



Research Article

EVALUATION OF ETIOLOGY, PREVALENCE AND PRESCRIBING PATTERNS OF DRUGS USED IN STROKE PATIENTS IN A SOUTH INDIAN GOVERNMENT HOSPITAL

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ABSTRACT

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Stroke is a major cause of mortality worldwide and commonly occurs in aged patients. After coronary heart disease (CHD) and cancer of all types, stroke is the third commonest cause of death worldwide. Stroke prevalence among the elderly in rural India was 1.1% and urban India was 1.9%. This study was conducted to describe and obtain the standard data about the prevalence, complaints during admission, risk factors associated and prescribing pattern of drugs in stroke patients. The prospective observational study was carried out for a period of six months in the Department of General Medicine SVRR Government General Teaching Hospital. The pharmacological therapy prescribed was analyzed to determine the prescribing pattern of drugs in 182 patients. It was observed that the prevalence of ischemic stroke (75.26%) was found to be greater as compared to that of the hemorrhagic stroke (24.74%). The incidence of stroke was estimated higher in males (67.6%) as compared to females (32.4%). Hemiplegia (18.68%) and headache (13.72%) were the prominent manifestations for admission of patients which .The occurrence of stroke was predominantly seen at the age of 51-60 years (29.6%). The common risk factor for stroke is alcoholism (63.18%), hypertension (54.95%) and smoking (49.46%). The current prescribing trends were antihypertensive (54.95%) followed by antiplatelets (52.75%) and antihyperlipidemics (50.55%). The prescribing trends for antihypertensive drugs in stroke were diuretics (28%) followed by ACE inhibitors (20%), ARB's (17%), beta-blockers (11%) and nitrates (8%). The prescribing pattern of drugs should be based on specificity and severity of stroke in order to facilitate rational use of drugs providing optimal care. Pharmacists are in a key position to provide pharmaceutical care to stroke survivors and initiate or recommend appropriate pharmacotherapy where indicated. Integration of a role of pharmacist in the management of stroke is crucial and improves outcomes of patients.

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INTRODUCTION:

Stroke is defined as a sudden onset focal neurological deficit of vascular etiology and is a major cause of mortality and morbidity around the world¹. Stroke is a major reason of mortality worldwide and generally occurs in

elderly patients^{2, 3}. After coronary heart disease (CHD) and cancer of all types, stroke is the third commonest cause of death worldwide. In India, the ICMR estimates in 2004 indicated that stroke contributed 41% of deaths and 72% of disability adjusted life years amongst the non-communicable diseases². WHO has defined stroke as "rapidly developing clinical signs of focal or global disturbance of cerebral function, lasting for more than twenty four hours or leading to death, with no apparent cause other than vascular origin." Epidemiologic studies on stroke help us with understanding the natural history of the disease, identification of risk factors, and predictive factors that can lead to markers for disease mechanisms². Drug utilization study using prescribing indicators enables us to detect and also to quantify problems in prescribing practices. Such study helps to frame appropriate interventions based on type of problems and ultimately promotes rational use of drugs in the community. Stroke is a clinical syndrome separated 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.
- Hemorrhagic strokes are caused by subarachnoid hemorrhage – bleeding from one of the brain's arteries into the brain tissue or intra-cerebral hemorrhage – arterial bleeding in the space between meninges. This category of stroke accounts for 1%–7% and 7%–27% respectively of all strokes worldwide.

According to the demographic data obtained the prevalence rate of stroke increases from 0.1–0.3/1000 in the < 45 year age group to 12–20/1000 in the 75–84 year age group. Similarly, the incidence rates increase from 27–34/100,000 in the 35–44 age groups to 822–1116/100,000 in the 75+ age group. Stroke prevalence among the elderly in rural India was 1.1% and urban India was 1.9%².

Prevalence is directly proportional to age and inversely proportional to the education levels of stroke survivors. Three changes

have contributed to the emergence of the stroke epidemic in India: demographic, lifestyle and socioeconomic. Non-modifiable stroke risk factors include age, sex, low birth weight, ethnicity and genetic factors^{4, 5}. According to the recent studies conducted it was found that modifiable risk factors⁶ such as hypertension (40%), alcoholism (35%), smoking (28%) and hyperlipidemia (17%) are the commonest cause of stroke among the elderly. Smoking, alcoholism, increased BMI, diabetes and hypertension are significantly associated with strokes among young people. The presence of coronary artery disease and large artery atherosclerosis are also considered the strong predictors of a new vascular event among the stroke survivors. Currently the awareness regarding the diagnosis of stroke is through the FAST examination (which adopts weakness of face, arm as well as speech and essentially time). The other means of diagnosis are CT scan, MRI scan, PET and ultra sound.

According to NICE guidelines 2011, early recognition and diagnosis of stroke using validated tools outside hospital environment can help save life and limit disability. Proven treatments of acute thrombotic stroke include intravenous thrombolysis within 3 hours of onset of symptoms, use of aspirin within 48 hours and decompressive surgery for malignant middle cerebral artery infarction. The drug treatment strategy is involved with selecting drugs like thrombolytics, anticoagulants, antihypertensives (angiotensin converting enzyme-inhibitors, angiotensin II receptor blockers, and diuretics), blood lipid lowering agents (statins), antiplatelet drugs (aspirin and clopidogrel), and cerebral activators. It is also recommended to select a route, and dosage form of drugs to have optimal therapeutic effects to manage cerebrovascular accident.

Primary management of stroke includes antiplatelet therapy with aspirin, statin therapy and blood pressure management. Secondary management with carotid endarterectomy, carotid angioplasty, warfarin and heparin is useful. Calcium antagonists like oral nimodipine is useful in hemorrhagic stroke. Primary prevention interventions are expected to target at behavior modification such as reduced smoking, alcohol and salt consumption patterns and increased physical activity. Increasing fruit and vegetable consumption (for

each 1-serving per day) is considered to reduce the risk of stroke by 6%. Secondary prevention is through the pharmacological therapy. Tertiary prevention is attributed to maintain their ability to carry out daily activities if they receive rehabilitation services at home. Stroke rehabilitation is expected to begin as soon as possible after a person has a stroke and continue for as long as it is clinically appropriate⁷.

Stroke related programmes in India are WHO steps programme, inter-stroke, The Indian Stroke Prospective Registry (INSPIRE), The Prospective Urban Rural Epidemiology (PURE), National Programme on prevention and control of cardio-vascular diseases, diabetes and stroke (NPCDCS), Indian Council of Medical Research (ICMR), stroke policy in India⁷.

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 of the patients⁸. The present study aims to provide a comprehensive review on 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 pattern in stroke occurred patients.

METHODOLOGY:

The prospective observational study was carried out for a period of six months (June -Nov 2015) in the Department of General Medicine SVRR Government General Teaching Hospital, situated in Tirupati. Study was conducted after approved by Institutional Human Ethical Committee, Sri Padmavathi School of Pharmacy.

A total of 163 in-patients from the in-patient department of General Medicine, who were diagnosed with stroke, were included after obtaining the Permission for collection of data and to accompany physician in General Medicine ward from Head of the General Medicine department. The authors were permitted

to utilize the hospital facilities to make a follow up of the prescription in the department. The data was collected in data collection form, which contains patient demographics (age, sex), date of admission and date of discharge, type of stroke, history of present illness, past medical history, family history, name of the drugs, dosage regimen (dosage form, route, frequency and duration).

Selection of study subjects Includes 1) Male and female patients of age 20 years and above were included in the study, 2) Patients diagnosed with Ischemic and Haemorrhagic stroke were included in the study, 3) Those patients who had radiologically confirmed diagnosis of Stroke using CT/MRI scan were included, 4) Patients with identified and unidentified risk factors were included and the patients with intracranial abnormalities like subdural hematoma, brain tumor and dementia and Patients in whom CT/MRI could not be obtained were excluded from the study.

The data obtained & the patient related parameters were computed and analyzed by using MS-Excel 2007. The results were expressed as percentage/proportion either as pictorial representation in the form of bar diagram & pie chart or in the tabular form.

RESULTS AND DISCUSSION:

On the basis of the study conducted on a tertiary care teaching hospital for 6 months the following results were obtained. Among 182 patients males found 123 (67.6%) followed by females 59 (32.4%) shows the incidence of the stroke was higher in males compared to the females. Among 182 stroke patients 137 (75.26%) patients experienced Ischemic Stroke and 45 (24.74%) patients experienced hemorrhagic stroke as shown in table 1. The ratio of Ischemic stroke to Hemorrhagic stroke was 3:1.

Table 2 shows both smoking and alcoholic 64 (35.2%) patients were higher incidence to the stroke as compared individual smoking 26 (14.43%) and alcoholic 51 (28%) patients. Hemiplegia 34 (18.68%), headache 25 (13.72%) and vomiting 25 (13.72%) were the prominent manifestations reason for admission of patients which is then followed by Weakness of arms 23 (12.63%), Weakness of legs 18 (9.89%), Dizziness 16 (8.8%), Slurred speech 13 (7.15%), numbness and tingling

sensation 13 (7.15%), Facial palsy 9 (4.94%) and Loss of consciousness 6 (3.3%).

Table 1: Prevalence of types of stroke according to gender wise

	Ischemic stroke	Hemorrhagic stroke	Total
Males	92 (50.56%)	31 (17.04%)	123 (67.6%)
Females	45 (24.7%)	14 (7.7%)	59 (32.4%)
Total	137 (75.26%)	45 (24.74%)	182 (100%)

Table 2: Percentage distribution based on social habits

S.no.	Social habit	No. of patients (n=182)	Percentage (%)
1.	Smoking	26	14.43
2.	Alcoholic	51	28
3.	Smoking+ Alcoholic	64	35.2
4.	None	41	22.5

Table 3: Distribution of patients based on reason for admission

S.no.	Reason for admission	No. of patients (n=182)	Percentage (%)
1	Hemiplegia	34	18.68
2	Headache	25	13.73
3	Vomiting	25	13.73
4	Weakness of arms	23	12.63
5	Weakness of legs	18	9.89
6	Dizziness	16	8.8
7	Slurred speech	13	7.15
8	Numbness & Tingling sensation	13	7.15
9	Facial palsy	9	4.94
10	Loss of consciousness	6	3.3

Table 4: Age wise distribution of stroke patients

S.no.	Age (years)	No. of patients (n=182)	Percentage (%)
1	20-30	13	7
2	31-40	21	11.5
3	41-50	29	16
4	51-60	54	29.6
5	61-70	37	20.3
6	71-80	18	9.9
7	>81	10	5.5

Table 5: Distribution of risk factors in stroke patients

S.no.	Risk factor	No. of patients	Percentage (%)
1	Alcohol	115	63.18
2	Hypertension	100	54.95
3	Smoking	90	49.46
4	Family history	46	25.28
5	Diabetes	43	23.63
6	Heart diseases	34	18.68
7	Obesity	27	14.82

Table 6: Percentage distribution of patients with different stages of Hypertension

Stage	Range (mm Hg)	No. of patients (n=182)	Percentage (%)
Normal	120/80	29	15.94
Pre hypertension	120-139/80-89	53	29.13
Stage 1	140-149/90-99	72	39.57
Stage 2	> 160/100	28	15.36

Table 7: Pattern of prescribing drugs in stroke patients

S.no.	Drugs Prescribed	No. of patients	Percentage (%)
1	Anti hypertensives	100	54.95
2	Antiplatelets	96	52.75
3	Anti hyperlipidemics	92	50.55
4	Anti-ulcers	89	48.91
5	Analgesics	85	46.71
6	Vitamin supplements	73	40.11
7	Antibiotics	71	39.01
8	Antidepressants	48	26.37
9	Antidiabetics	43	23.62
10	Anticoagulants	36	19.78
11	Anticonvulsants	32	17.58
12	Neuroprotectants	26	14.28

Table 8: Pattern of prescribing Antihypertensive drugs in stroke patients

S.no.	Antihypertensive drug	No. of patients (n=100)	Percentage (%)
1	Diuretics	28	28
2	ACE inhibitors	20	20
3	Calcium Channel Blockers	18	18
4	ARB's	17	17
5	Beta blockers	11	11
6	Nitrates	8	8

ACE = Angiotensin Converting Enzyme, ARB = Angiotensin receptor blocker

Table 4 shows the occurrence of stroke was predominantly seen at the age of 51 - 60 years 54(29.6%) followed by 61 -70 years 37 (20.3%).The study conducted observed that the major and common risk factor for stroke is alcohol (63.18%) followed by hypertension (54.95%). From the above table 6 shows the distribution of patients on the basis of different stages of hypertension according to JNC guidelines 7 was calculated and the patients mainly belong to the stage I category with 72 (39.57 %) followed by pre hypertensioncategory 53 (29.13%). Table 7 shows the current prescribing patterns were evaluated the commonly prescribed drugs for stroke patients were antihypertensive drugs in 100 (54.95%) patients followed by antiplatelets in 96 (52.75%) patients and anti hyperlipidemics in 92 (50.55%) patients. Table 8 shows the prescribing trends for antihypertensive drugs in stroke were diuretics (28%) followed by ACE inhibitors (20%), ARB's (17%),beta blockers (11%) and nitrates (8%).

CONCLUSION:

The study showed prevalence, various risk factors affecting stroke prevalence and drug utilization review of stroke patients. According to the study the prevalence of ischemic stroke was higher as compared to hemor-

rhagic stroke. The incidence was seen higher in males with age group of 51-60 years. The major clinical manifestation associated with stroke was hemiplegia and headache. The common risk factor for stroke is alcoholism, hypertension and smoking. The study also reported the prescribing trends of antihypertensive, antiplatelet, and anti-hyperlipidemics. The usage of drugs differs with hospitals and physicians. The prescribing pattern of drugs should be based on specificity of the condition and severity of stroke in order to facilitate rational use of drugs providing optimal care. Therefore, Standard Stroke Prescribing Guidelines should be adopted in India to provide rational therapy.

REFERENCES:

1. MonodeepBiswas et al, Etiology and risk factors of ischemic stroke in Indian-American patients from a hospital-based registry in New Jersey, USA; *Neurology Asia* 2009; 14(2); 81 – 86.
2. ChachuKuriakose, NaseemShifafiya M, To evaluate the prevalence and drug prescribing trends in stroke patients: A retrospective study; *International Journal of Chemical and Phar-*

- maceutical Sciences 2014, Dec., Vol. 5 (4); 22-27.
3. Preethiprathyusha B, Abdul naveed, Shreya S, Sri lakshmi G and Vinayrao; Prescribing pattern of drugs in stroke patients admitted to a multi-specialty hospital, india; Indo American Journal of Pharm Research 2014; 4(02); 1015-20.
 4. Ansari AK, Akhund IA and Shaikh AQ. Stroke in elderly: identification of risk factors. J Ayub Med Coll Abbottabad 2001; 13: 11-3.
 5. Ali L, Jameel H and Shah MA. Risk factors in stroke. J Coll Physicians Surg Pak 1997; 7:7-10.
 6. Eapen RP and Parikh JP. A study of Clinical Profile and Risk Factors of Cerebrovascular Stroke, GMJ, 2009; 64(2): 47-54.
 7. Salmann Kanji, Celine Corman and Andre G. Douen. Blood Pressure Management in Acute Stroke: Comparison of Current Guidelines with Prescribing Patterns. Can. J. Neurol. Sci. 2002; 29; 125-131.
 8. Sangram Vurumadla, Rakshith V, Murari Ch, Venkateshwarlu K; A Study On Symptoms, Risk Factors And Prescribing Pattern of Drugs Used In Stroke Patients; Int J Pharm Pharm Sci, Vol 7, Issue 1, 421-426.
 9. Paul. O Mahony, Rechard G. Thomson, Ruth Dobson, Halen Rodgers and Oliver F.W. James; The Prevalence of Stroke and Associated disability; Journal of Public Health Medicine 1999; Vol. 21, No.2; pp. 166-171.
 10. Davies Adeloye; An Estimate of the Incidence and Prevalence of Stroke in Africa: A Systematic Review and Meta-Analysis; June 2014 | Volume 9 | Issue 6 | e100724; 1-14.
 11. Preethi P, Abdul Naveed, S, Sri Lakshmi G and Vinay Rao. Prescribing pattern of drugs in stroke patients admitted to a multispecialty hospital. Indo American Journal of Pharmaceutical Research. 2014; 4(2): 1015-1020.
 12. Sylvan Lavy, Eldad Melamed and Esther Cahane. Hypertension and Diabetes as Risk Factors in Stroke Patients. Stroke. 1973; 4.
 13. Mo-Yeol Kang and Hyoung-Ryool Kim. Association between Voluntary/Involuntary Job Loss and the Development of Stroke or Cardiovascular Disease: A Prospective Study of Middle-Aged to Older Workers in a Rapidly Developing Asia Country. BMJ. 2014; 9(11); 144-159.
 14. Tapas Kumar and Shyamal Kumar; Epidemiology of stroke in India; Neurology Asia 2006; 11; 1 - 4.
 15. Banerjee TK, Roy MK, Bhoi KK. Is stroke increasing in India-preventive measures that need to be implemented; J Indian Med Assoc 2005; 103:162-6.
 16. Celin AT and Seuma J. Assessment of Drug Related Problems in Stroke Patients Admitted to a South Indian Tertiary Care Teaching Hospital, Indian Journal of Pharmacy Practice, 2012; 5(4): 28-33.
 17. Eapen RP and Parikh JP. A study of Clinical Profile and Risk Factors of Cerebrovascular Stroke, GMJ, 2009; 64(2): 47-54.
 18. Chambless LE, Shahar E, Sharrett AR, Heiss G, Wijnberg L, Paton CC, et al. Association of transient ischemic attack/stroke symptoms assessed by standardized questionnaire and algorithm with cerebrovascular risk factors and carotid artery wall thickness. The ARIC Study, 1987-1989. Am J Epidemiol 1996; 144:857-66.
 19. Susan RW. Pharmacotherapy Principles and Practice: Stroke, 3rd New York, McGraw Hill; 2008. p. 161-73.
 20. Mathew JR, Cheryl DB, George H. Sex differences in stroke: epidemiology, clinical presentation, medical care, and outcomes. Lancet Neurol 2008; 7(10):915-26.