A Prospective Study on the Effect of Co Morbidities, Quality of Life and Prescription Analysis on Stroke Patients.

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ABSTRACT

To study the effect of co morbidities, quality of life, motor and cognitive dysfunction and assess the influence of age, gender in stroke patients. Observe prescribing pattern of drugs. Patients were evaluated for following parameters Age, Gender, Motor FIM, Cognitive FIM, QOL, Comorbidities. Comorbid conditions were assessed using CCI. Patient's disability was assessed using FIM. The ADL was recorded according to Katz Index. Different Prescription patterns were identified. The incidence of stroke is maximum in the age group of 51-60 years which comprises 30% patients. Stroke is more common in males than females. Smoking and Alcoholism were detected as most common risk factors. FIM Scores of physical and cognitive disability are useful to measure patient's progress and showed improvement or functional gain in the patients. Hypertension and Diabetes Mellitus were most frequent comorbidities in Stroke. Various classes of drugs were administered to patients. Calcium channel blockers, Beta Blockers, Diuretics, ACE Inhibitors, ARB's and combinations. Phenytoin, Piracetam, Mannitol, Atorvastatin, Aspirin, Enoxaparin were prescribed. There should be a standard stroke pharmacotherapy for better usage and patient compliance. The incidence of Stroke has significant impact in the quality of Life of the patients. Various risk factors associated with Stroke and presence of comorbidities deteriorate the patient's progress. FIM scores clinically assess physical and cognitive disability. The standard prescribing patterns should be followed for pharmacotherapy to improve patient care.

Keywords: Quality of life, Stroke, Incidence, Pharmacotherapy.

INTRODUCTION

The cerebrovascular diseases clearly rank first in frequency and importance among all the neurologic diseases of adult life. They compose about 50% of all neurological hospital admission. Stroke is the second leading cause of death and the third leading cause of disability and possesses a significant burden of care for those who survive. Present study evaluates the association and impact of co morbidities, various risk factors, functional outcomes[16] and treatment on stroke patients and assesses the life[1] time health impact on stroke patient. An instrument designed and broadly used to assess function (behavioral and cognitive) is Functional Independence Measure (FIM). Gain in the function is attributed based on reduction in risk factor, therapeutic intervention and time. Based on the impression that the stroke has a significant burden of care, this study has been taken as an insight to capture FIM on both cognitive and motor functions which show the dependence of the patient performing Activities of daily living (ADL) despite of treatment. This FIM measurement is a direct reflection of the care needed from the patient relatives. Optimal management[3] of co morbidity conditions may accelerate recovery and reduce the cost of medical care. This study also determines the health related quality of life after surviving a stroke.

Etiology and Classification

Stroke can be either ischemic or hemorrhagic (88% and 12%, respectively, of all strokes in the 2006 American Heart Association report). A classification of stroke by mechanism is given in Hemorrhagic strokes include subarachnoid hemorrhage, intracerebral hemorrhage, and subdural hematomas. Subarachnoid hemorrhage occurs[4] when blood enters the subarachnoid space owing to either trauma, rupture of an intracranial aneurysm, or rupture of an arteriovenous malformation (AVM). By contrast, intracerebral hemorrhage occurs when a blood vessel ruptures within the brain parenchyma itself, resulting in the formation of a hematoma. The non-modifiable risk factors are age, race, sex, low birth weight, and family history. The most common modifiable, well-documented risk factors for stroke include hypertension, cigarette smoking, diabetes, atrial fibrillation[15] and dyslipidemia. A second very important risk factor for stroke is cardiac disease.

Pathophysiology

Ischemic Stroke

In carotid atherosclerosis, progressive accumulation of lipids and inflammatory cells in the intima of the affected arteries, combined with hypertrophy of arterial smooth muscle cells, results in plaque formation. Eventually, sheer stress may result in plaque rupture, collagen exposure, platelet

aggregation, and clot formation. The clot can remain in the vessel, causing local occlusion, or travel distally as an embolism, eventually lodging downstream in a cerebral vessel[5].

Hemorrhagic Stroke

The pathophysiology of hemorrhagic stroke is not as well studied as that of ischemic stroke. However[6] it is known that the presence of blood in the brain parenchyma causes damage to the surrounding tissue through the mechanical effect it produces (mass effect) and the neurotoxicity of the blood components and their degradation products. Approximately 30% of intracerebral hemorrhages continue to enlarge over the first 24 hours, most within 4 hours, and clot volume is the most important predictor of outcome, regardless of location. Hemorrhage volumes >60 mL are associated with 71% to 93% mortality at 30 days. Much of the early mortality of hemorrhagic stroke (up to 50% at 30 days) is caused by the abrupt increase in intracranial pressure that can lead to herniation and death. There is also evidence to support that both early and late edema contributes to worsened outcome[7] after intracerebral hemorrhage.

Aim and objective of the study

To study the functional outcomes in Ischemic and Hemorrhagic Stroke patients.

Objectives[12-14]

Primary objective

To study the effect of functional outcomes on basis of dependent and independent functional days.

Secondary objectives

1.   To derive risk factor assessment tool for stroke.

2.   To define and classify motor and cognitive dysfunction

3.   To perform a cohort study on antibiotic prophylaxis in Stroke patients.

Purpose of the Study

To study the effect of co morbidities, quality of life, motor and cognitive dysfunction and assess the influence of age, gender in stroke patients. Observe prescribing pattern of drugs.

MATERIALS AND METHOD

Study site

Kims hospital secunderabad

Study design

A Prospective Cross-sectional cohort study.

Study duration: 6 months

Inclusion criteria

1 Male and female patients of age 20 years and above were included in this study.

2. Patients diagnosed with Ischemic and haemorrhagic stroke were included in the study.

3. All patients having radiologically confirmed diagnosis of Stroke using MRI, CT scan were included.

4. Patients with or without comorbidity conditions were included.

Exclusion criteria

1. Age less than 20 years

2. Patient with intracranial abnormalities like subdural hematoma, brain tumor and dementia were excluded.

3. Patients in whom CT/MRI could not be obtained were excluded from the study.

Study method

Patients who were admitted to the hospital during the study period with the clinical diagnosis of Stroke are to be assessed and evaluated for the following.

Motor FIM (Functional Independence Measure)

The motor FIM is an assessment instrument of motor functional status. It is an 16 item measurement that evaluates the parameters like self-care, sphincter control and mobility, locomotion. Each item on the motor FIM is scored on a 7 point ordinal scale that ranges between 1 and 7. FIM scale is used extensively in Stroke to measure the patient's progress and assess rehabilitation outcomes. The items include:

1. Self Care
2. Sphincters
3. Mobility
4. Locomotion

Cognitive FIM

Cognitive function refers to a person's ability to process thoughts, memory, ability to learn new information, speech, and reading comprehension. Cognitive FIM is a 14 item measurement that evaluates the parameters like communication, psychosocial and cognition. The items on the FIM are scored on a 7 point ordinal scale that ranges between 1 and 7. FIM scale focuses on the burden of care that is, the level of disability indicating burden of caring for the patients. The items include

1. Communication
2. Psychosocial
3. Cognition

Comorbidity Conditions

The type, incidence and severity of comorbidities is studied by patient's history, physical examination and a structured form to collect information. The comorbidities are assessed according to and Charlson Comorbidity Index by taking into account both the number and severity of 19 predefined co morbid conditions and provides a weighted score.

RESULTS AND DISCUSSION

The study included 50 Stroke patients. Among the total 50 patients the mean age was found to be 53.94 years.
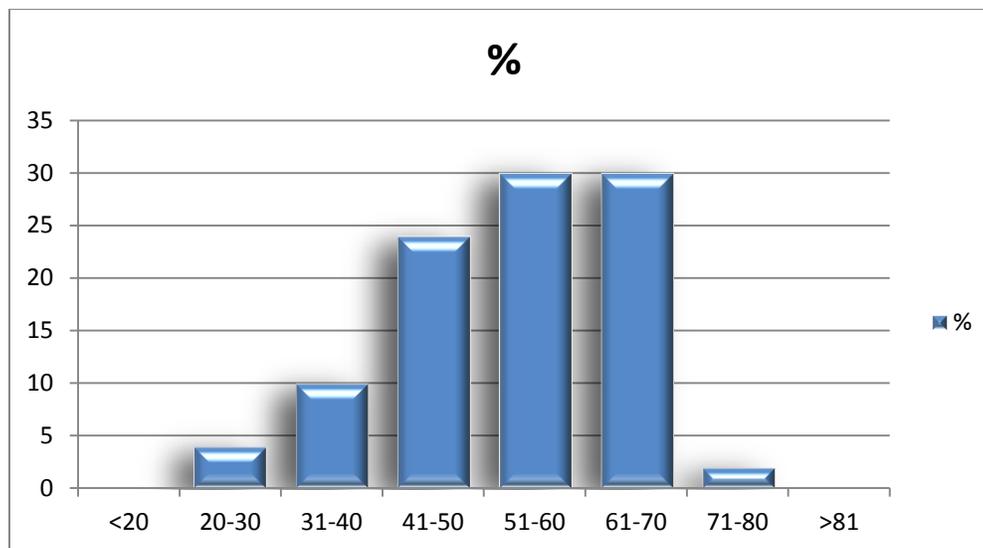

Figure 1: The Percentage of Incidence of Stroke in Different Age Groups

The incidence of stroke is maximum in the age group of 51-60 years which comprises 30% of the population.

Table 1: Age Distribution of Stroke in Males and females

S.No	Age (in years)	No.of males	No.of females	p-value
1	<20	0	0	
2	20-30	1	1	
3	31-40	5	0	
4	41-50	9	3	
5	51-60	7	8	
6	61-70	6	9	
7	71-80	1	0	
8	>81	0	0	
	Total	29	21	
		Mean=51.03	**Mean=57.95**	

Out of the total 50 patients, the mean age of affected males was found to be 51.03 years.

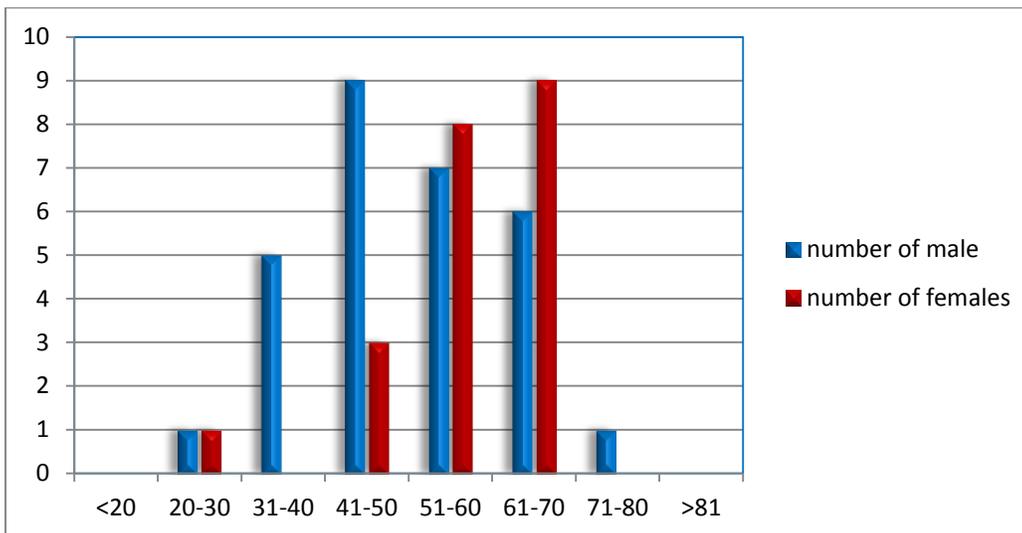The mean age of affected females was found to be 57.95 years.

Figure 2: The incidence of Stroke in different age groups of males and females
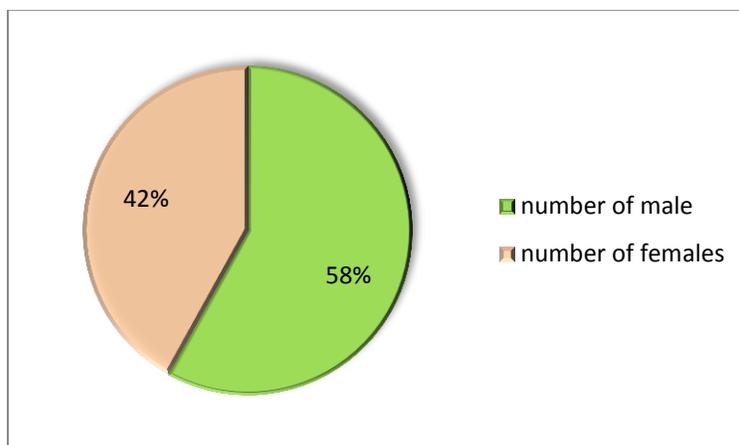

Figure 3: The percentage of incidence of Stroke in males and females

Among the total of 50 patients the males affected was found to be 55% and the females affected was found to be 45% with Stroke.

Table 2: The incidence of Ischemic stroke and Haermorrhagic stroke in different ages

S.No	Age (in years)	Ischemic stroke	p-value	Hemorrhagic stroke	p-value
1	<20	0		0	
2	20-30	2		0	
3	31-40	5		0	
4	41-50	8		4	
5	51-60	15		0	
6	61-70	12		3	
7	71-80	1		0	
8	>81	0		0	
		Total=43		**Total=6**	

Among the total 50 patients 43 patients had Ischemic stroke and 6 patients had Hemorrhagic Stroke.
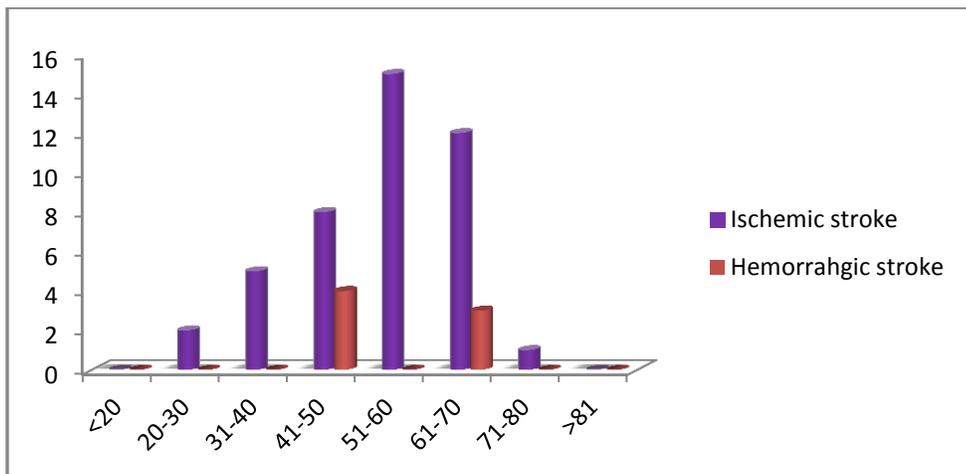
Figure 4: Age distribution of Ischemic and Hemorrhagic stroke

Ischemic stroke was found to be prevalent in the age group of 51-60 years and hemorrhagic stroke was prevalent in the age group of 41-50 years.
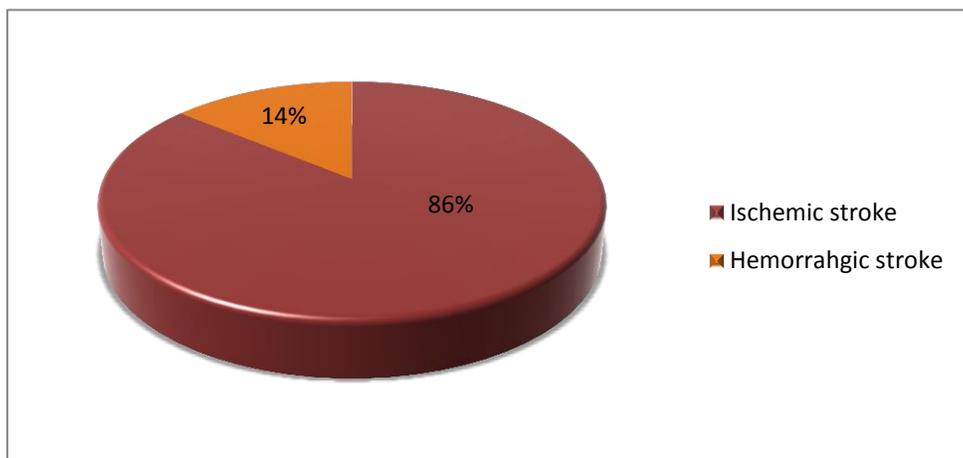

Figure 5: Incidence of Ischemic and Hemorrhagic stroke

Ischemic stroke patients comprised 86% of the total population and Haemorrhagic Stroke patients comprised 14% of the total population.

Table 3: Distribution of Stroke types in different age groups and genders

S.No	Age (in years)	Ischemic stroke		Hemorrhagic stroke	
		No.of males	No.of females	No.of males	No.of females
1	<20	0	0	0	0
2	20-30	1	1	0	0
3	31-40	5	0	0	0
4	41-50	5	3	4	0
5	51-60	7	8	0	0
6	61-70	5	7	1	2
7	71-80	1	0	0	0
8	>81	0	0	0	0
		Total=24	Total=19	Total=5	Total=2

43 (86%) of the patients had Ischemic stroke, out of these males affected were 24 and females affected were 19. 7(14%) of the patients had Hemorrhagic stroke, out of these males affected were 5 and females affected were 2.
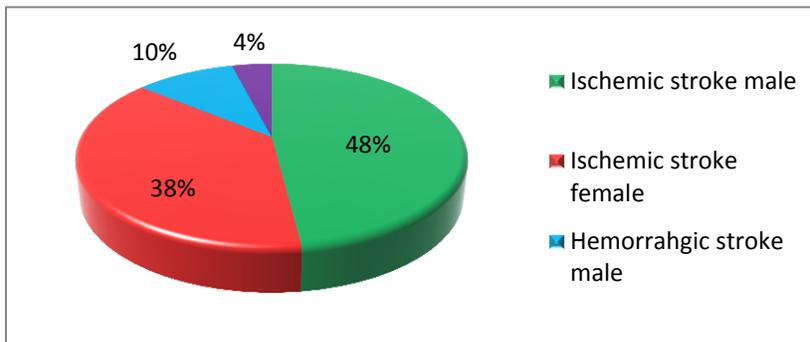

Figure 6: Gender distribution of Ischemic stroke and Hemorrhagic stroke

It was found that the incidence of Ischemic stroke and Hemorrhagic stroke was more common in males as compared to females.

Table 4: Length of Hospital Stay (LOS)

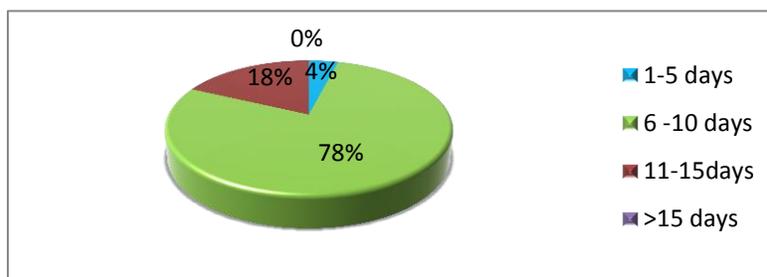| S.No	No.of days	No.of patients	Percentage	p-value
1	1-5 days	2	4	
2	6-10 days	39	78	
3	11-15 days	9	18	
4	>15 days	0	0	
	Mean= 9	Standard deviation=		

Figure 7: Percentage of length of stay (LOS) in the patients

The mean length of stay (LOS) was found to be 9 days, duration of stay for most of the patients was 6- 10 days which comprised 78 % of the population.

Table 5: Length of stay in Ischemic and Hemorrhagic stroke

S.No	No.of days	Ischemic stroke	Hemorrhagic stroke
		No.of patients	No.of patients
1	1-5 days	2	0
2	6-10 days	32	7
3	11-15 days	9	0
4	>15 days	0	0
		Mean for Ischemic stroke= 8.97	Meanfor Hemorrhagic stroke=9.14

The mean length of stay (LOS) for Ischemic stroke was found to be 8.97 days.

The mean length of stay (LOS) for Hemorrhagic stroke was found to be 9.14 days.

It was found that the Length of stay (LOS) in patients with Hemorrhagic stroke was more when compared to that of patients with Ischemic stroke.
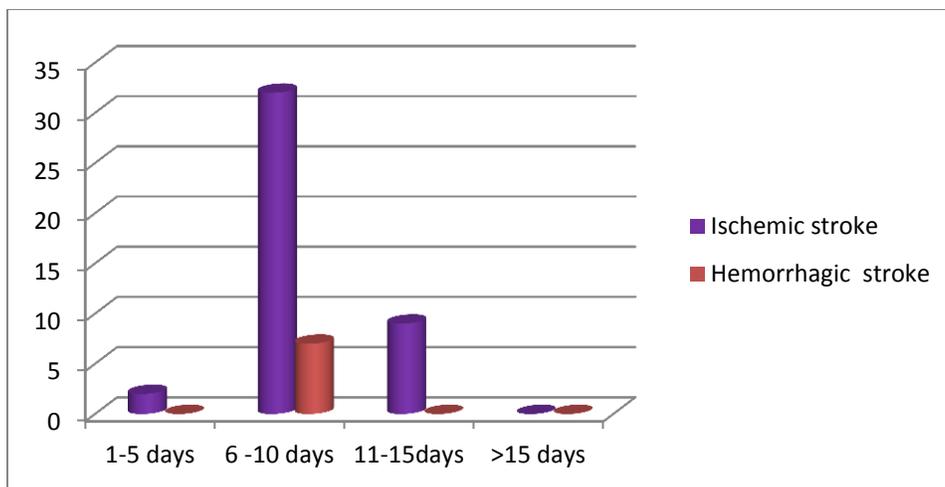

Figure 8: Length of stay (LOS) for Ischemic stroke and Hemorrhagic stroke

Results showed that duration of stay for most of the patients was found to be 6-10 days.

Table 6: Social history of the patients

S.No	Habit	No.of patients	Percentage in total population
1	Alcohol	14	28
2	Smoking	11	22
3	Tobacco	6	12
	Total	**31**	

Among the total of 50 patients 31 patients had significant social history, out of which 14 (28 %) were Alcoholic, 11 (22%) were Smokers and 6 (12%) were Tobacco users.
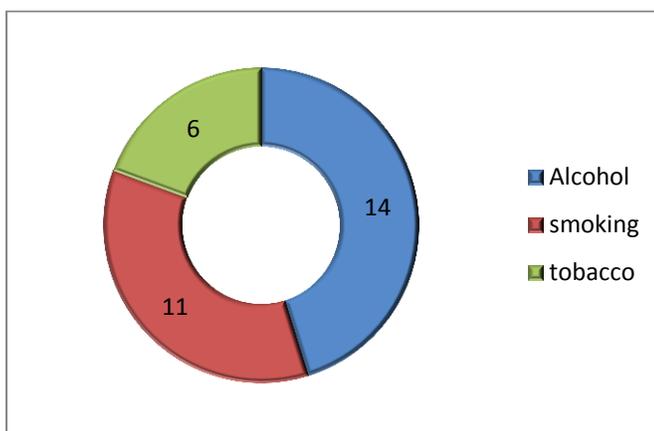

Figure 9: Percentage of social history of patients

In the study it was observed that among the social habits smoking was a significant risk factor in stroke patients

Table 7: Combined social history of the patients

S.No	Habit	No.of patients	Percentage
1	Alcohol	5	26.31578947
2	Smoking	2	10.52631579
3	Tobacco	1	5.263157895
4	Alcohol+ Smoking	6	31.57894737
5	Smoking+Tobacco	2	10.52631579
6	Alcohol +Smoking + Tobacco	2	10.52631579

It was observed that alcoholism and smoking habits were identified as significant social history which was found in 6 patients.
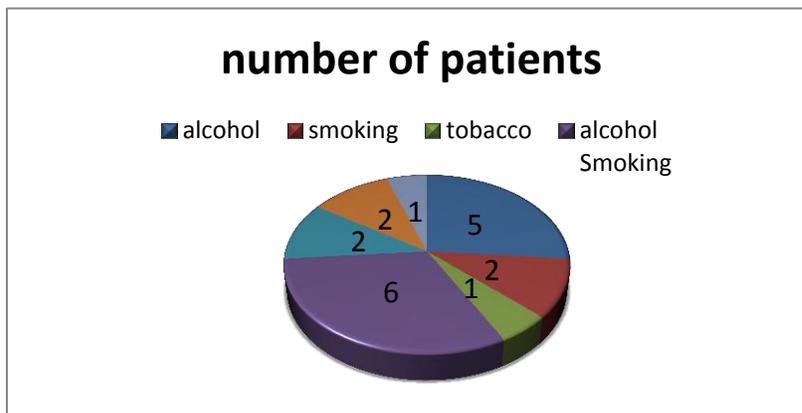
Figure 10: Number of Patients with Significant Social Habits

Table 8: Diagnostic tests used to identify stroke

S.No	Type	No.of patients	Percentage
1	MRI Scan of brain	11	22
2	CT Scan of brain	33	66
3	Both	6	12

Out of the total 50 patient MRI scan of brain was performed in 11 (22%) patients and CT scan of brain was performed in 33 (66%) patients.

Both MRI and CT scan were performed in 6 (12%) patients.

Figure 11: Percentage of diagnostic tests performed in stroke

Results showed that CT scan of brain was performed in most of the patients that comprise 66% of the population

Table 9: Diagnostic tests of Ischemic and Hemorrhagic stroke

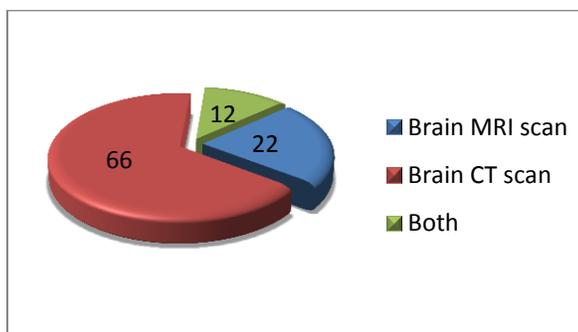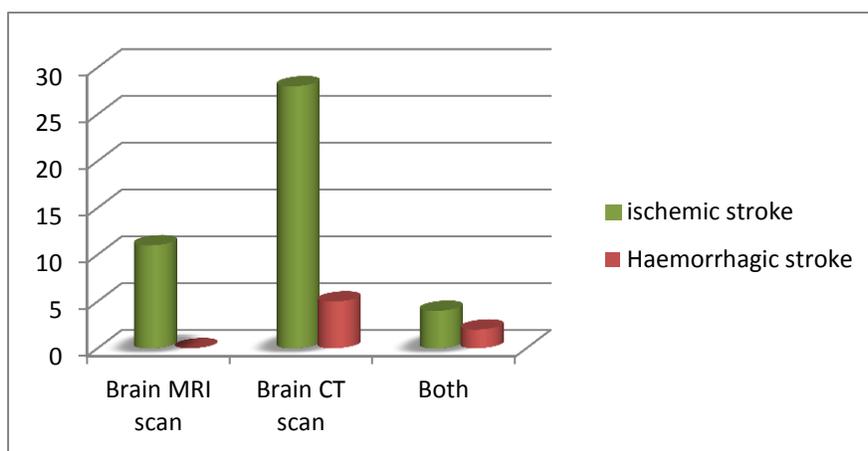| S.No	Type	Ischemic stroke	Hemorrhagic stroke
1	MRI Scan of brain	11	0
2	CT Scan of brain	28	5
3	Both	4	2

Results showed that 11 patients were identified with Ischemic stroke using MRI as diagnostic tool and 28 patients were identified with Ischemic stroke using CT scan as diagnostic tool. The frequency of CT scan findings that showed ischemic stroke was found to be 28 and Haemorrhagic stroke was found to be 5. Both MRI and CT scans performed which identified Ischemic stroke were 4 and Haemorrhagic stroke were 2.

Figure 12: Diagnostic tests performed for Ischemic Stroke and Haemorrhagic Stroke

It was found that CT scan of Brain was relatively more performed than MRI scan in diagnosis of stroke.

Table 10: Functional Independence Measure Scores for patients with Stroke on Admission and at Discharge

S.No	Item	On admission	Before discharge	Improvement
1	Eating	1.64	5.58	3.94
2	Grooming	1.64	5.56	3.92
3	Bathing/showering	1.66	5.6	3.94
4	Dressing upper body	1.68	5.64	3.96
5	Dressing lower body	1.66	5.58	3.92
6	Toileting	1.72	5.58	3.86
7	Swallowing	2.3	6.44	4.14
8	Bladder management	2.2	6.4	4.2
9	Bowel management	2.2	6.4	4.2
10	Transfers: bed/chair/wheelchair	1.64	5.48	3.84
11	Transfers: toilet	1.64	5.38	3.74
12	Transfers: bathtub/shower	1.66	5.44	3.78
13	Transfers: car	1.64	5.5	3.86

14	Locomotion: walking/wheelchair	1.7	5.58	3.88
15	Locomotion: stairs	1.64	5.46	3.82
16	Community mobility	1.64	5.44	3.8
	Total	**28.26**	**91.06**	**62.8**

Table 11: Cognitive FIM scores on Admission and at Discharge

S.No	Item	On admission	Before discharge	Improvement
1	Expression	2.98	5.96	2.98
2	Comprehension	2.82	5.98	3.16
3	Reading	2.64	5.9	3.26
4	Writing	2.7	5.78	3.08
5	Speech intelligibility	2.78	6.12	3.34
6	Social interaction	2.98	6.2	3.22
7	Emotional status	2.62	6.02	3.4
8	Adjustment tolimitations	2.68	5.92	3.24
9	Use of leisure time	2.66	5.78	3.12
10	Problem solving	2.6	5.8	3.2
11	Memory	2.94	6.16	3.22
12	Orientation	2.88	6.2	3.32
13	Concentration	2.86	6.18	3.32
14	Safety awareness	2.82	5.78	2.96
	Total	**38.96**	**83.78**	**44.82**

The results showed that the patients with Stroke had total FIM score on Admission of 67.22 units.

The Total FIM score at Discharge was 174.84 units.

The improvement or Functional Gain was found to be 107.62 units.

Table 12: Activities of Daily Life as recorded according to Katz Index

S.No	Item	On admission	Before discharge	Improvement
1	Bathing	0.08	0.78	0.7
2	Dressing	0.1	0.82	0.72
3	Toileting	0.08	0.92	0.84
4	Transferring	0.08	0.84	0.76
5	Continence	0.16	0.96	0.8
6	Feeding	0.16	0.96	0.8
	Total	**0.66**	**5.28**	**4.62**

It was observed that majority of the patients showed improvement in their daily activities after Stroke.

Table 13: Comorbid conditions and their frequencies

S.No	Comorbidity	Number of patients
1	Hypertension	32
2	Diabetes mellitus	8
3	Hyperlipemia	6
4	CHF	1
5	Neurological disorders	1
6	Constipation	32

The most frequent co morbid conditions identified in the patients were Hypertension, Diabetes Mellitus, Hyperlipidemia followed by Constipation also. Out of 50 patients, 32 patients had Hypertension, 8 had Diabetes Mellitus, 6 had Hyperlipidemia, 32 had Constipation. It was detected that Hypertension and Diabetes mellitus were identified as a significant risk factors in patients with Stroke.

Table 14: Incidence of Comorbidities in the Patients

S.No	No of co -morbidities	Number of Patients	Percentage
1	0	7	14
2	1	12	24
3	2	24	48
4	3	7	14
5	4	0	0

Results showed that atleast two comorbidities were found in most of the patients that comprise 48% of the population.

Table 15: Risk Factors for Cerebrovascular Stroke

S.No	Modifiable risk Factor	Number of patients	Non-Modifiable risk factor	Number of patient
1	Hypertension	32	Age	36
2	Diabetes	8	Gender	29
3	Hyperlipidemia	6	Family History	0
4	Alcohol use	14	History of Stroke	1
5	Smoking and Tobacco use	14	Fibromuscular Dysplasia	0
6	Obesity	1	patent Foramen Ovale	0
7	Circulation problems	0		

Out of the total 50 patients modifiable risk factors that were prominent in most of the patients were hypertension, Diabetes Mellitus, Hyperlipidemia. The non-modifiable risk factors that were significant were Age, Gender in the population. The study suggests that Hypertension is a significant modifiable risk factor and Age is an important non modifiable risk factor.

Table 17: Distribution patterns of hemorrhagic Stroke

S.No	Type of Hemorrhage	Number of patients	Percentage
1	Right thalamic haemorrhage	2	28.57142857
2	Left thalamic haemorrhage	1	14.28571429
3	Left ganglio capsular	1	14.28571429
4	right thalamic bleed	1	14.28571429
5	Hyperdense Haematoma	1	14.28571429
6	Capsulo ganglionic	1	14.28571429

Out of 7 patients with Hemorrhagic stroke, the most common type of stroke was Right Thalamic Hemorrhagic stroke. Right Thalamus was most commonly affected are in the patients.

Patients were treated with different classes of drugs.

- Among the 50 patients, Anticoagulant drugs like Enoxaparin was administered to 29 patients.

- Antacid (Pantoprazole) was administered to 36 patients.

- Laxatives (lactulose) was administered to 32 patients.

- Dyslipidemic drugs like Atorvastatin was administered to 34 patients.

- Antiplatelet drugs like Aspirin was administered to 33 patients.

- Antihypertensive class of drugs like calcium channel blockers (Amlodipine) was administered to 24 patients,Beta Blockers like labetelol was administered to 10 patients and Metoprolol was administered to 5 patients, Diuretics (Furosemide) was administered to 5 patients, central Sympatholytics (clonidine) was administered to 5 patients, Angiotensin II blocker (Telmisartan) was administered to 4 patients.

- Anti epileptics like Phenytoin was administered to 12 patients.

- Cerebral activators like Piracetam was administered to 5 patients.

- Neurotonics like multivitamin were administered to 10 patients.

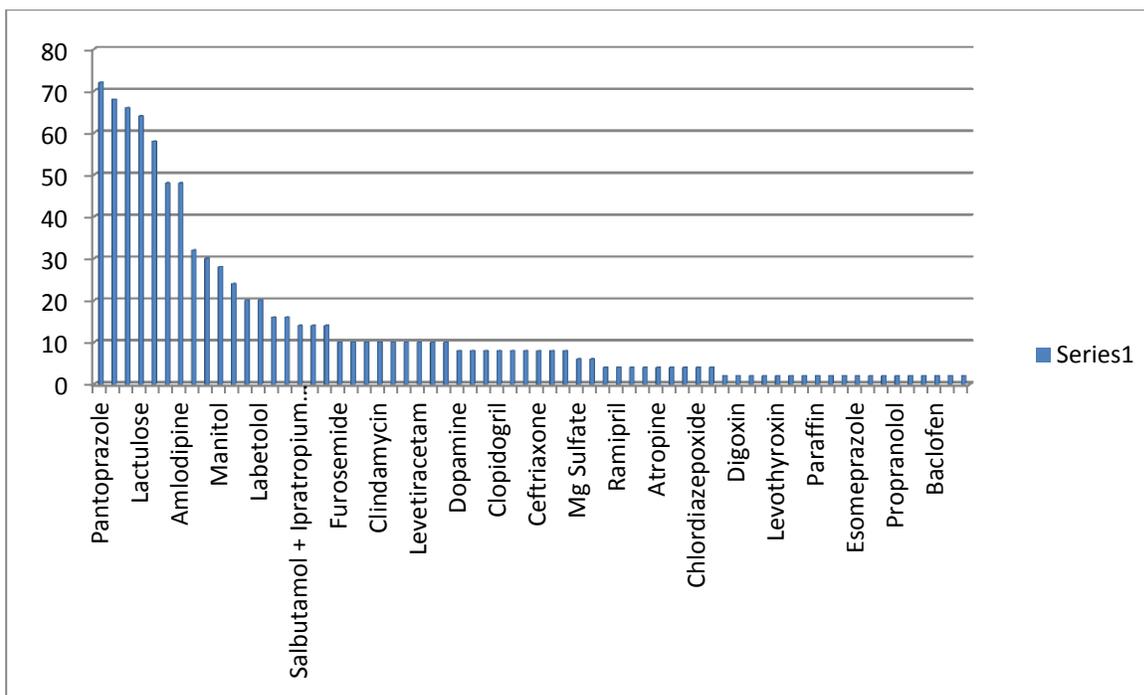- Mannitol diuretic was administered to 14 patients.

Figure 13: Frequency of drugs that were prescribed

Therefore the incidence of stroke is maximum in the age group of 51-60 years which comprises 30% patients. Stroke is more common in males than females. Smoking and Alcoholism were detected as most common risk factors. FIM Scores of physical and cognitive disability are useful

to measure patient's progress and showed improvement or functional gain in the patients. Hypertension and Diabetes Mellitus were most frequent comorbidities in Stroke. Various classes of drugs were administered to patients. Calcium channel blockers, Beta Blockers, Diuretics, ACE Inhibitors, ARB's and combinations. Phenytoin, Piracetam, Mannitol, Atorvastatin, Aspirin, Enoxaparin were prescribed. There should be a standard stroke pharmacotherapy for better usage and patient compliance. The most frequent co morbid conditions identified in the patients were Hypertension, Diabetes Mellitus, Hyperlipidemia followed by Constipation also was found to be similar to study conducted by Altinay Goksel Karatepe et al[8] conducted a research on Co morbidity in Patients After Stroke: Impact on Functional Outcome and Celina A.T et al[11] studied the Assessment of Drug Related Problems in Stroke Patients Admitted to a South Indian Tertiary Care Teaching Hospital.[9]. Smoking, tobacco and alcohol along with constipation were reported common factors effecting the quality of life these were consistent with study observed in Berit Ahlsio et al investigated Disablement and Quality of Life After Stroke and K A Sotaniemi et al[10] evaluated the Correlation of Clinical and Computed Tomographic Findings in Stroke Patients. The incidence of stroke is maximum in the age group of 51-60 years which comprises 30% of the population which was similar to study conducted by Ivica Bilic et al studied Risk factors and Outcome Differences Between Ischemic and Haemorrhagic Stroke Myzoon Ali et al analysed Stroke Outcome in Clinical Trial Patients Deriving from different countries. Patients were evaluated for following parameters - Age, Gender, Motor FIM, Cognitive FIM, QOL, Comorbidities. Comorbid conditions were assessed using CCI. Patient's disability was assessed using FIM. The ADL was recorded according to Katz Index. Different Prescription patterns were identified.

CONCLUSION

The incidence of Stroke has significant impact in the quality of Life of the patients. Various risk factors associated with Stroke and presence of comorbidities deteriorate the patient's progress. FIM scores clinically assess physical and cognitive disability. The standard prescribing patterns should be followed for pharmacotherapy to improve patient care.

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