIBING PATTERNS OF DRUGS IN STROKE PATIENTS

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ABSTRACT

Cardiovascular diseases are the leading cause of death worldwide, mainly occurs in elderly patients. Incidence of stroke has nowadays become a major public health problem. Due to inadequate and well defines research in India about the clinical symptoms, medications of stroke, more need of research in this field is very much essential. Our study mainly focused on the major risk factors related for stroke, pattern of prescription of drugs, management and prevention of stroke. Effective prevention and treatment are an important component to reduce the impact of stroke. The role of a pharmacist is very much crucial in improving the outcomes of the patients by conducting a medication utilization strategy program. Our study 1 was a cross sectional observation study conducted in IMS and SMU hospital in Bhubaneswar for over 2 years. Study 2 was a retrospective study conducted in a multispecialty hospital in Ananthapur, Andhra Pradesh. Study 3 was a prospective observational study conducted in a super specialty hospital in Warangal for over 6 months. Study 4 was conducted for a period of seven months in Narayana hrudayalaya hospital. Study 5 was a prospective observational study conducted in cardiology department in sagar hospitals, Bengaluru. In all our 5 studies mentioned we mainly took account of age, risk factors, social habits, prescription guidelines of stroke, prevention and management of stroke. In all our studies elderly patients were more prone to stroke. Hypertension and hyperlipidemia were identified as the major risk factors in our study. Males were more prone to stroke compared to females and elderly patients above 50 years of age were more prone with stroke. Antihypertensive, statins, hypolipidemics were found to be major drugs utilized

in the prescription pattern of stroke.

KEYWORDS: Stroke, Drugs, Prescribing pattern.

INTRODUCTION

According to world health organization stroke is a group of disorders of heart and blood vessels that is rapidly developing with the clinical signs and the disturbances of cerebral function and their symptoms.[1]

According to WHO 15 million people suffer with stroke worldwide.[1] It is an acute focal neurological deficit which is developing within 24 hours.[1] There are three types of stroke which includes Ischemic stroke (88%), Hemorrhagic stroke (12%) and Transient (rare type).[2] Cerebrovascular accident (or) Stroke is an injury caused to the brain due to poor blood flow leading to death if not diagnosed in its early stages.[1] It is a major cause of morbidity and mortality and major reason for death in elderly people worldwide.[1] It occurs due to two reasons 1)Brain cannot receive blood supply due to interruption of blood flow 2) Rupturing of blood vessels occurs due to invading of blood supply to surrounding areas. Due to deprive blood supply to a part of brain it may lead to hypoxia leading to brain damage.[1] Stroke or cerebrovascular accident is the third major cause of death and mortality. It can lead to disability of the patient. It is a major public health challenge in the society.[2] Major risk factors related to Stroke in Indian population are history of hypertension, diabetes, smoking, obesity. The modifiable risk factors that contributed for stroke in India are demographic, socioeconomic and life style.[2] The non-modifiable risk factors for occurance of stroke are sex, age, ethnic, race, genetic factors and low birth weight. The choice or decision of drug therapy given is based on the patient condition.[3] The prescribing pattern and treatment therapy mainly involves drugs like anticoagulants, thrombolytics, angiotensin receptor blockers, antihypertensives, diuretics, statins, cerebral activators and antiplatelet drugs.[3] A particular dosage and route of administration should be selected according to the patient condition to have optimal therapeutic effects. Primary prevention of Cardiovascular accident or Stroke includes drugs like antiplatelets and maintenanceof blood pressure.[4] Secondary prevention therapy includes cardiac angioplasty, carotid endarterectomy and drugs like warfarin and heparin are useful. Infections occurance are also one of the major causes of Stroke. Prevention antibiotic therapy helps to prevent occurance of post-operative stroke and also to improve functional outcomes.[4] Drug utilization patterns of drugs playa a major key role for selection of appropriate drugs for the patient. It is an analytical descriptive collection,

understanding, quantification and evaluation of the prescribing pattern.[5] Pharmacists play key role in providing a proper pharmaceutical care to stroke patients in identifying and solving the drug related issues.[5] Role of a pharmacist is very much crucial for improving the outcomes of the patient.[5] Nowadays inappropriate drug therapy is the most common problem worldwide which can be resolved with the help of a drug utilization pattern which enables proper evaluation of the drugs in the prescription and analyzing drug related problems for ensuring the safety of the patients.[5] Physicians are also making decisions based on a patient by patient basis on which drug is appropriate for achieving maximum efficacy along with patient safety.[5]

EPIDEMIOLOGY

Incidence of stroke in India: Five studies were conducted in India estimated the cumulative stroke incidence in Mumbai and three of urban Kolkata. The first study was conducted in Kolkata during the year 1998-1999. The age adjusted cumulative incidence was found to be 105/10000 people per year. The incidence of stroke was found to be more among women and elderly aged people of above 40 years. The study population was surveyed only once during a specific period of time.[6]

The second study was conducted was conducted in Kolkata during the time period of 2003-2005. The age adjusted cumulative incidence was found to be 145/10000 people per year. The incidence of stroke was more among elderly aged people and cumulatively progressed with increasing age. Cumulative incidence was more among women (178/1000010 when compared to men (118/10000).[6]

The third longitudinal study was conducted in Kolkata during time period of 2003-2010. The study was aimed at identifying the mortality of stroke and long term outcomes of post stroke in a cohort cross section study in an urban region. A cohort of 763 first ever stroke and 278 recurrent stroke cases were taken. The age adjusted cumulative incidence was found to be 141/10000 persons. The mortality was found to be 51% in starting five years and later 71% in the next seven years. The study concluded that men were at a greater risk of death when compared to women.[6]

A study conducted by Dalal et al. two year survey study in a defined geographical area estimated the age cumulative incidence of stroke was found to be 152/10000 persons per year. Men were found to be at more risk when compared to women in this study. The same

resurvey conducted in year 2009 concluded that age standardized cumulative incidence was found to be 137/10000 persons per year.[6]

Prevalence of stroke in India: Six population based cross sectional studies was done to estimate the prevalence of stroke in India. A population based cross sectional studies was done in Bengaluru on neurological disorders during the time period of 1993-1995 in the urban and rural regions. The age estimated prevalence in this study was found to be 262/10000 persons per year. Prevalence of stroke in rural areas was found to be (165/10000) and in the urban regions was found to be (36/10000). Prevalence of stroke was more in rural area than urban area. People aged above 50 years were found more prone to stroke.[7]

A two year study was conducted in dharavi in Mumbai during the time period of 2006-2008. This was a multi survey using WHO screening and included stroke and cognitive impairment patients. The age standardized stroke prevalence in this study was found to be 4.87/100 persons per year. The stroke prevalence in men (6.74/100) which was twice when compared to women (3.48/100).[7]

Prevalence of neurological disorders was found in an area Srinagar in Jammu and Kashmir for a period of five months from October 1999. The prevalence of stroke found in this study was 559/10000 people per year. Seventy four percent of the survivors in the study were identifies to be as haemmorrhagic stroke.[7]

A study conducted in Rohtak in Haryana in the year of 1974 and the same population was surveyed again in the year 1994. The prevalence of stroke was found to be 44.28/10000 persons per year. The prevalence of stroke among men (46.78/10000) is more than women (41.52/10000). Prevalence of stroke in urban and rural were similar.[7]

A study conducted in Gadchiroli in Maharashtra during the year 2011-2013 estimated the age adjusted stroke mortality rate 192/10000 people per year.[7]

METHODOLOGY

Study 1 was a retrospective hospital based study which was carried out for a two year period in department of Neurology and Medicine and SUM hospital & AIIMS, BBSR. Total of 1224 patients of either sex of 20 years and above diagnosed with different types of stroke and had a confirmed diagnosis using CT\MRI and admitted for minimum 7 days duration. Patients with history of smoking, alcohol consumption, hypertension, hypercholesterolemia, obese were

taken in to the study. Patients with other history of CNS disorders, HIV, Hepatic encephalopathy, liver disorders were excluded from the study.

Study 2 was a retrospective study of six months which was conducted in a multispeciality health care in Anantapur, Andhrapradesh. Total of 90 patients of either sex diagnosed with Ischemic, Haemmorhagic stroke were considered and confirmed with CT\MRI scan. Patients with previous history of hypertension, smokers and non-smokers, alcoholic and non-alcoholic were taken. Patients with Intracranial abnormalities, dementia, tumour and no confirmed CT\MRI Scan diagnosis and who are below 18 years were excluded from the study.

Study 3 was a hospital based study conducted in a super speciality hospital, in Warangal. Total of 102 patients either sex aged above 18 years, diagnosed with stroke and admitted in an intensive care unit were taken. Patients with history of smoking, alcohol consumption, hypertension, old stroke, diabetes mellitus were taken in to the study.

Study 4 was a prospective observational study conducted in department of Neurology, Narayana Hrudayalaya hospital for a period of seven months. Total of 124 patients of either sex above 20 years and diagnosed with stroke confirmed diagnosis with CT\MRI were included in the study. Patients with Intracranial abnormalities and unconfirmed diagnosis with CT\MRI were excluded from the study.

Study 5 was a prospective observational and analytical study carried out in IHD patients in department of cardiology at Sagar hospital, Kumaraswamy layout, Bengaluru, India. Total of 120 patients of either sex above 18 years of age and diagnosed with stroke were included. Patients who are not willing, pregnant women and cancer patients were excluded from the study.

RESULTS

Table 1: Demographic Data of Study Participants in Study 1.

Age in years	Male 742 (60.6%)	Female 482(39.4%)	Total 1224(100%)
20-39	68 (9.2)	32 (6.6)	100 (8.2)
40-59	391 (52.7)	311 (64.5)	702 (57.3)
60-79	270 (36.4)	132 (27.5)	402 (32.9)
≥80	13 (1.7)	7 (1.4)	20 (1.6)

Table 2: Demographic Data of Study Participants in Study 2.

Age in years	Male(60)	Female(30)	Total(90)	ePatPecreP
20-30	2	1	3	3.33
31-40	4	2	6	6.67
41-50	8	5	13	14.44
51-60	16	8	24	26.67
61-70	20	8	28	31.11
71-80	9	6	15	15.56
81-90	1	0	1	1.11

Table 3: Demographic Data of Study Participants in Study 3.

Age in years	Male (N=68 (%))	Female (N=34 (٪))
25-40	5 (7.35)	4 (11.76)
41-55	24 (35.29)	9 (26.47)
56-70	28(41.17)	15(44.11)
≥71	11(16.07)	6 (17.64)
Mean ± SD	59 ± 12.022	58.94 ± 12.032

Table 4: Demographic Data of Study Participants in Study 4.

Age in years	Number (M=65, F=59)	Percentage٪
20-39	12	9.68
40-59	54	43.55
>60	58	46.77
Mean ± SD	41 ± 14.71	56.36 ± 12.66

Table 5: Demographic Data of Study Participants in Study 5.

Age in years	Number(M=74, F=46)	Percentage٪
≤50	23	19.17
51-60	27	22.5
61-70	30	25.0
71-80	25	20.83
≥81	15	12.50

Table 6: Types of Stroke in Study Population.

Types of Stroke	Study 1		Study 2		Study 3		Study 4	
Patients	**N**	٪	**N**	٪	**N**	٪	**N**	٪
Ischemic Stroke	807	65.9	59	65.56	69	67.23	102	82.26
Hemorrhagic Stroke	417	4.13	31	34.44	33	32.37	22	17.74
Total	1124	10	90	100	102	100	124	100

Table 7: Social Histories of Study Participants.

Social Histories	Study 1(N=1124)		Study 2(N=102)		Study 3(N=120)	
Patients	**Number**	**٪**	**Number**	**٪**	**Number**	**٪**
Smoking	26	29	28	27.44	22	18.32
Alcohol	14	16	41	40.19	41	34.17
Total	40	45	69	67.63	63	52.49

Table 8: Risk Factors in study1 Population.

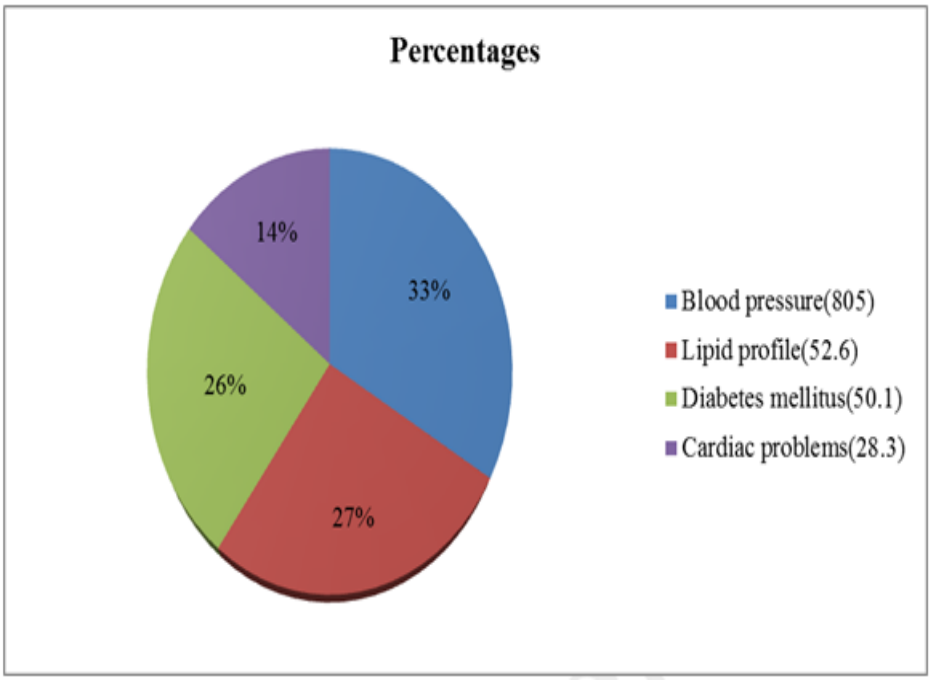


Table 9: Risk Factors in Study 2 Population.

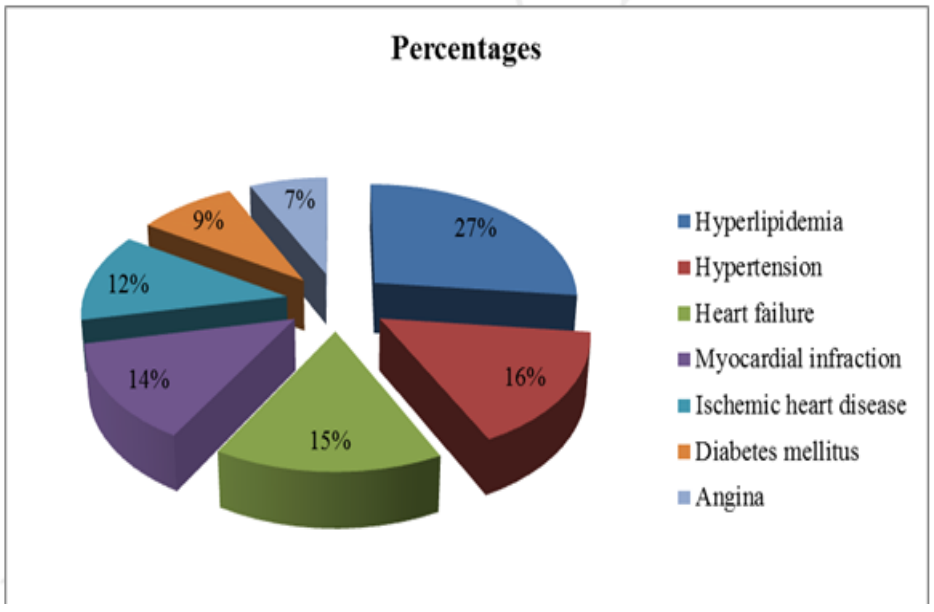


Table 10: Co-Morbid and Stroke Complications in Study 3 Population.

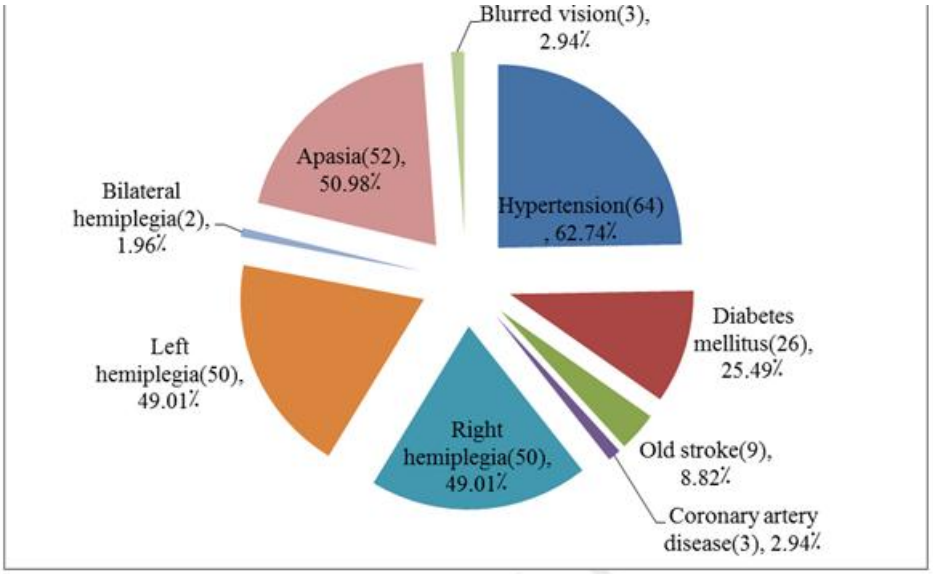


Table 11: Number of Co-Morbidities in Study 5 Population.

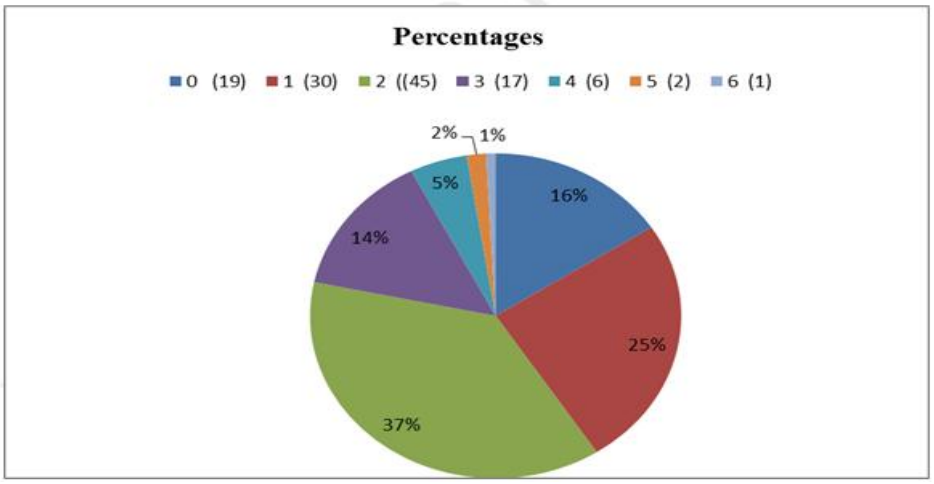


Table 12: Symptoms of Stroke in Study 2 Population.

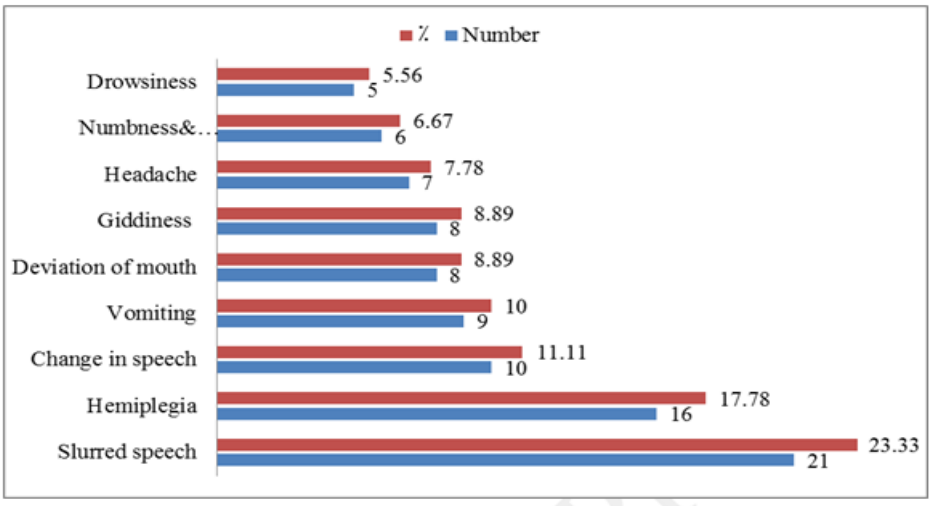


Table 13: Drugs Prescribed in Stroke Patients in Study 1.

Therapeutic class	Number (N)	Percentage (٪)
Thrombolytic drugs	23	1.8
Anticoagulants	314	25.6
Antiplatelet drugs	805	65.7
Beta blockers	108	12.6
α 2 –adrenergic blockers	72	8.4
Alpha- adrenergic blockers	45	5.2
Mixed α +β blockers	70	8.1
CCBs	443	51.7
ACE inhibitors	290	33.8
ARBs	212	24.7
Diuretics	126	14.7
Lipid lowering agents	819	66.9
Cerebral activators	412	33.6
Antibiotics	380	31.04
Anti-epileptics	422	34.4
Osmatic diuretics	811	66.2
Anti-Psychotics	138	11.2
Laxatives	331	27.04
Antacid medications	942	76.9

Table 14: Drugs Prescribed in Stroke Patients in Study 2.

Therapeutic class	Number (N)	Percentage (٪)
Lipid lowering agents (N=85)		
Atorvastatin	63	74.11
Rosuvastatin	17	20
Simvastatin	5	5.89
Anti-atherogenics (N=87)		
Clopidogrel	32	36.78
Aspirin	13	14.94
Clopidogrel + Aspirin	40	45.98
Warfarin	2	2.3
Anti-anginals (N=72)		
Nitroglycerine	27	37.5
Isosorbide mono nitrate	11	15.28
Combination of both	34	47.22
Beta blockers (N=48)		
Metoprolol	20	41.67
Carvedilol	17	35.42
Atenolol	7	14.58
Metaprolol + Nifedipine	4	8.33
Diuretics (N=34)		
Furosemide	13	38.23
Spiranolactone	9	26.47
Ramipril+Telmisartan+Hydrochlorthiazide	2	5.88
Mannitol	10	29.42

Anxiolytics (N=70)		
Clonazepam	22	31.43
Diazepam	36	51.43
Clobazam	12	17.14
ACE inhibitors (N=5)		
Ramipril	5	100
ARBs		
Telmisartan	6	66.67
Losartan	3	33.33
CCBs (N=34)		
Amlodipine	19	55.88
Nifedipine	15	44.12
Antibiotics (N=58)		
Ceftriaxone	12	20.69
Amoxicillin + clavulanic acid	21	32.21
Amikacin	5	8.62
Clindamycin	7	12.07
Levofloxacin	9	15.52
Piperacillin + Tazobactum	4	6.89

Table 15: Drugs Prescribed in Stroke Patients in Study 3.

Therapeutic class	Number (N)	Percentage (٪)
Anti-coagulant drugs	44	43.13
Cerebral activator drugs	77	75.47
Beta blockers	11	10.78
CCBs	48	47.04
ACE inhibitors	3	2.94
ARBs	6	5.88
Anti-HTN combination	20	19.6
Anti-epileptics drugs	24	23.52
Dyslipidimic drugs	22	21.56
Neurotonics drugs	95	83.32
Anti-platelet drugs	94	92.14

Table 16: Drugs Prescribed in Stroke Patients in Study 4.

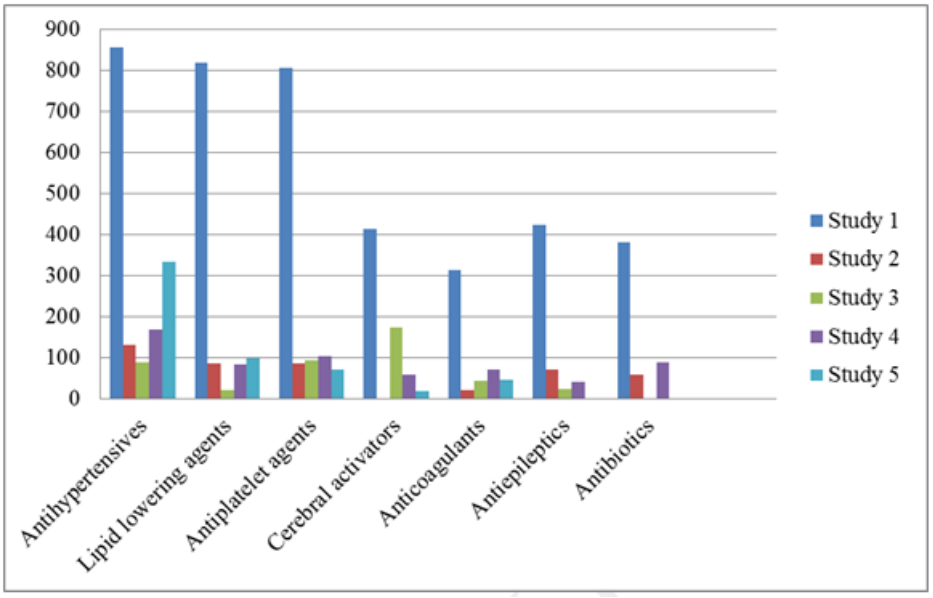
Therapeutic class	Number (N)	Ischemic	Haemorrhagic
Anti coagulants	70	63	7
Anti-Platelet drugs	103	89	14
Beta blockers	34	26	8
CCBs	64	50	14
ACE inhibitors	3	3	0
ARBs	10	10	0
Anti-HTN combination	8	8	0
Anti-epileptics	41	30	11
Dyslipidemics	83	73	10
Neurotonics	59	48	11
Diuretics	10	10	0

Osmotic diuretics	38	25	13
Antipsychotics	26	23	3
CNS stimulant	13	9	4
Antibiotics	89	73	16
Laxatives	75	59	16

Table 17: Drugs Prescribed in Stroke Patients in Study 5.

Therapeutic class	Number of prescriptions(N)	Percentage (٪)
Diuretics	68	8.35
ACE Inhibitors	28	3.43
ARBs	28	3.43
B-blockers	90	11.10
Alpha blockers	90	1.10
CCBs	30	3.68
Lipid lowering agents	99	12.16
Anti anginals	55	6.75
Anti-Platelets	71	8.72
Anti-Coagulants	46	5.65
Positive inotropic agent	18	2.20
Anti-diabetics	17	2.08
Anthelmintics	21	2.57

Table 18: Major Groups of Drugs Prescribed in All Study Population.



In study 1 total of 1224 subjects were recruited out of which 742 (60.6٪) were males and 482 (39.4٪) were females (table 1). The highest prevalence of stroke was among 40-59 years aged group with comprised of 702 (57.3٪) patients. Majority of patients were diagnosed with Ischemic Stroke 65.9 ٪(Table 6). Hypertension 805 (65.7٪) was identified as most common risk factor in majority of the patients (Table 8). Antihypertensives 856 (69.9٪) were majority

of the prescribed drugs (Table 13).

In study 2 a total of 90 subjects were recruited out of which 60 (66.67%) were males and 30 (33.33%) were females (table2). The prevalence of Stroke was highest among 61-70 aged group patients 28 (31.1%). Majority of patients were diagnosed with Ischemic stroke 59 (65.56%) (Table 6). History of smoking was identified as majority social habit among patients 26 (29%) (Table 7). Hyperlipidemia was found to be the major risk factor for occurrence of stroke (47.05%) (Table 9). Patients with positive family history 72 (80%) were in majority. Among the drugs prescribed lipid lowering agents were prescribed were prescribed in majority patients 85 (74.11%) (Table 14).

In study 3 a total of 102 patients were recruited 68 (33.3%) were males and 34 (66.66%) were females (Table 3). Patients with social habits of alcohol consumption were more, Ischemic stroke was identified in majority of patients 69 (32%) (Table 7). Hypertension was identified as the major risk factor inpatients 64 (62.72%) (Table 10). Majority of patients were treated with neurotonic drugs 85 (83.33%) (Table 15).

In study 4 a total of 124 subjects were recruited out of which 65 were males and 59 were females (Table 4). Incidence of stroke was maximum among age group of 60 years 58 (46.77%). Patients experiencing Ischemic stroke were major in number 102 (82.26%) (Table 6). In prescribing drugs antiplatelet therapy was given in majority of patients Aspirin (84), Clopidogrel (19) (Table 16).

In study 5 a total of 120 subjects were recruited out of which 74 (61.67%) were males and 46 (38.33%) were females. Majority of patients affected with stroke were between 51-60 aged 27 (22.5%) (Table 5). Never smokers 83 (69.17%) and non-alcoholics 79 (65.83%) were present (Table7). Among prescribing drugs lipid lowering agents were given more 99 (12.16%) (Table 17).

DISCUSSION

Stroke is the major cause of disability and death worldwide therefore its prevention is necessary for a better living. There are several epidemiological studies done which investigated on the risk factors and the drug utilization pattern in stroke for better therapeutic and positive outcomes for the patient. Based on the etiology two types of prevention of stroke are present. First type is primary prevention of stroke which involves treating with aspirin,

statin therapy, controlling of blood pressure. Warfarin, heparin, carotid endarterectomy, carotid angioplasty are involved in the secondary prevention of stroke. Early diagnosis and enhancement can decrease the harmful and dangerous outcome of stroke. Common risk factors for stroke are diabetes, hypertension, smoking, obesity. Mostly elderly patients above 50 years are more prone for stroke.

In study 1 n=1224, 60.6% were males and 30.66% were females in comparison to a study by Vurumadla et al. where it was 69.33% males and 30.66% female. The incidence of stroke was maximum among age group of 40-59 (57.3%) comparable to chachu kurlakose et al. The prevalence of ischemic stroke (65.9%) was higher when compared to haemmoragic stroke (31.4%). Hemiplegia was observed majorly of 56% of the population. Most common risk factor was hypertension (65.7%) followed by dyslipidemia and diabetes. Majority of drugs given were antihypertensives followed by hypolipidemics and antiplatelet whereas in spurthlet el al. study patients were treated with majorly antiplatelet and least with nitrates.

In study2 n=90, 60 were male (66.67%) and 30 were female (33.33%). patients of age group between 60-90 were more same as reported in mukesh et al. Majority of patients had ischemic stroke 59(65.6%) compared to haemmoragic stroke 29(32.33%) which are similar to vurumadla et al. Social history of smoking had higher rate of incidence 29% followed by alcohol 16% which are similar to sekar v et al. Most common risk factor was found to be hyperlipidemia (47.05%) followed by hypertension (28.05%), heart failure (28.25%), myocardial infarction (23.78%), diabetes mellitus (16simvastatin 5.89%), angina (12.4%) similar to MD. Obaidur rahman et al. Among drugs lipid lowering agents atorvastatin (74.11%) were mostly prescribed followed by Esposti et al.

In study 3n=102 patients males were more susceptible to stroke compared to females. Another study done in Taiwan by Wu et al. also revealed males were more prone than females. similarly one study done in Turkey by Nuray and Mehtap estimates males had more stroke than females. Similarly a study done in Pondicherry estimated more males than females. Most of patients prone with stroke were between age group of 56-70 years. Patients with hypertension were reported more 36(35.29%) similar to Nagaraj et al. Chennai study and Guo et al. study. In our study 28(27.45%) were smokers and 41(40.19%) patients consumed alcohol. An Indian based study by Sharma and sharma reported that 31.2% smokers were at a risk of stroke. Among 102 patients 69(32%) were identified with ischemic stroke and 33(32%) were identified with hemorrhagic stroke. Kalita et al. concluded that

ischemic stroke were more in number than hemorrhagic stroke. Nandigam et al. reported patients with ischemic were more than hemorrhagic stroke. Out of all stroke related complications 50(49.19%) with left hemiplegia, 2(1.96%) with both sided hemiplegia, 52(50.96%) with aphasia and 3(2.94%) with blurred vision. A study done by Kenneth and cheng reported the prevalence of stroke complications as 69% hemiparesis, 61% leg paresis, 57% aphasia, 51% bluured vision problems. Major co morbidities were found to be hypertension, diabetes mellitus which was similar to Wu et al. A study reported by Meschia et al. found 71% and 27% had a past history of hypertension and diabetes mellitus. Guo et al. reported in their study about past medical history having 65.67% of hypertension and 348.7% of diabetes mellitus in the present study 77 (75.49%) patients were administered with cerebral activators.

In study 4 n=124 mean age of patients was between 36-56 years which was similar to study done by R P Eapen and Naik et al, who found age group between 57 & 58. Nurray and Mehtap also reported in their study age group between 61-70 more prone to stroke. Among the types of stroke ischemic (82.26%) stroke more than hemorrhagic (17.24%). Among the types of stroke, ischemic stroke (82.26) was found to be more than hemorrhagic which is similar to study Celin at el. Another study Robert et al. also described more ischemic stroke patients than hemorrhagic stroke patients. In the present study patients were prescribed with anticoagulants, antiplatelets, dyslipidemics.

In study 5 n=120,76(61.67%) were males and 48(38.33%) were females. This observation is similar to a study conducted by Ganachari M S et al. which showed predominance of males over females. Study concluded by Alagiriswami et al. and Satish kumar et al. also shows increase in number of males prone to stroke than females. Among 120 patients major patients major patients were between age groups of 61-70 years which is similar o he study conducted Ramanath et al. Patients with hypertension and diabetes have an increased risk of comorbidities and complications. In our study majority of patients (25.83) suffering with ischemic stroke due to comorbidities and hypertension. This is similar to a study conducted by Khan M A et al. higher rate of hypertension patients(29.33%) followed by diabetes mellitus(5.33%) and ischemic stroke followed by both hypertension and diabetes. In another study conducted by Dawalji S et al. higher rate of hypertension (25.88%) followed by diabetes mellitus (5.88%), COPD and asthma (2.49%).

Smoking can be a major cause for increasing blood pressure and causing stroke. In our study we found that 69.17% did not indulge in smoking, 12.5% were nonsmokers, 10% were occasional smokers, 6.66% were recurrent smokers, 1.66% were chainsmokers, 65.83% were non alcoholics, 34.17% consume alcohol. In our study we found that lipid lowering agents were majorly used which can decrease cardiovascular events and in the treatment of dyslipidemia which is similar to a study conducted by A.H.M Nazmul Hasan with highest number of lipid lowering agents.

LIMITATIONS

In study 2 shows the clinical features of CT examination such as infracts n=76 (84.44%) and bleeds n=14 (15.56%) when compared to other articles. These clinical features will helpful for diagnosis and treatment of stroke.

In study 4 prescription patterns of different therapeutic classes in stroke patients are mentioned with both Ischemic and Hemorrhagic types. It will be useful for the comparison of drugs that prescribed for both types of strokes when compared to other articles.

CONCLUSION

Despite several advances and development in the treatment of stoke the effectiveness and enhancement and feasibility has yet not improved. Primary and secondary prevention of stroke is very much essential to obtain beneficial therapeutic outcomes. Drug prescription analysis and rational utilization of drugs along with drug prescription outlines is necessary for positive outcomes of patient safety and care. Early identification and therapy plays a major role in qualitative patient care. Hypertension and hyperlipidemia were identified as the major risk factors in our study. Males were more prone to stroke compared to females and elderly patients above 50 years of age were more prone with stroke. Antihypertensive, statins, hypolipidemics were found to be major drugs utilized in the prescription pattern of stroke.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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