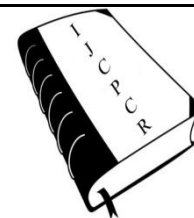




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## DRUG UTILIZATION PATTERN OF STROKE PATIENTS IN A TERTIARY CARE HOSPITAL

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### ABSTRACT

The medical care costs for procedure, medication and testing associated with stroke in India are high and are projected markedly in the future as the number of Indians affected grows. The burden on patients' quality of life, healthcare systems and society are pharmacoeconomic considerations in managing stroke. The objective of this study was to analyse and evaluate the medical, social and economic outcomes of the drug therapy and observe the prescribing attitude of physician in stroke patients. We collected data from 158 cases of stroke patients on the basis of age, gender, social habits. This hospital is a 1200 bedded government hospital provided Out patient / Inpatient care for Indian citizens free of charge. A total of 158 prescriptions were collected and the average number of drugs prescribed were 18.91% generics and 99.20% essential drugs. The most predominant age group was found to be 61-70 yrs. Among all patients 67.08% were male and 32.9% were female. Drug utilization was evaluated in all patients with stroke. Mannitol 69.62%, Neuroprotective drugs 63.92%, Antimicrobials 70.25%, Neurostimulants 0%, Anti-lipidaemic agents 35.44%, Multivitamins 3.79%, Antacids 89.87%, Aspirin 64.55%, Anti-hypertensives 37.97%, Hypoglycaemic agents 13.29%, Anti-platelets 5.06%, Thrombolytics 1.89%, Anti-coagulants 0.63% were prescribed. Our article suggests that, incidence of polypharmacy was very low. Patients using neuro-protective drugs are high. Appropriate prescribing may prevent the cost effectiveness, outcome from the drug therapy and may decrease the disability and mortality. Further research is needed to understand the neuro-stimulant prescribing in stroke patients, so that effective interventions can be design and implement in future.

**Keywords :** Stroke; Drugs; Age; Gender; and Polypharmacy.

### INTRODUCTION

In the fight against stroke disease, neuroprotective drugs have become weapon of choice. It is the most common neurological condition causing long-term disability and has enormous socioeconomic impact on patients, their families and health services [1]. Drug utilisation in developing countries is a matter of growing interest. Studies stress a number of related problems, healthcare infrastructure is inadequate [2]. Government has insufficient control of the drug supply system [3]. Drugs are freely available on prescription [4,5] often illegally [6]. The use of drug is often irrational from a biomedical point of view and over consumption of drugs and drug shortage occurs simultaneously within the same country. WHO addressed drug utilization as a marketing distribution, prescription as use of drug in a society considering it's

constituents either medical, social and economic [7]. A study on the process of drug utilization, focus on the factors related to the prescribing, dispensing, administering and taking of medications and it's associated events covering the medical and non-medical determinants of drug utilization. The effect of drug utilization as well as study of how drug utilisation related to the effect of drug use beneficial or adverse [8-10]. Stroke is a leading cause of death or disability worldwide [11]. Therefore stroke prevention is of great importance for public health. A number of epidemiological studies have investigated risk factors for stroke [12-15]. Therefore drug utilization studies which evaluated, analyzed the medical, social and economic outcomes of the drug therapy observe the prescribing attitude of physician in stroke patients. The

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present prescription monitoring study for stroke patients was done in the inpatient department (IPD) of Mahatma Gandhi Memorial Hospital (MGMH), Warangal, Andhra Pradesh. This kind of research enlightened the lacuna in the present prescribing practice of physician and help in improving the patient's healthcare for them.

## METHOD

The MGMH also named as Mahatma Gandhi Memorial Hospital to the health needs of community consisting of medical students, paramedical students, nonteaching and administrative staff under Warangal populations numbering about 32.46 lakhs people. MGMH is located near to Kakatiya medical college, Warangal, Andhra Pradesh. We collected data from 158 cases of stroke patients on the basis of age, gender, social habit. This hospital is a 1200 bedded government hospital provided Out patient / Inpatient care for Indian citizens free of charge. The pilot study was started at MGMH after getting official consent of the medical superintendent to collect the information from the patients admitted at AMC, IMC and General Wards. The proforma was prepared as per WHO based guidelines [15] and the human ethical committee of Kakatiya Medical College approved it. Information was collected from chronically ill patients who visited MGMH such as those suffering from stroke. Generally the physician write the prescription on the case sheet after examining the patients and the pharmacist dispense the medications to the particular ward and drugs were administered by the nurse. The prescriptions which include neuro-protective drugs, antibiotics, diuretics, lipid lowering drugs and antacids were audited and analysed category wise. Further we also tried to segregate the patients based on the socio demographic data. Patients with any stage of stroke and those who suffered either from diabetes mellitus, hypertension or both were included in the study and other co-morbidities such as Asthma, COPD, Peptic ulcers, Renal and Hepatic diseases were excluded. The following drugs were dispensed from MGMH for

stroke as per the essential drug list (EDL) available at the health centre. Piracetam, Mannitol 20%, Cefixime, Atorvastatin, Ranitidine, Multi-vitamins.

## RESULTS

A total around 2800 patients visited AMC, ICU, General ward and Fever wards over a period of three months. On the basis of inclusion and exclusion criteria 158 patients were selected for the present study. Among them 106 were males and 52 were females. Drugs received among male and female population were shown in Table :1

The highest number of patients were in the age group 61-70 yrs. Whereas, Drugs usage among various age groups N (%) were shown in Table :2

The percentage and corresponding number of patients who visited either monotherapy or combination i.e. two or three drugs is shown in Table No:3. Monotherapy Verus Combination therapy.

Overall 97.46% of patients were treated with a single neuroprotective drugs and 2.53% were treated with neuroprotective drug combinations. Among those who were treated with drug combination 1.26% received two drugs and 0.63% received a regimen has three drugs. During the study it was observed that the most commonly prescribed antibiotics were  $\beta$ -lactam penicillins and Cephalosporins followed by Aminoglycosides. It has been shown in Table No:4 Most commonly used Antimicrobial agents

A total of 111 antimicrobials agents were prescribed. The routes of administration were Oral, IV and Drops. The most frequent co-morbid conditions of the study were found to be hypertension 37.9%, followed by diabetes 13.2%. All the antimicrobial agents were prescribed by brand name.

**Table I**

Drugs	Male N (%)	Female N (%)	Total N (%)
Mannitol 20%	83(52.53)	27(17.08)	110(69.62)
Piracetam	74(46.83)	27(17.08)	101(63.92)
Antibiotics	77(48.73)	34(21.51)	111(70.25)
Atorvastatin	33(20.88)	23(14.55)	56(35.44)
Multi-vitamins	3(1.89)	3(1.89)	6(3.79)
Ranitidine	99(62.65)	43(27.27)	142(89.87)
Aspirin	72(45.56)	30(18.98)	102(64.55)
Anti-hypertensives	39(24.68)	21(13.29)	60(37.97)
Anti-diabetic drugs	14(8.86)	7(4.43)	21(13.29)
Anti-platelet drugs	5(3.16)	4(2.53)	8(5.06)
Thrombolytics	2(1.26)	1(0.63)	3(1.89)
Anticoagulants	0	1(0.63)	1(0.63)

**Table II**

Drug	18-30yrs	31-40 yrs	41-50 yrs	51-60 yrs	61-70 yrs	71-80 yrs	81-90 yrs
Mannitol 20%	12(14.28)	11(13.25)	16(16.84)	15(15.78)	17(14.91)	13(13.54)	26(16.88)
Piracetam	13(15.47)	11(13.25)	15(15.78)	15(15.78)	18(15.78)	12(12.5)	17(11.03)
Antibiotics	13(15.47)	12(14.45)	14(14.73)	14(14.73)	16(14.03)	15(15.62)	27(17.53)
Atorvastatin	8(9.52)	7(8.43)	6(6.31)	11(11.57)	8(7.01)	10(10.41)	6(3.89)
Multivitamins	1(1.19)	1(1.20)	0	0	1(0.87)	2(2.08)	1(0.64)
Ranitidine	16(11.59)	17(20.48)	19(0.2)	17(17.89)	17(14.91)	20(20.83)	36(23.37)
Aspirine	15(17.85)	13(15.66)	15(15.78)	11(11.57)	18(15.78)	12(12.5)	18(11.68)
Antihypertensives	6(7.14)	10(12.04)	8(8.42)	6(6.31)	11(9.64)	7(7.29)	12(7.79)
Antidiabetic drugs	0	0	2(2.10)	4(4.21)	3(2.63)	3(3.12)	9(5.84)
Antiplatelet drugs	0	1(1.20)	0	2(2.10)	3(2.63)	1(1.04)	1(0.64)
Thrombolytics	0	0	0	0	2(1.75)	0	1(0.64)
Anticoagulants	0	0	0	0	0	1(1.04)	0
Total	84(100)	83(100)	95(100)	95(100)	114(100)	96(100)	154(100)

**Table III**

Monotherapy	Two drug combination	Three drug combination
154 (97.46%)	3 (1.26%)	1 (0.63%)

**Table IV**

Category	Drugs	No.of agents prescribed	% Consumption
B-lactam Penicillins	Amoxicillin + Clavulonic acid	36	32.43
Cephalosporins	Cefpodoxime proxetil	64	57.65
Aminoglycosides	Neomycin with polymyxine B	11	9.90

**Table V**

Indicators	Data
<b>Prescribing indicators</b>	
Average drugs prescribed	98.73%
Generics	18.91%
Antibiotics	70.25%
Injections	68.65%
On essential drug list	96.20%
<b>Facility indicators</b>	
Availability of EDL	Yes
Key drugs available	99.20%
<b>Complimentary indicators</b>	
Without drugs	0%
Average drug cost ( Rs / prescription)	550/-
Drug cost on injections	90.90%

## DISCUSSION

Most of the researchers that has addressed pharmacological intervention for motor and speech recovery after stroke as included small population. In the meta-analysis involving the use of medications facilitate motor recovery after stroke. Seven studies using amphetamine treatment in the rehabilitations of 172 patients varied in quality. [17] In contrast to the studies where amphetamine treatment were not used in our

patients. Neuro stimulant medications also have been assessed with stroke survival with aphasia.[18] Piracetam appeared to be effective in restoring language function. This study was similar to the previous research whereas Piracetam was used in 78 male patients. In our study antacids were prescribed mostly. In previous studies by Yu-Ching Chou *et al.*, 2006 reported that antacids were prescribed frequently although antacids were not prescription only drug, they were reimbursed by the 2/5<sup>th</sup>

of prescriptions in Taiwan contain antacids and the percentage was as high as 87% in prescription with NSAIDS.[19] But the concomitant prescription of antacid and NSAID is not a good explanation for the use of antacid in their studies because oral NSAIDS were seldom prescribed to these patients. The use of antacids might be partly attributed to this patient. The use of antacids might be partly attributed to the fact that magnesium compounds were usually taken as laxatives. However, this study was similar to the previous studies where antacids used in our study populations 99 male and 43 female patients. Sule Salami *et al.*, 2011 reported that anti-lipidaemic therapy was somewhat less frequent with 73% prescribed this category at discharge. In contrast to this studies where anti-lipidaemic drugs were prescribed. In our study 32 among male and 23 among female with anti-lipidaemic drugs.

Uncontrolled BP significantly increase the risk of adverse cardiovascular outcomes such as MI, stroke and mortality. [21] Hypertension is a major risk factor for stroke and stroke prevention is a main reason for the use of antihypertensive drugs. [22,23] The current data could be interpreted to mean that hypertension is more prevalent in Varmland than in Skane, but there are no actual prevalence data to corroborate this assumption. Furthermore, it is not known whether stroke morbidity is higher in Varmland nor whether the case fatality ratios for stroke differ between Varmland and Skane. Clinical trials and community based interventions indicate that anti hypertensive drug treatment may reduce stroke mortality considerably. [24,25]

Juan Merlo *et al.*, 1996 reported that hypertension may not be a primary cause of hemorrhagic stroke. [22] Accordingly antihypertensive drug treatment would reduce the risk of hemorrhagic stroke but, would have less preventive effect against thromboembolic stroke. As thromboembolic stroke is more common than hemorrhagic stroke in Swedon and most other western countries. The relationship between stroke mortality and antihypertensive drug utilization should be weak in accordance with the previous researches. However an interesting observation was that antihypertensive drug utilization rate versus antithrombotic drugs was similar to the previous studies.

Our hospital is dedicated to poor patients to recognize the early symptoms of stroke as time wasted

equals brain tissue loss. Sadly as expectedly there was a slightly higher mortality rate in the age above 60 yrs, with no death recorded in the younger than 40 yrs of age. Our findings are contrast with Hamann G *et al.*, which found that 96% of the stroke patients were still receiving an anti-thrombotic medication but, in our research we found it was 66.44%. [26] Persistence in the antithrombotic category in our study was 5.06% was Clopidogrel, 64.55% for Aspirin and 0.63% for Heparin.

Our results could indicate that tobacco use is associated with socioeconomic indicators that also affect medication taking. Table No.5 Details on drug use indicators

The heart and stroke foundation of Canada found higher rate of tobacco use among Canadians in the low and medium income levels. [27] In a report on the use of smoking cessation, medication after hospitalisation for heart disease. Whelan *et al.*, 2005 found that there were significant socioeconomic difference between the patients would report the use of medications and those who were still smoker [28].

Heatherl Lummis *et al.*, 2008 reported that, unknown how many patients quit smoking after stroke. It is unclear why there is an association between those who smoked under anti-lipidaemic medications persistence and not with persistence in the other drug classes studied. Further research could help identify the barriers to medication persistence in people who smoke. [29] Therefore present investigation was similar to the other researches. Our results showed that commonly prescribing anti-diabetic drug was metformin.

## CONCLUSION

Our article suggests that the incidence of polypharmacy was very low. Patients using neuroprotective drugs are high. Appropriate prescribing may prevent the cost effectiveness, outcome from the drug therapy and may decrease the disability and mortality. Further research is needed to understand the neurostimulant prescribing in stroke patients, so that effective interventions can be design and implement in future.

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