

A PROSPECTIVE STUDY ON ASSESSING RISK FACTORS AND TREATMENT PATTERN OF DRUGS FOR STROKE IN TERTIARY CARE HOSPITAL

M. Manoj Sai*, K. Vani, N. Shiny Helen and K. Shabna

Department of Pharmacy Practice, Saastra College of Pharmaceutical Education and Research, Nellore, Andhra Pradesh.

Received date: 09 January 2023

Revised date: 29 January 2023

Accepted date: 19 February 2023

*Corresponding Author: M. Manoj Sai

Department of Pharmacy Practice, Saastra College of Pharmaceutical Education and Research, Nellore, Andhra Pradesh.

ABSTRACT

Stroke is a neurological disorder characterized by blockage of blood vessels. Clots form in the brain and interrupt blood flow, clogging arteries and causing blood vessels to break, leading to bleeding. The present study was aimed to assess risk factors, clinical profile of stroke and monitoring treatment pattern of drugs for stroke in a tertiary care hospital. The study was Prospective observational study. The Present study was conducted for a period of six months. The Present study was conducted in department of neurology in a tertiary care hospital. The sample size was 255 Patients. Patients with more than 18 years age and Patients who are diagnosed with stroke were included in the study. The clinical data contains information regarding age, sex, BMI, diagnosis, laboratory data, and diagnostic results. The collected clinical data was expressed as percentages. In our study 46-55 patients were in the age group patients were more 62 (24.31%) as compared to other age groups. Male patients were more 221 (98.22%) as compared to female patients 34 (13.33%). Risk factors for stroke development wise distribution includes hypertension risk factor patients were more 54 (21.17%) as compared to other stroke risk factors. The prescribing pattern of drugs in stroke treatment includes thrombolytics prescribed patients were more 40 (15.68%) as compared to other prescribed medications. The study concludes that the proper risk factor control and following the treatment guidelines in the stroke treatment reduces the severity of stroke.

KEYWORDS: Stroke, Blood vessels, Hypertension, BMI, Thrombolytics, Severity of stroke.

INTRODUCTION

Stroke is a neurological disorder characterized by blockage of blood vessels. Clots form in the brain and interrupt blood flow, clogging arteries and causing blood vessels to break, leading to bleeding.^[1-3] Rupture of the arteries leading to the brain during stroke results in the sudden death of brain cells owing to a lack of oxygen. Stroke can also lead to depression and dementia. Until the International Classification of Disease 11 (ICD-11) was released in 2018, stroke was classified as a disease of the blood vessels. Due to this misclassification within the ICD, stroke patients and researchers did not benefit from government support or grant funding directed towards neurological disease.^[4-5]

Risk Factors for Stroke

As noted earlier, the risk of stroke increases with age and doubles over the age of 55 years in both men and women. Risk is increased further when an individual has an existing medical condition like hypertension, coronary

artery disease or hyperlipidemia. Nearly 60% of strokes are in patients with a history of transient ischemic attack (TIA). Some of the risk factors for stroke are modifiable, and some are non-modifiable.^[6-9]

Reperfusion

The intravenous thrombolytics (IVT): The IVT treatment paradigm was originally developed to treat coronary thrombolysis but was found to be effective in treating stroke patients. The efficiency of thrombolytic drugs depends on factors including the age of the clot, the specificity of the thrombolytic agent for fibrin and the presence and half-life of neutralizing antibodies. The drugs used in IVT treatment aim to promote fibrinolysin formation, which catalyzes the dissolution of the clot blocking the cerebral vessel.^[10-13]

Antihypertensive therapy: Hypertension is a risk factor for stroke. There are many reasons for high BP in stroke, including a history of hypertension, acute

neuroendocrine stimulation, increased intracranial pressure, stress linked to hospital admission and intermittent painful spells.

Glucose management: Hyperglycemia (elevated blood glucose) is common in stroke patients, so targeting blood glucose levels is an efficient stroke management strategy.

Antiplatelet therapy: This therapy is used for acute ischemic stroke management and for prevention of stroke incidence. It is also vital in controlling non-cardioembolic ischemic stroke and TIA. Antiplatelet agents like aspirin, clopidogrel and ticagrelor are the most widely used drugs administered to stroke sufferers within the first few days of attack. Dual antiplatelet therapy, which involves a combination of clopidogrel, prasugrel or ticagrelor with aspirin, has become popular; many studies have tested the efficacy and safety of this dual therapy.^[14-18]

Prevention and Treatment Strategies for Stroke

Stroke prevention involves modifying risk factors within a population or individuals, while stroke management depends on treating its pathophysiology. Despite an enormous amount of research into stroke over the last two decades, no simple means of treating or preventing all the clinical causes of stroke has been established.^[19-20]

The overall direction of current stroke research is to generate novel therapies that modulate factors leading to primary and secondary stroke.

Aim

The present study was aimed to assess risk factors, clinical profile of stroke and monitoring treatment pattern of drugs for stroke in a tertiary care hospital.

Objectives

The objectives of the study include

- To investigate the demographic details of study patients.

RESULTS

Table 1: Age wise distribution.

S. no.	Age	Total no of patients (N=255)	Percentage (%)
1	20-25	26	10.19
2	26-35	56	21.96
3	36-45	65	25.49
4	46-55	62	24.31
5	56-65	46	18.03
	Total	255	

In our study 20-25 patients were in the age group of 26 (10.19%), 26-35 patients were in the age group of 56(21.96%), 36-45 patients were in the age group of 65

- To assess the risk factors of stroke.
- To monitor the clinical profile of stroke patients in a hospital.
- To evaluate the drug prescribing pattern in stroke management.

METHODOLOGY

Study Design: It was Prospective observational study.

Study Period: The Present study was conducted for a period of six months.

Study site: The Present study was conducted in department of neurology in a tertiary care hospital.

Sample size: It was 255 Patients.

Inclusion criteria

- Patients with age of more than 18 years.
- Patients having stroke symptoms.
- Patients who are diagnosed with stroke.
- Patients who prescribed with stroke medications.
- Patients with one or more stroke risk factors.

Exclusion criteria

- Patients who are not willing to give consent.
- Pregnancy.
- Lactation.
- Patients with improper diagnosis.
- Psychiatric abnormalities.

Patient data collection

The research protocol was approved by ethical Committee to perform the research work in the neurology department. The patient data collection form was created with assistance of physician, teaching faculty of pharmacy practice and health care professional's advice to collect the basic patients details from medication charts. The data collection form contains information regarding age, sex, BMI, diagnosis, laboratory data, and diagnostic results. The collected clinical data was expressed as as percentages.

(25.49%), 46-55 patients were in the age group of 62 (24.31%), 56-65 patients were in the age group of 46 (18.03 %).

Table 2: Gender wise distribution.

S. no.	Category	Total no of patients (N=255)	Percentage (%)
1	Male	221	98.22
2	Female	34	13.33
	Total	255	

Gender wise distribution of patients includes, total of 255 patients were selected for the study. It includes male patients were 221 (98.22%), and female patients were 34 (13.33%).

Table 3: Marital status wise distribution.

S.no.	Marital status	Total no of patients (N=255)	Percentage (%)
1	Single	108	42.35
2	Married	98	38.43
3	Widow	29	11.37
4	Divorce	20	7.84
	Total	255	

The Marital status wise distribution includes, Single patients were 108(42.35%), Married patients were 98(38.43%), and Widow patients were 29(11.37%), Divorce patients were 20(7.84%).

Table 4: BMI.

S.no.	BMI	Total no of patients (N=255)	Percentage (%)
1	< 18.5	23	9.01
2	18.5–24.9	60	23.52
3	25–29.9	77	30.19
4	More than 30	85	33.33
	Total	255	

The < 18.5 BMI patients were 23(9.01%), 18.5–24.9 BMI patients were 60(23.52%), 25–29.9 BMI patients were 77(30.19%), and More than 30 BMI patients were 85(33.33%).

Table 5: Educational status.

S.no	Education	Total no of patients (N=255)	Percentage (%)
1	Primary	70	27.45
2	Secondary	149	58.43
3	Graduation	36	14.11
	Total	255	

The educational status includes Primary education patients were 70 (27.45%), Secondary education patients were 149 (58.43%), Graduation education patients were 36 (14.11%).

Table 6: Time for hospital admission.

S.no	Time for hospital admission	Total no of patients (N=255)	Percentage (%)
1	6-12 hours	138	54.11
2	12–24 hours	85	33.33
3	25–48 hours	32	12.54
	Total	255	

The Time for hospital admission includes 6-12 hours time for hospital admission patients were 138(54.11%), 12–24 hours time for hospital admission patients were 85(33.33%), 25–48 hours time for hospital admission patients were 32(12.54 %).

Table 7: Type of stroke.

S.no	Type of stroke	Total no of patients (N=255)	Percentage (%)
1	Ischemic stroke	176	69.01
2	Hemorrhagic stroke	79	30.98
	Total	255	

Type of stroke in patient's wise distribution includes Ischemic stroke patients were 176(69.01%), Hemorrhagic stroke patients were 79(30.98%).

Table 8: Severity of stroke.

S.no	Severity of stroke	Total no of patients (N=255)	Percentage (%)
1	Mild	59	23.13
2	Moderate	151	59.21
3	Severe	45	17.64
	Total	255	

The severity of stroke includes Mild severity of stroke patients were 59 (23.13%), Moderate severity of stroke patients were 151 (59.21%), Severe severity of stroke patients were 45 (17.64%).

Table 9: Altered areas in brain.

S.no	Altered areas	Total no of patients (N=255)	Percentage (%)
1	Corpus callosum	65	25.49
2	Cerebellum	37	14.50
3	Parietal lobe	42	16.47
4	Frontoparietal lobe	22	8.62
5	Tempoparietal lobe	40	15.68
6	Occipitoparietal lobe	49	19.21
	Total	255	

Altered areas in brain patients includes Corpus callosum were 65 (25.49%), Cerebellum were 37 (14.50%), Parietal lobe were 42 (16.47%), Frontoparietal lobe were 22 (8.62%), Tempoparietal lobe were 40 (15.68%), Occipitoparietal lobe were 49 (19.21%).

Table 10: Risk factors for stroke development wise distribution.

S.no	Risk factors	Total no of patients (N=255)	Percentage (%)
1.	Hypertension	54	21.17
2.	Diabetes mellitus	38	14.90
3.	Alcohol	29	11.37
4.	Smoking	21	8.23
5.	Coronary artery disease	34	13.33
6.	Obesity	27	10.58
7.	Previous history of stroke	22	8.62
8.	Neurological abnormalities	30	11.76
	Total	255	

Risk factors for stroke development wise distribution includes Hypertension patients were 54 (21.17%), Diabetes mellitus patients were 38 (14.90%), Alcohol patients were 29 (11.37%), Smoking patients were 21 (8.23%), Coronary artery disease patients were 34 (13.33%), Obesity patients were 27 (10.58%), Previous history of stroke patients were 22 (8.62%), Neurological abnormalities patients were 30 (11.76%).

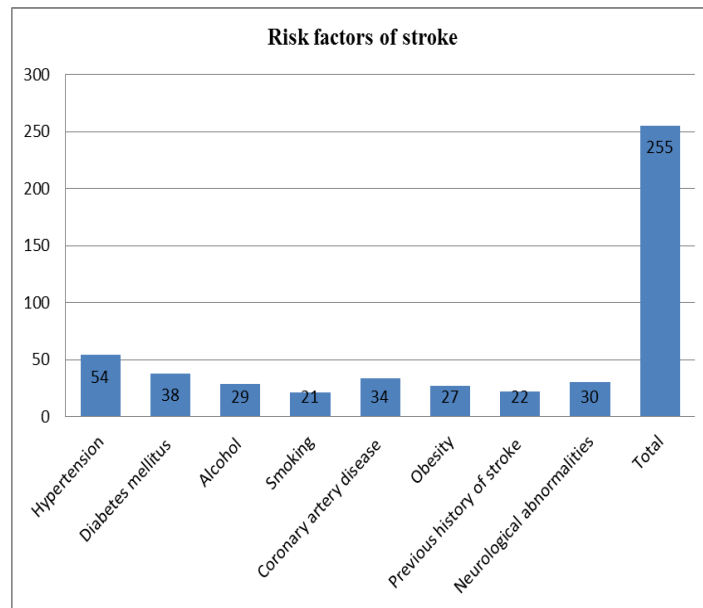


Figure 1: Risk factors for stroke development wise distribution.

Table 11: Distribution of Clinical symptoms in stroke patients.

S.no	Clinical symptoms	Total no of patients (N=255)	Percentage (%)
1.	Left side muscle weakness	43	16.86
2.	Slurred speech	25	9.80
3.	Deviation of Mouth	36	14.11
4.	Headache	44	17.25
5.	Numbness	19	7.45
6.	Giddiness	25	9.80
7.	Hemiparesis	63	24.70
	Total	255	

The distribution of data based on Clinical symptoms in stroke patients includes left side muscle weakness patients were 43 (16.86%), Slurred speech patients were 25(9.80%), Deviation of Mouth patients were

36(14.11%), Headache patients were 44(17.25%), Numbness patients were 19(7.45%), Giddiness patients were 25(9.80%), Hemiparesis patients were 63 (24.70%).

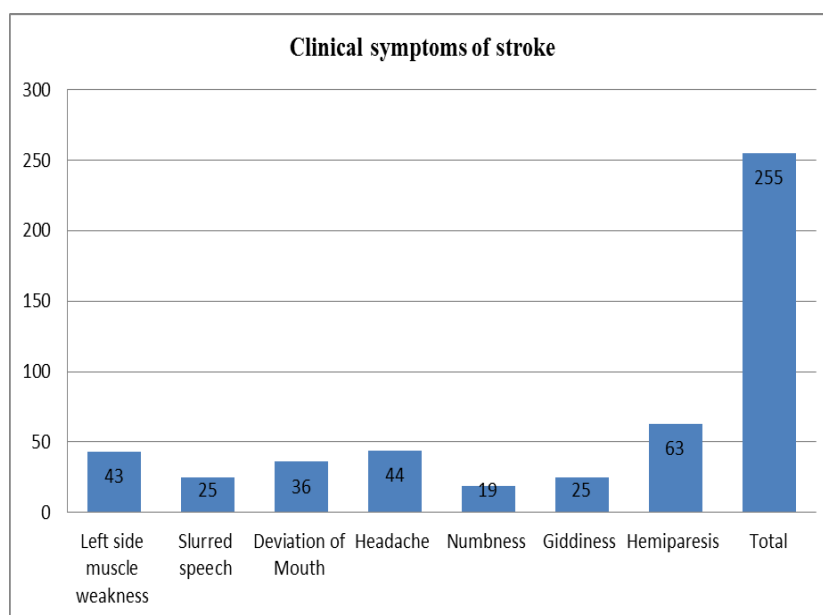


Figure 2: Distribution of data based on Clinical symptoms in stroke patients.

Table 12: Laboratory tests for stroke treatment.

S.no	Laboratory tests	Total no of patients (N=255)	Percentage (%)
1	Blood test	31	12.15
2	Lipid test	40	15.68
3	Blood sugar test	33	12.94
4	Renal function test	10	3.92
5	Liver function test	18	7.05
6	MRI scan	52	20.39
8	ECG	50	19.60
9	EEG	21	8.23
	Total	255	

The Laboratory tests for stroke treatment includes blood test referred patients were 31 (12.15%), Lipid test referred patients were 40 (15.68%), Blood sugar test referred patients were 33 (12.94%), Renal function test

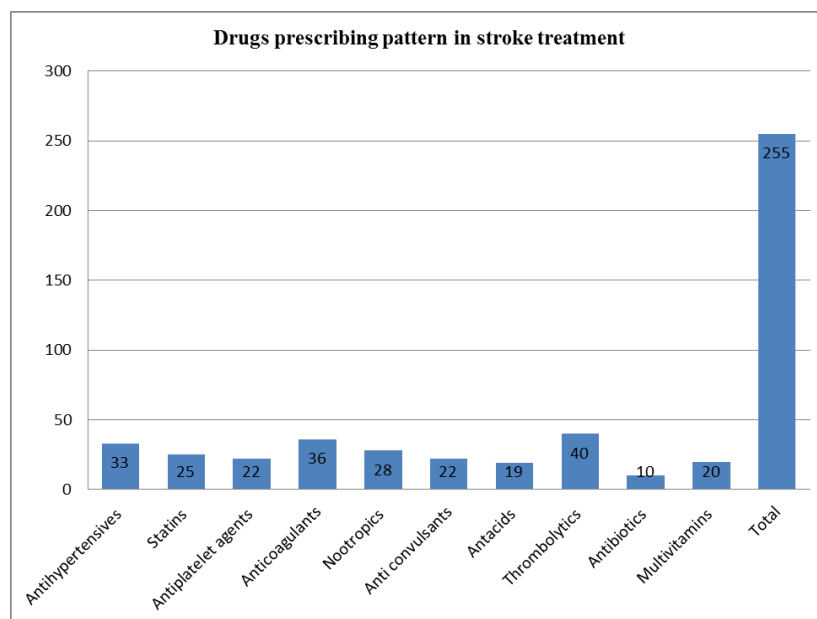
referred patients were 10 (3.92%), Liver function test referred patients were 18 (7.05%), MRI scan referred patients were 52 (20.39%), ECG referred patients were 50(19.60%), EEG referred patients were 21(8.23%).

Table 13: Drugs prescribing pattern in stroke treatment.

S.no	Number of drugs	Total no of patients (N=255)	Percentage (%)
1	Antihypertensives	33	12.94
2	Statins	25	9.80
3	Antiplatelet agents	22	8.62
4	Anticoagulants	36	14.11
5	Nootropics	28	10.98
6	Anti convulsants	22	8.62
7	Antacids	19	7.45
8	Thrombolytics	40	15.68
9	Antibiotics	10	3.92
10	Multivitamins	20	7.84
	Total	255	

The prescribing pattern of drugs in stroke treatment includes Antihypertensives patients were 33 (12.94%), Statins patients were 25 (9.80%), Antiplatelet agents patients were 22 (8.62%), Anticoagulants patients were 36 (14.11%), Nootropics patients were 28 (10.98%),

Anti convulsants patients were 22 (8.62%), Antacids patients were 19(7.45%), Thrombolytics patients were 40 (15.68%), Antibiotics patients were 10 (3.92%), Multivitamins patients were 20 (7.84%).

**Figure 3: Drugs prescribing pattern in stroke patients wise distribution.**

DISCUSSION

- In our study 46-55 patients were in the age group patients were more 62 (24.31%) as compared to other age groups.
- Male patients were more 221 (98.22%) as compared to female patients 34 (13.33%).
- The Marital status wise distribution includes single patients were more 108(42.35%) as compared to other marital status of the patients.
- The BMI of the study patients includes more than 30 BMI patients were more 85(33.33%) as compared to other BMI levels of the study patients.^[21-22]
- The educational status includes secondary education patients were more 149 (58.43%) as compared to other education levels of the study patients.
- The Time for hospital admission includes 6-12 hours time for hospital admission patients were more 138(54.11%) as compared to other hospital admitted patients.
- Type of stroke in patient's wise distribution includes Ischemic stroke patients were more 176(69.01%) as compared to hemorrhagic stroke patients 79(30.98%).
- The severity of stroke includes moderate severity of stroke patients were more 151 (59.21%) as compared to mild and severe stroke risk patients.
- Altered areas in brain patients include Corpus callosum were more 65 (25.49%) as compared to other affected regions in brain.
- Risk factors for stroke development wise distribution includes hypertension risk factor patients were more 54 (21.17%) as compared to other stroke risk factors.
- The distribution of data based on Clinical symptoms in stroke patients includes hemiparesis clinical symptom patients were more 63 (24.70%) as compared to other stroke clinical symptoms.^[23-24]
- The Laboratory tests for stroke treatment includes MRI scan referred patients were more 52 (20.39%) as compared to other laboratory examinations.
- The prescribing pattern of drugs in stroke treatment includes thrombolytics prescribed patients were more 40 (15.68%) as compared to other prescribed medications.^[25-29]

CONCLUSION

We conclude that the proper risk factor control and following the treatment guidelines in the stroke treatment reduces the severity of stroke. Our study findings found that hypertension is the major risk factor for stroke. To minimize hypertension proper patient counseling is required for the stroke patients. Among all the drugs anti platelet drugs, antacids and vitamin supplements were majorly prescribed. Ischemic stroke is the leading form of stroke among the patients. The regular follow up of the patient should be taken for the medication adherence and to prevent stroke complications.^[30-31]

The common risk factors for stroke are hypertension, smoking, alcoholism. The study also assessed the prescribing pattern of drugs. The majority of drugs were belongs to antihypertensives and antiplatelets. So the need of proper prescribing pattern of drugs should preferably be based on the specificity of the condition and the severity of stroke so as to facilitate rational use of drugs and thereby provide optimal care.

REFERENCES

1. Gaddam Damodar, Subash Vijayakumar, SD Rajendran, E. Ashok Kumar. Stroke and its risk factor analysis; A Hospital based prospective study. International Journal of Pharma Informa, 2011; 1: 3.
2. Jan L, Madeleine JM, Richard GT, Gary AF, Martin W, Martin E, et al. Response to symptoms of stroke in the UK: a systematic review. BMC Health Serv Res, 2010; 10: 157.
3. Snowdon DA, Greiner LH, Mortimer JA, Riley KP, Greiner PA, Markesbery WR. Brain infarction and the clinical expression of Alzheimer disease. The Nun Study. JAMA, 1997; 277: 813–817.
4. Abraham J, Rao PS, Inbaraj SG, Shetty G, Jose CJ. An epidemiological study of hemiplegia due to stroke in South India, Stroke, 1970; 1: 477-481.
5. Neaton JP, Went Worth DN, Cutter J, Stamler J, Kuller L, Risk factors death from different types of stroke, multiple risk factor intervention trial research group. Ann. Epidemiol., 1933; 3: 493-9.
6. Berger K, Sculter H, Stogbaver F, Assmann G. Incidence and risk factors for stroke in an occupational cohort; The PROCAM Study. Prospective Cardiovascular Muenster study, Stroke, 1998; 29: 1562-1566.
7. Kiyohare Y, Kaso I, Iwamoto H, Nakayama K. Kujishime M. The impact of alcohol and hypertension on stroke incidence in a general Japanese population. The hesayama Study. Stroke, 1995; 26: 368-372.
8. Ebusu T, Tanaka C, Umeda M, Kitamura M, Fukunaga M, Aoki I, et al. Haemorrhagic and non haemorrhagic stroke diagnosis with diffusion weighted and T2 weighted echo plannar MR imaging. Radiology, 1997; 203: 823-8.
9. Ismail Srtiopranoto., Halwan Fuad Bayuangga., Andre Stefanus Panggabean., Sarastiti Alifaningdyah., Lutfan Lazuardi., Fatwa Sari Tetra Dewi., and Rusdy Ghazali Malueka. Prevalence of Stroke and Associated Risk Factors in Sleman of Yogyakarta Special Region, Indonesia. Journal of Hindawi. May, 2019.
10. Ginenus Fekadu., Legese Chelkeba. and Ayantu Kebede. Risk factors, Clinical presentations and predictors of stroke among adult patients admitted to stroke unit if Jimma University medical center, south west Ethiopia: prospective observational study. Journal of BMC neurology. August, 2019.
11. Shaik Afsar Pasha., ch.Bhuvana., V.Kumudini., R.Haribabu., sk.Arif Pasha., B.Bhaskara Rao. Drug Utilization patterns of stroke patients in a Tertiary

- Teaching Hospital. *World Journal of Pharmaceutical Research*. December, 2017.
12. Subash Vijay Kumar., G.Damodar., S.Ravikanth., G.Vijay Kumar. Drug Utilization Pattern of stroke patients in a Tertiary care Hospital. *International journal of current pharmaceutical and clinical research*. January, 2012.
 13. Monaliza. Meena Aggarwal., Achal SriVastava. Awareness of risk factors and warning symptoms of stroke in General population. *Nursing and Midwifery Research journal*. April, 2012.
 14. Chih-Ying., Hung-Ming Wu., Jiann-Derlee., Hsu-Huei Weng. Stroke risk factors and subtypes in different Age groups: A hospital-Based study. *Neurology India*. December, 2010.
 15. CAPRIE Steering Committee, A randomised, blinded, trial of clopidogrel versus aspirin in patients at risk of ischaemic events- CAPRIE Steering Committee. *Lancet*, 1996; 348: 1329-39. DOI: 10.1016/s0140-6736(96)09457-3.
 16. Sherman DG, Albers AA, Kase CS, O'Riordan W, Pineo GF. The efficacy and safety of enoxaparin versus unfractionated heparin for the prevention of venous thromboembolism after acute ischaemic stroke (PREVAIL Study): an open-label randomised comparison. *Lancet*, 2007; 369: 1347-1355.
 17. 20. Muir KW, Ford GA, Messow CM, Ford I, Murray A, Clifton A, 2017. Endovascular therapy for acute ischaemic stroke: the Pragmatic Ischaemic Stroke Thrombectomy Evaluation (PISTE) randomised, controlled trial. *J Neurol Neurosurg Psychiatry*, 88: 38-44. DOI: 10.1136/jnnp-2016-314117.
 18. Nishiyama T, Yokoyama T, Matsukawa T, Hanaoka K. Continuous Nicardipine HCl infusion to control blood pressure after evacuation of acute cerebral hemorrhage. *Can J Anaesth*, 2000; 47: 1196-1201.
 19. Preethi BP, Naveed AS, Sri Lakshmi G, Rao V. Prescribing pattern of drugs in stroke patients admitted to a multi-specialty hospital, India. *Indo Am J Pharmaceut Res.*, 2014; 4(2): 1015-20.
 20. Vurumadla S, 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.*, 2015; 7(1): 421-6.
 21. 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.
 22. Hart CL, Hole DJ, Smith GD. The relation between questions indicating transient Ischemic attack and stroke in 20 years of follow up in men and women in the Renfrew/Paisley Study. *J Epidemiol Community Health*, 2001; 55: 653-6.
 23. Kleindorfer D, Judd S, Howard V, McClure L, Safford M, Cushman M, et al. Self-reported stroke symptoms without a prior diagnosis of stroke or transient ischemic attack-a powerful new risk factor for stroke. *Stroke*, 2011; 42(11): 3122-6.
 24. Liyan G, James FM, Suzanne J, Paul M, Leslie AM, Virginia JH, et al. What stroke symptoms tell us: association of risk factors and individual stroke symptoms in the reasons for geographic and racial Differences in Stroke (REGARDS) study? *J Stroke Cerebrovasc Dis.*, 2012; 21(5): 411-6.
 25. Gill R, Chow CM. Knowledge of heart disease and stroke among cardiology inpatients and outpatients in a Canadian inner-city urban hospital. *Can J Cardiol*, 2010; 26(10): 537-41.
 26. Dalal PM, Malik S, Bhattacharjee M. Population-based stroke survey in Mumbai, India: Incidence and 28-day case fatality. *Neuroepidemiol*, 2008; 31: 254-61.
 27. Susan RW. *Pharmacotherapy Principles and Practice: Stroke*, 3rd New York, McGraw Hill, 2008; 161-73.
 28. Kammersgaard LP, Jorgensen HS. Early infection and prognosis after acute stroke: the Copenhagen stroke study. *J Stroke Cerebrovasc Dis.*, 2001; 10: 217-21.
 29. Chandrashekar G, Reddy H. Etiology and risk factors of stroke in young: A prospective study. *Int J Sci Study*, 2016; 4: 79-83.
 30. Kuriakose C, Shifafiya MN, Tharakan NS, Sattanathan K, Kumar S. A prospective study of clinical profile of stroke in a tertiary care hospital. *Asian J Pharm Clin Res*, 2016; 9: 178-81.
 31. Kumar NS, Padala R, Vallampalli G, Thatikonda A, Prasad PN. Clinical and Etiological profile of ischemic stroke in young adults: A prospective, observational, hospital based study from seacoast population of South India. *Austin J Cerebrovasc Dis Stroke*, 2017; 4: 1-4.