



A PROSPECTIVE STUDY ON CLINICAL PROFILE OF STROKE IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Objectives: To determine the clinical profile and to assess the quality of life on basis of activities of daily living in Stroke patients. **Methods:** A prospective observational study was carried for a period of 6 months in a tertiary care Hospital, Mysuru. A total of 202 inpatients were included in the study on basis of inclusion criteria. The data were collected by reviewing patient reports and was statistically analysed using IBM SPSS Statistics software version 20.0. **Results:** The incidence of ischemic stroke (81.1%) was higher than that of hemorrhagic stroke (18.8%) and the occurrence increases with age having a mean of 62.14 ± 13.9 and 61.13 ± 12.9 years respectively. Hypertension, diabetes mellitus, smoking, alcoholism, past history and family history of stroke were the major risk factors. The time onsets for ischemic and hemorrhagic stroke were 6am-12pm (51.2%) and 12pm-6pm (39.4%) respectively. Neurological severity was assessed using National Institute of Health Stroke Scale (NIHSS) and showed moderate to severe deficit (44.5%) in ischemic and moderate deficit (50%) in hemorrhagic stroke. Quality of life (QOL) was assessed using Barthel Index and Modified Rankin Scale. Prescribing trends among ischemic stroke were osmotic diuretics (86.5%), antiplatelets and hypolipidemics (73.7%) whereas for hemorrhagic stroke were osmotic diuretics (92.1%), antihypertensives (76.3%). **Conclusion:** Identification of risk factors quantifies the stroke risk and effective management with lifestyle modification could reduce the incidence rate.

KEYWORDS: Stroke, Ischemic, Hemorrhagic, Quality of life.

INTRODUCTION

World Health Organisation (WHO) defines Stroke as the acute neurological deficit occurring as a result of the pathologic processes and is manifested either as brain infarction or hemorrhage which is caused by focal or generalized brain injury that lasts more than 24 hours or leads to death and has no other cause than vascular origin.^[1]

Stroke is one of the preeminent causes of infirmity, morbidity and mortality. According to WHO, every year about 15 million people worldwide suffer from Stroke. Mortality rate increases over 6 million people per year along with morbidity rate of 5 million people. Stroke is the third commonest cause of fatality worldwide after coronary heart disease and cancer.^[2] By the end of 2050, almost 80% of Stroke cases may contemporise in countries like China and India. Researches in India have shown a Stroke prevalence of 471 patients over 1 lakh population. In people aged above 60 years, Stroke is considered as the second leading cause of death and in

people aged between 15 to 59 years it is the fifth prominent cause of death in India.^[3]

Non-modifiable risk factors include age, gender, race, family history, previous history of Stroke, low birth weight, circadian pattern of Stroke and modifiable risk factors like excessive alcoholism, drugs, hypercoagulability, oral contraceptive use, acute infection, inflammatory process, smoking or tobacco use, pathological condition, diet, obesity, residential area, hyperlipidemia, hypertension and diabetes mellitus may increase the incidence of Stroke. The American Heart Association/ American Stroke Association (AHA/ASA) recommends the use of thrombolytic therapy (recombinant tissue plasminogen), antiplatelets (aspirin, dipyridamol, ticlopidine, clopidogrel), anticoagulants (warfarin, heparin), thrombin inhibitors (dabigatran, argatroban), antihypertensives (nitroprusside, nicardipine, labelatol) and hypolipidemics in Ischemic stroke while osmotic diuretics (mannitol), neuromuscular relaxants, neuroprotectives, neurorestoration and calcium channel blockers (nimodipine) in Hemorrhagic stroke.^[4-5]

The present study was performed to determine clinical profile of Stroke. This study was undertaken to determine various aspects of Stroke which will pave a way for healthcare professionals to deal with this deadly and disabling disease. The present study also emphasizes the need to provide awareness and to determine rationality in prescription of drugs based on therapeutic guidelines.

MATERIALS AND METHODS

A prospective observational study was carried for a period of 6 months (October 2017-March 2018) in a tertiary care Hospital, Mysuru. The study was approved by Institutional ethical committee.

A total of 202 inpatients were included in the study on basis of inclusion and exclusion criteria. Patients above 18 years of both gender having clinical and computed

tomography (CT) conformed diagnosis of ischemic or hemorrhagic stroke, with or without co-morbid diseases were incorporated in study. Patients of age group below 18 years, pregnant or lactating women, those with Stroke due to trauma or intracranial abnormalities like brain tumour, dementia, hematoma and whose medical data is incomplete were excluded from the study. All relevant data of the enrolled patients including socio-demographic and clinical data were collected by reviewing patient reports, patient interview and was statistically analysed using IBM Statistical Package for the Social Sciences (SPSS) software version 20.0. The data was analysed using statistical method such as Chi-square test and the level of significance was assessed using p-value. Neurological severity assessment was performed using NIHSS, quality of life was assessed using Barthel index and Modified Rankin Scale.

RESULTS

Table 1: Comparison of determinants of Ischemic and Hemorrhagic Stroke using statistical analysis.

Variables		Type of Stroke		Chi-square	p-value
		Ischemic Stroke N (%)	Hemorrhagic Stroke n (%)		
Age group	21-40 years	15 (9.1%)	5 (13.1%)	3.437	0.329
	41-60 years	59 (35.9%)	11 (28.9%)		
	61-80 years	79 (48.1%)	22 (57.8%)		
	>80 years	11 (6.7%)			
Gender	Male	97 (59.1%)	24 (63.1%)	0.207	0.649
	Female	67 (40.8%)	14 (36.8%)		
Occupational status	Business	12 (7.3%)	5 (13.1%)	4.302	0.367
	Daily worker	53 (32.3%)	13 (34.2%)		
	Agriculture	20 (12.1%)	1 (2.6%)		
	Sales and services	9 (5.4%)	3 (7.8%)		
	None	70 (42.6%)	16 (42.1%)		
Residential area	Urban	46 (28%)	14 (36.8%)	1.142	0.285
	Rural	118 (71.9%)	24 (63.1%)		
Past history of Stroke	Yes	116 (70.7%)	26 (68.4%)	0.079	0.779
	No	48 (29.2%)	12 (31.5%)		
Family history of Stroke	Yes	85 (51.8%)	17 (44.7%)	0.621	0.431
	No	79 (48.1%)	21 (55.2%)		
Social habits	Smoker	50 (51.5%)	8 (33.3%)	7.426	0.059
	Alcoholic	48 (49.4%)	9 (37.5%)		
	Smoker and alcoholic	45 (46.3%)	5 (20.8%)		
Food habits	Vegetarian	21 (12.8%)	5 (13.1%)	0.024	0.988
	Non-vegetarian	32 (19.5%)	7 (18.4%)		
	Mixed	111 (67.6%)	26 (68.4%)		
Drinking habits	Tea	19 (11.5%)	6 (15.7%)	0.521	0.771
	Coffee	88 (53.6%)	19 (50%)		
	Mixed	57 (34.7%)	13 (34.2%)		
Onset of Stroke	12 am-6 am	21 (12.8%)	8 (21%)	11.596	0.009
	6 am-12 pm	84 (51.2%)	10 (26.3%)		
	12 pm-6 pm	31 (18.9%)	15 (39.4%)		
	6 pm-12 am	28 (17%)	5 (13.1%)		
Assessment of neurological severity using NIHSS	Minor (1-4)	18 (10.9%)	5 (13.1%)	1.373	0.712
	Moderate(5-15)	70 (42.6%)	19 (50%)		
	Moderate to severe (16-20)	73 (44.5%)	13 (34.2%)		
	Severe(21-42)	3 (1.8%)	1 (2.6%)		

Assessment of QOL using Modified Rankin Scale	Slight disability	4 (2.4%)	1 (2.6%)	1.860	0.602
	Moderate disability	33 (20.1%)	7 (18.4%)		
	Moderately severe disability	72 (43.9%)	21 (55.2%)		
	Severe disability	55 (33.5%)	9 (23.6%)		
Assessment of QOL using Barthel Index	Constant care (<40)	95 (57.9%)	22 (57.8%)	1.442	0.696
	Institutional care (40-55)	41 (25%)	8 (21%)		
	Assisted dependence (60-80)	20 (12.1%)	7 (18.4%)		
	Nearly complete independence (85-100)	8 (4.8%)	1 (2.6%)		

From the study of 202 Stroke patients, it was observed that the incidence of Ischemic Stroke (81.1%) was higher than that of Hemorrhagic Stroke (18.8%) with a mean age of 62.14±13.9 and 61.13±12.9 years respectively. In this study, 97 male (59.1%) and 67 female patients (40.8%) were diagnosed with Ischemic Stroke whereas 24 male (63.1%) and 14 female patients (36.8%) were diagnosed with Hemorrhagic stroke (p=0.649).

From the study, past history of Stroke was reported by 116 Ischemic patients (70.7%) and 26 Hemorrhagic patients (68.4%) (p=0.779). Family history of Stroke was reported by 85 Ischemic stroke patients and 17 Hemorrhagic stroke patients (p=0.431). Based on residential area, about 118 Ischemic patients (71.9%) and 24 Hemorrhagic patients (63.1%) were residents of rural areas (p=0.285) and showed higher risk for Stroke. Among 202 Stroke patients, Hypertension (49.3% in Ischemic patients and 65.7% in Hemorrhagic patients) followed by Diabetes Mellitus (23.7 % in Ischemic patients and 18.4 % in Hemorrhagic patients) were the commonly identified co-morbid diseases. Among 164 Ischemic patients, 50 patients (51.5%) were smokers and 48 patients (49.4%) were alcoholic whereas among 38 Hemorrhagic patients, 8 patients (33.3 %) were smokers and 9 patients (37.5 %) were alcoholic, (p=0.059) these social habits contributes to Stroke risk.

Onset of Stroke symptoms was analyzed, among 164 ischemic patients, 84 patients (51.2%) showed highest peak in morning (6 am-12 pm) whereas among 38 hemorrhagic patients, 15 patients (39.4%) showed significant peak in afternoon (12 pm-6 pm) (p=0.009). Severity assessment using NIHSS showed that 73 patients (44.5%) had moderate to severe deficit and 19 patients (50%) had moderate neurological deficit in Ischemic and Hemorrhagic stroke respectively (p=0.712). By assessing the activities of daily living using Barthel Index, 95 Ischemic (57.9%) and 22 Hemorrhagic (57.8%) patients required constant care (p=0.696) whereas by using MRS a notable number of ischemic patients (43.9%) and hemorrhagic patients (55.2%) had moderately severe disability (p=0.602). Commonly prescribed drugs in Ischemic Stroke were Mannitol (86.5%) and oral glycerol (65.8%) followed by a combinational therapy of Aspirin and Atorvastatin (73.7%). Whereas in Hemorrhagic patients commonly prescribed drugs were Mannitol (92.1%), Oral glycerol

(92.1), Atorvastatin (57.8%), Amlodipine (47.3%) and Nimodipine (28.9%).

DISCUSSION

Among 202 Stroke patients, the incidence of Ischemic stroke was higher when compared to Hemorrhagic stroke. This may be due to the differences in gender, advancement of age, co-morbid diseases, sedentary lifestyle and time of varying prevalence of risk factors. Comparable results were obtained in the study performed by Zhang *et al.*^[6] and observed that incidence rate of Ischemic Stroke (91.7%) was higher than that of Hemorrhagic Stroke (8.3%).

Non-modifiable risk factors like age, gender, past history and family history of Stroke and cardiovascular disorder may increase Stroke risk. Male predominance may be due to increased risk factors such as cigarette smoking, alcohol consumption, increased stress levels while protective estrogen hormone in female reduces the risk as compared to male. Synchronal results were obtained in study conducted by Praveen *et al.*^[2] Increasing age may influence the occurrence of Stroke. This may be due to increased prevalence of hypertension, lack of exercise in adult and geriatric population. Synchronal study was performed by Sanjay *et al.*^[7] results revealed that the occurrence rises with age and a peak between 61 to 70 years. Family history of Stroke and cardiovascular disease may influence Stroke risk through genetic disorders or inherited coagulation disorders that will predispose to arterial disease, hereditary disorders of lipid metabolism causing premature atherosclerosis and thus results in Stroke. Comparable results were observed in study conducted by Madhura *et al.*^[8]

Modifiable risk factors like residents in rural area, smoking, alcoholism, hypertension and diabetes mellitus also play a vital role in the incidence of Stroke. In rural areas Stroke risk may be due to lack of monitoring which probably leads to under-reporting or under-diagnosis by Healthcare professionals, whereas in urban areas, along with Stroke risk, development of highly sophisticated Healthcare system reduces incidence rate. Analogous results were observed in the study carried out by Dhiraj *et al.*^[9] and showed that 29 patients (90.6%) were residing in rural areas and 3 patients (9.3%) in urban areas. On contrary, study conducted by Sapna *et al.*^[10] showed that the rate of Stroke were higher among urban

community in about 431 patients and 110 patients in rural area.

Smoking causes structural arterial damage of the blood vessel walls leading to carotid atherosclerosis. Increased fibrinogen levels and platelet aggregability, elevated hematocrit values and reduced cerebral flow of blood due to vasoconstriction of arteria results in infarct. A parallel study was conducted by Vasavilatha *et al.*^[11] Alcohol consumption increases Stroke incidence, which may be due to increased calorie intake resulting in increased body weight and blood pressure. Alcohol intoxication may change insulin response in the body by increasing glucose level and causing hepatic cell damage thereby reducing clotting factor production. A synchronal study was conducted by Eapen *et al.*^[12]

Increased intraluminal pressure results in vast modification of endothelium and smooth muscle cells in intra-cerebral arteries. Thus raised stress level on endothelium can increase the blood brain barrier penetrability causing local or multifocal oedema. Endothelial disruption results in altered blood cell endothelial interaction forming local thrombi and ischemic abrasion. Retrograde changes in smooth muscle cells and endothelium results in intra-cerebral hemorrhages. Comparable results were obtained in study conducted by Tarun *et al.*^[13] and Monaliza *et al.*^[14] and found that Hypertension and Diabetes Mellitus were the predominant risk factors.

Ischemic Stroke patients shows significantly highest peak in the morning (6am-12 pm) whereas hemorrhagic patients shows significantly highest peak in afternoon (12 pm-6 pm). This may be due to some exogenous (diet, seasonal variation, sleep/awake cycles) and endogenous (blood pressure, autonomic nervous system activity) factors. Similar study was conducted by Lee Min.^[15]

The topographic distribution of areas affected in brain showed that the most commonly affected site for infarct were small vessel followed by parietal region whereas for hemorrhage were capsuloganglionic region followed by thalamic region. Similar results were obtained in the study conducted by Sanjay *et al.*^[7] and found that in Ischemic patients, there were involvement of parietal region (30.08%) followed by basal ganglia (9.75%) and frontal lobe (7.31%) Whereas in Hemorrhagic patients, there were involvement of thalamus (10.56%) accompanied by ventricular (5.69%) and basal ganglia (4.06%).

Neurological deficit assessment was performed using NIHSS scale, the results showed that Ischemic Stroke patients were having moderate-severe neurological deficit whereas, Hemorrhage patients were having moderate neurological deficit. Comparable results were obtained by Donker *et al.*^[16] Activity of daily living was assessed using Barthel Index and found that most of the Ischemic and Hemorrhagic patients required constant

care. Concurrent results were obtained in study conducted by Pinedo *et al.*^[17] The functional outcome was assessed using Modified Rankin Scale and showed moderately severe disability in both types of Stroke patients. Mohamed *et al.*^[18] conducted a parallel study.

In Ischemic Stroke patients, the commonly prescribed drugs were Osmotic diuretics (Mannitol), combinational therapy of Antiplatelet and Hypolipidemics (Aspirin and Atorvastatin) whereas in Hemorrhagic Stroke, Osmotic Diuretics (Mannitol, Oral glycerol), Hypolipidemics (Atorvastatin) and Calcium channel blockers (Amlodipine and Nimodipine) were most often prescribed. The results when compared with standard treatment guideline AHA/ASA shows that rational prescription of medication were given to patients. A similar study was performed by Mohanraj *et al.*^[19] and Subhash *et al.*^[20] which includes the use of Atorvastatin (74.11%) followed by Antiplatelets (45.98%), diuretics like Furosemide (38.23%).

CONCLUSION

The study was undertaken to determine the types, frequency and percentage of risk factors, clinical manifestation, Health related quality of life, severity assessment and prescribing pattern in Stroke patients which was carried out in a tertiary care Hospital, Mysuru. The study was performed to demonstrate the key role of modifiable and non-modifiable risk factors associated with Stroke risk. Assessment of Stroke-related disability, neurological deficit and functional outcomes of daily living helps to improve patient's quality of life. This study also emphasizes the need to provide awareness and to determine rationality in prescribing of drugs based on therapeutic guidelines.

REFERENCES

1. Stroke 1: definition, burden, risk factors and diagnosis. <https://googleweblight.com/i?u=https://www.nursingtimes.net/clinical-archive/neurology/stroke-1/definition-burden-risk-factors-and-diagnosis/7021670.article&dhl=en-IN>. Updated October 16, 2017. Accessed February 15, 2018.
2. Kumar P, Devi P, Athmika N. A retrospective study of clinical profile of Stroke victims in Coimbatore medical college hospital. *Journal of Dental and Medical Sciences*. 2016; 15(8): 67-70.
3. Kuriakose C, Shifafiya NM, Tharakan NS, Sattanathan K. A prospective study of clinical profile of stroke in tertiary care hospital. *Asian Journal of Pharmaceutical and Clinical Research*. 2016; 9(3): 178-181.
4. Raghuvanshi S. A study of clinical profile and subtypes of acute ischemic stroke in a tertiary care center. *Internal Journal of Scientific Study*. 2016; 4(5): 128-131.
5. Goldstein LB, Bushnell CD, Adams RJ *et al.* Guidelines for the primary prevention of Stroke. *American Heart Association journal*. 2016; 42: 1-87.

6. Zhang FL, Guo ZN, Wu YH *et al.* Prevalence of Stroke and associated risk factors: a population based cross-sectional study from Northeast China. *British Medical Journal Open*. 2017; 7(9): 1-11.
7. Patne SV, Chintale KN. Study of clinical profile of Stroke patients in rural tertiary health care centre. *Internal Journal of Advances in Medicine*. 2016; 3(3): 666-670.
8. Lakshmikumar MT, Bettegowda S, Vuyyuru S. Clinical profile of patients with cerebrovascular accident: a study from rural hospital. *Scholars Journal of Applied Medical Sciences*. 2015; 3: 3253-3264.
9. Kapoor D, Dhiman A, Sharma R, Sundar S. Clinical profile, risk factors and aetiology of young stroke: a tertiary care hospital based study from the Sub-Himalayan region in North India. *International journal of research in medical sciences*. 2014; 2(4): 1355-1359.
10. Sridharn SE, Unnikrishnan JP, Sugumaran S *et al.* Incidence, types, risk factors and outcome of stroke in a developing country. *American heart association*. 2009; 40: 1212-1218.
11. Vasavilatha G, Krishnamoorthy A, Kranthi P, Chandrasekhar M. Study on the role of risk factors in cerebrovascular stroke. *Journal of evolution of medical and dental sciences*. 2015; 4(6): 914-924.
12. Eapen RP, Parikh JH, Patel NT. A study of clinical profile and risk factors of cerebrovascular stroke. *Gujarat medical journal*. 2009; 64(2): 47-54.
13. Mishra T, Ishwar A, Pandey P, Singh A. A study of clinical profile and risk factors in ischemic stroke with special reference to serum homocysteine and lipid profile: a cross sectional observational study. *International Journal of Advances in Medicine*. 2016; 3(4): 888-892.
14. Monaliza, Aggarwal M, Srivastava A. Awareness of risk factors and warning symptoms of stroke in general population. *Nursing and mid wifery research journal*. 2017; 8(2): 149-161.
15. Liou LM, Lin HF, Tsai CL, Lin RT. Timing of stroke onset determines discharge- functional status but not stroke severity: a hospital – based study. *Kaohsiung journal of medical sciences*. 2013; 29: 32-36.
16. Donkor ES, Owolabi MO, Bampoh PO, Amoo PK. Profile and health related quality of life of Ghanaian stroke survivors. *Clinical interventions in aging*. 2014; 4(9): 1701-1708.
17. Pinedo S, SanMartin V, Zaldibar B *et al.* Quality of life of stroke patients and their care givers. *International journal of physical medicine and rehabilitation*. 2017; 5(1): 1-6.
18. Fouad MM, Farag SH, Hegazy MI, Aziz MAE. Prediction of functional outcome in ischemic stroke patients: an observational study on Egyptian population. *Cureus*. 2017; 9(6): 1-11.
19. Mudhaliar MR, Swarnakumari D, Yiragimreddy PR, Venkataramana B. Drug use evaluation and appropriateness of medication used in stroke atients. *World journal of pharmaceutical and medical research*. 2016; 2(5): 168-174.
20. Vijayakumar S, Damodar G, Ravikanth S, Vijayakumar G. Drug utilization pattern of stroke patients in a tertiary care hospital. *International journal of current pharmaceutical and clinical research*. 2012; 2(1): 3-7.