



Clinical Profile of Acute Cerebrovascular Accidents

R. M. Bala Ashwathy¹ and N. Deepthi^{2*}

¹Saveetha Medical College and Hospital, Thandalam, Chennai - 602 105 India.

²Department of General Medicine, Saveetha Medical College and Hospital, Thandalam, Chennai – 602 105 India.

Authors' contributions

This work was carried out in collaboration between both authors. Author RMBA contributed to data collection, compiling and analysis of data, is the main author. Author ND contributed to statistics and conclusion, is the corresponding author. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i47B33219

Editor(s):

(1) Dr. Sawadogo Wamtinga Richard, Ministry of Higher Education, Scientific Research and Innovation, Burkina Faso.

Reviewers:

(1) Ghada Abd Alrhan Taqa, University of Mosul, Iraq.

(2) B. Puvarajan, Veterinary College And Research Institute, Orathanadu, India.

Complete Peer review History: <https://www.sdiarticle4.com/review-history/74897>

Received 01 August 2021

Accepted 05 October 2021

Published 05 November 2021

Original Research Article

ABSTRACT

Background: Acute cerebrovascular disease or stroke is one of the most leading causes of morbidity and mortality. Due to change in dietary habits and life style factors, there is increase in co-morbid conditions like diabetes and hypertension. This in turn increases the risk for developing stroke.

Aim: To study the cerebrovascular accident patients by analyzing and comparing their clinical profile.

Materials and Methods: A prospective study was conducted in a tertiary care hospital in stroke patients. The type of stroke, associated risk factors and prognosis of the patients were studied.

Results: A total of 50 patients were included in the study, for a period of 4 months from January 1, 2021 to April 30, 2021. Both male and female were included in the study. The mean age of the patients was 56.86 years. Thrombotic stroke was the most common (50%) followed by embolic and hemorrhagic stroke. Hypertension was the most commonly associated risk factor (80%), followed by diabetes (60%), smoking (52%), dyslipidemia (34%) and alcohol (28%). The comparatively higher incidence of cerebrovascular accidents in age less than 60 years is attributed to the rise in risk factors in the young age ($P < 0.05$). The average duration of hospitalization was 6.58 days. There is no in-hospital mortality.

Conclusion: With prevalence of risk factors on rise, younger individuals are also affected. Proper risk factor management will help in preventing stroke and its recurrence.

Keywords: Cerebrovascular accidents; diabetes mellitus; hypertension; dyslipidemia; smoking; alcohol; thrombotic stroke; embolic stroke; hemorrhagic stroke.

1. INTRODUCTION

Acute cerebrovascular accident (CVA), also known as stroke, is defined by World Health Organization (WHO), as rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than vascular origin [1,2,3,4,5,6]. There are two main types of stroke, ischemic stroke and hemorrhagic stroke. Ischemic stroke is further classified as thrombotic stroke and embolic stroke. Stroke is a neurological disorder characterised by blockage of blood vessels [7]. Ischemic stroke may be due to an obstruction within the blood vessel which supplies blood to the brain. Hemorrhagic stroke occurs due to the weakening of blood vessel which would rupture and bleed into the surrounding brain tissues [8]. Ischemic stroke is caused by deficient blood and oxygen supply to the brain. Hemorrhagic stroke is caused by bleeding or leaky blood vessels [7]. Investigations like CT modalities and MRI help to identify the type of stroke (ischemic or hemorrhagic), severity and location of lesion, the patency of the intracranial vessels, the degree of cerebral perfusion, and the presence and size of the ischemic penumbra [9]. CT scan remains the primary imaging modality for the initial evaluation of patients with suspected stroke [10,11]. The incidence of stroke is also influenced by some risk factors – modifiable and non-modifiable [7,12,13]. Modifiable risk factors include diabetes, hypertension, dyslipidemia, smoking, alcohol, etc [7,2,12,13]. Non-modifiable risk factors include age, gender, etc [7,12,13]. Though stroke is commonly observed in old age, the risk factors tend to increase the chances of CVA in young age. Duration of hospitalization, incidence of nosocomial infection and in-hospital mortality marks the prognosis and quality of patient care.

1.1 Aims and Objectives

- To assess the demographic characteristics like age and gender distribution of stroke.
- To analyze the type of stroke and site of lesion.
- To assess the incidence of other co-morbid conditions and risk factors.

- To assess the type and episodes of nosocomial infections.
- To assess the duration of hospitalization and in-hospital mortality rate.

2. MATERIALS AND METHODS

A prospective observational study was conducted in a tertiary care hospital. A total of 50 patients diagnosed with cerebrovascular accident (CVA) in the General Medicine Department, were analysed in this study, from 1st January, 2021 to 30th April, 2021. The study was based on the clinical profile of the patients. This study analyzed the type of stroke and the site of lesion in the patients. The risk factors like smoking, alcohol, diabetes, hypertension and dyslipidemia were assessed along with demographic details. The duration of stay in hospital and prognosis of the patients was recorded.

2.1 Inclusion Criteria

- All adult patients with the age of eighteen years or more hospitalized with clinical diagnosis suggestive of acute cerebrovascular accident or stroke - including ischemic and hemorrhagic subtypes.
- Patients with recurrent episodes of stroke will also be included.

2.2 Exclusion Criteria

- Patients less than 18 years of age and who are not willing to participate in the study
- Patient who gets discharged against medical advice before the advised duration of hospitalization.

2.3 Statistical Methods

Continuous data was represented as mean \pm SD. Categorical data was represented as value (%). Chi-Square test was the statistical tool used in the study. Data were analyzed with SPSS software (version 22.0 for Windows, IBM Corp., Armonk, NY). P value less than 0.05 was considered statistically significant at 95 percent confidence interval [14].

3. RESULTS

A total of 50 stroke patients were included in this study. Demographic details were analyzed for each patient. Among them 32 (64%) were male and 18 (36%) were female. The mean age was 56.86 years with a range, 25-82 years. The age wise and gender wise distribution of the study subjects is given in Fig. 1.

The clinical profile studied for each patient included age, gender, type of stroke, site of lesion from CT and MRI reports, risk factors, duration of stay in the hospital, incidence of nosocomial infection and prognosis. The investigations for diagnosis of stroke included MRI and CT scan - stating the type of stroke and affected areas in the brain and the vessels involved.

The stroke is classified into 3 types – thrombotic stroke, embolic stroke and hemorrhagic stroke. Among the study subjects, 25(50%) had thrombotic stroke, 13(26%) had embolic stroke and 12(24%) had hemorrhagic stroke as shown in Fig. 2.

The arteries found to be involved in developing stroke in this study include- Middle cerebral artery(28%), Lenticulostriate branch of MCA(24%), Posterior cerebral artery(14%), Anterior cerebral artery(4%), Recurrent artery of Heubner(2%), Common carotid artery(10%), External carotid artery(2%), Internal carotid artery(6%), Posterior communicating artery(2%), Vertebral artery(2%), Vertebrobasilar artery(6%) as shown in Fig. 3.

Among 50 patients, the common site of lesion was corona radiata in 10(20%), thalamus in 5 (10%), internal capsule in 4(8%), lentiform nucleus in 3(6%), basal ganglia in 3(6%), caudate nucleus in 2(4%), parietal lobe in 7(14%), frontal lobe in 6(12%), temporal lobe in 5(10%), occipital lobe in 3(6%), cerebellum in

4(8%), midbrain in 2(4%), pons in 2(4%) and medulla in 1(2%) like given in Fig. 4.

In this study, 5 major risk factors were studied in the patients - smoking, alcohol, diabetes, hypertension and dyslipidemia. Among them hypertension was the most important risk factor in majority (80%) of the stroke patients. The second commonly associated risk factor was diabetes (60%) followed by smoking (52%), dyslipidemia (34%) and alcohol (28%). This has been illustrated in Fig. 5.

Among the male gender, smoking (52%) and hypertension (50%) were predominant, followed by diabetes (42%), diabetes (42%) and alcohol (28%). Among the females, hypertension was predominant (30%), followed by diabetes (18%) and dyslipidemia (14%).

Age and gender-wise distribution of risk factors in stroke patients is given in Table 1. Among the age group of 20 – 39 years, smoking was a risk factor in 4(8%), hypertension in 4(8%), diabetes in 1(2%), dyslipidemia in 1(2%) and alcohol in 1(2%). In the age group of 40 – 59 years, hypertension was predominant in 22(44%), smoking in 17(34%), diabetes in 13(26%), dyslipidemia in 12(24%) and alcohol in 11(22%). In the age group of 60 years and above, diabetes was predominant in 16(32%), followed by hypertension in 14(28%), smoking in 5(10%), dyslipidemia in 4(8%) and alcohol in 2(4%). (P<0.05).

The incidence of cerebrovascular accidents is comparatively higher in age group of 40-59 years. This is attributed to the rise in risk factors in the young age. (P<0.05).

During the stay in the hospital, bed sores was evident in 1(2%) out of the 50 patients. No other nosocomial infection occurred. The average days of hospitalization were 6.58 in the stroke patients. There is no incidence of in-hospital mortality.

Table 1. Age-wise and Gender-wise Distribution of Risk factors in Stroke patients

Risk factors	20 - 39 years of age		40 – 59 years of age		60 years of age and more	
	Male	Female	Male	Female	Male	Female
Diabetes mellitus	1	0	9	4	11	5
Hypertension	2	2	13	9	10	4
Dyslipidemia	1	0	7	5	2	2
Smoking	4	0	17	0	5	0
Alcohol	1	0	11	0	2	0

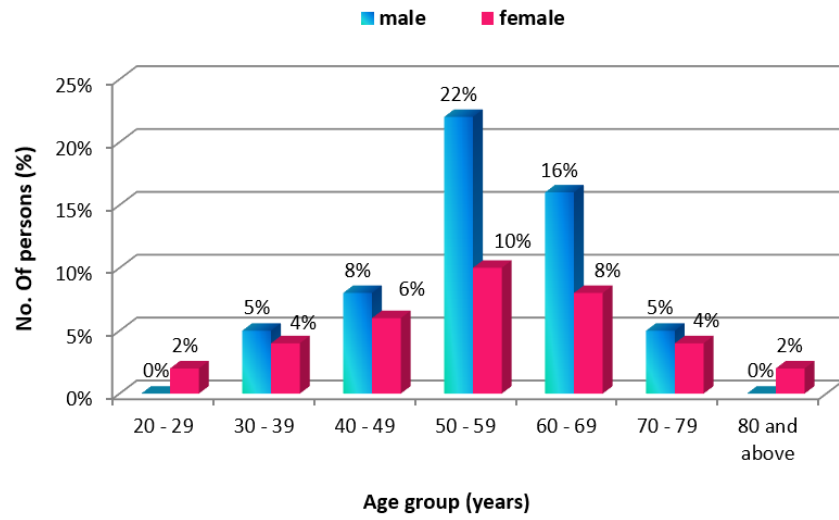


Fig. 1. Age and Gender wise distribution of cerebrovascular accidents patients

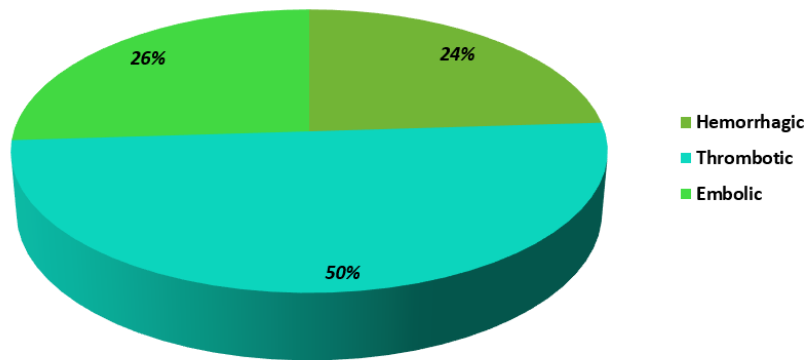


Fig. 2. Types of Stroke

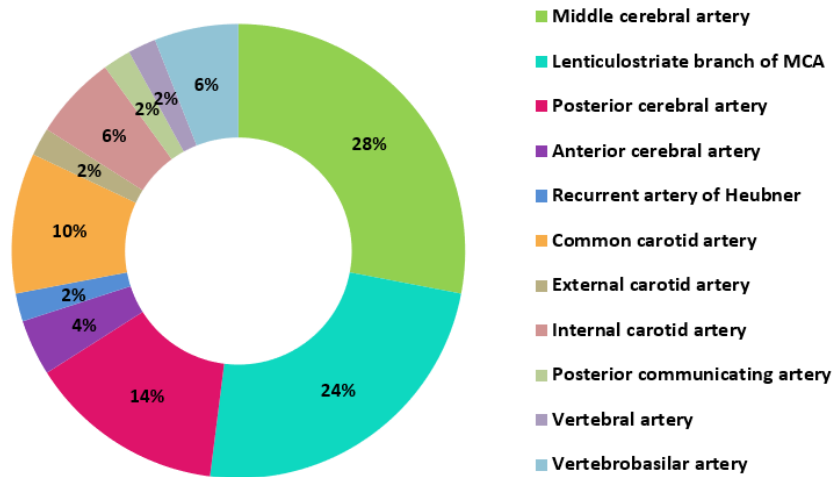


Fig. 3. Arteries involved in cerebrovascular accidents

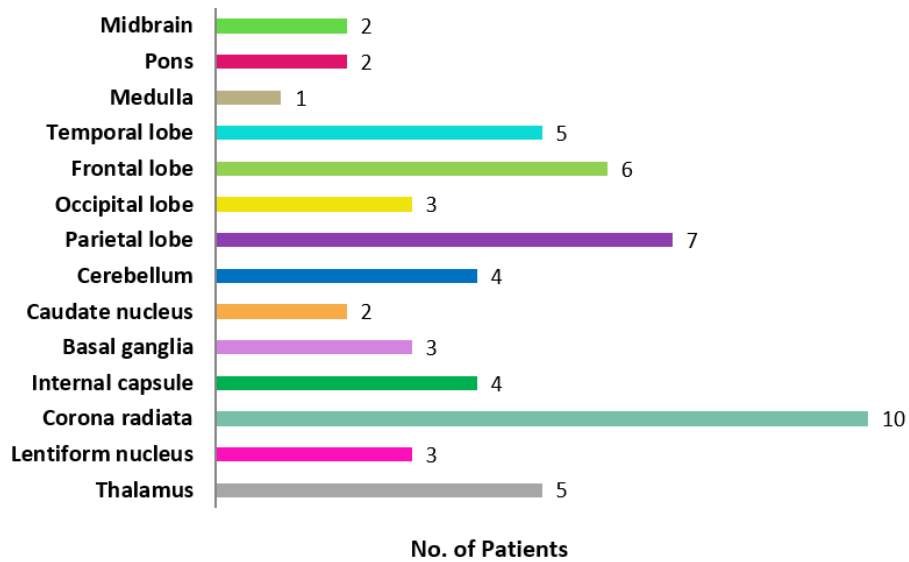


Fig. 4. Common site of lesion in the patients

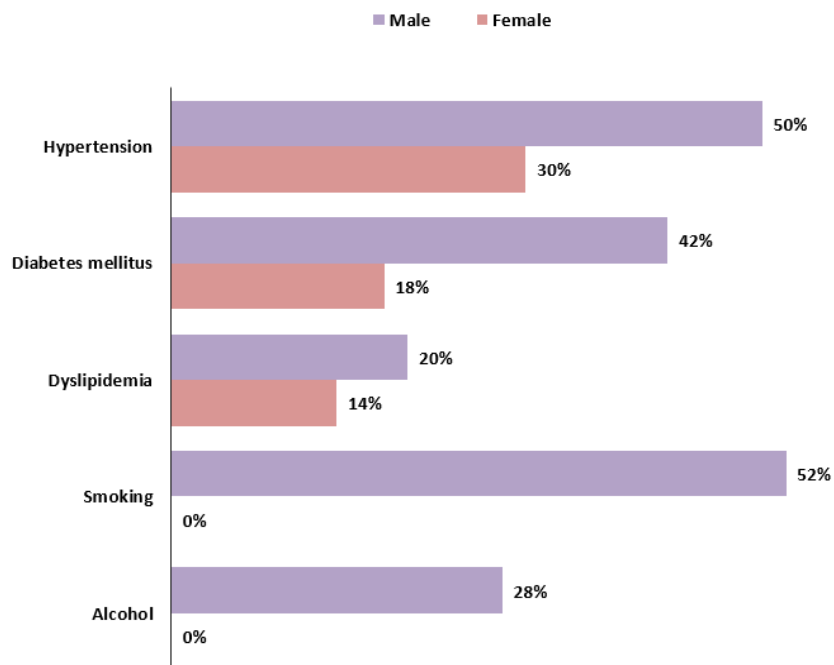


Fig. 5. Associated Risk factors in Stroke

4. DISCUSSION

Cerebrovascular accidents are most commonly seen in old age above 60 years. But that doesn't make the young adults to not develop stroke. Other than age, there are many other factors which predispose to cerebrovascular accidents.

In this study, for a period of 4 months, 50 patients diagnosed with cerebrovascular accident

were included in the study. Among them 64% were male and remaining were female. This report of male predominance correlates with *Patne et al.*, [1], *Kuriakose et al.*, [2], *Wajngarten et al.*, [15], *Vaidya et al.*, [12], *Sayyed et al.*, [16] and *Iqbal et al.*, [8].

The mean age of the study subjects is 56.86 years. Majority are of age group 50-59 years (32%) followed by age group 60-69 years (24%).

This correlates to study reports of *Jebasingh et al.*, [6] where the mean age is 56 years and the incidence was higher in the age group of 51-60 years. The reports of *Sayyed et al.*, [16] showed the majority of the patients were in the age group of 50-60 years (38%). On the other hand, the study reports of *Patne et al.*, [1] and *Kuriakose et al.*, [2] showed majority of patients affected were above the age of 60 years. In our study, 11% of stroke patients were <40 years of age. It was 14% in reports of *Sayyed et al.*, [16] and *Iqbal et al.*, [8]. The findings from these study reports show the start of rise in incidence of cerebrovascular accidents in younger age group.

Among the 50 subjects of our study, thrombotic stroke was the most common type of stroke followed by embolic and hemorrhagic stroke. This makes ischemic type of cerebrovascular accident most common in this study. This corresponds to study reports of *Patne et al.*, [1], *Kuriakose et al.*, [2], *Kuriakose et al.*, [2], *Akbar et al.*, [3], *Ahangar et al.*, [17], *Vaidya et al.*, [4], *Lakshmikummar et al.*, [13], *Jebasingh et al.*, [6], *Sayyed et al.*, [16] and *Iqbal et al.*, [8].

In our study, the most common site of lesion was corona radiata followed by parietal lobe, frontal lobe, thalamus and temporal lobe. The study reports of *Patne et al.*, [1], *Kuriakose et al.*, [2], *Vaidya et al.*, [4] and *Jebasingh et al.*, [6] showed parietal lobe followed by frontal lobe were the commonly affected sites in stroke patients. Middle cerebral artery followed by posterior cerebral artery and anterior cerebral artery were the commonly involved blood vessels in our study. This is similar to study reports of *Lakshmikummar et al.*, [13].

The risk factors which predispose to cerebrovascular accidents include non-modifiable factors like age, gender, etc and modifiable factors include hypertension, diabetes, dyslipidemia, smoking, alcohol, etc. Among the modifiable risk factors, hypertension was the most common factor affecting 50% of male and 30% of female CVA patients. The prevalence of hypertension as most common risk factor in stroke patients, corresponds to reports of *Patne et al.*, [1], *Kuriakose et al.*, [2], *Upoyo et al.*, [12], *Akbar et al.*, [3], *Wajngarten et al.*, [15], *Vaidya et al.*, [4], *Chitrabalam et al.*, [5], *Lakshmikummar et al.*, [13], *Jebasingh et al.*, [6], *Sayyed et al.*, [16] and *Iqbal et al.*, [8].

Diabetes was the second most common risk factor in our study subjects. In this study both

type 1 and type 2 diabetes were included. The reports of *Chitrabalam et al.*, [5], *Lakshmikummar et al.*, [13], *Jebasingh et al.*, [6] and *Iqbal et al.*, [8] also signify the role of diabetes as one of the major risk factor in developing stroke.

Overall smoking was the third common risk factor (52%), though it was the most common one in the male subjects in our study. Smoking is reported to have a strong association with cerebrovascular accidents by *Shah et al.*, [18] and *Lakshmikummar et al.*, [13].

Dyslipidemia increases the risk of stroke much more when associated with other risk factors like diabetes, smoking, etc. In our study alcohol was the fourth common risk factor in male stroke patients (28%). This correlates with reports of *Lakshmikummar et al.*, [13], where alcohol constituted as risk factor in 27% of subjects.

The study of *Ahangar et al.*, [17] and *Jebasingh et al.*, [6], report diabetes and dyslipidemia to be the common risk factors after hypertension. The reports of *Patne et al.*, [1], *Kuriakose et al.*, [3] and *Vaidya et al.*, [4] show smoking and dyslipidemia to be commonly involved in stroke patients following hypertension. In the study of *Sayyed et al.*, [16], following hypertension, both smoking and alcohol were equally (34%) involved. The risk factor prevalence in our study is similar to that of *Iqbal et al.*, [8], where hypertension is the most common risk factor, followed by dyslipidemia, smoking, diabetes and lastly alcohol. Moreover these risk factors also have strong association with each other.

On statistical analysis of the current study results, P value is less than 0.05 ($P < 0.05$). Risk factors like hypertension, diabetes, smoking, dyslipidemia and alcohol have a major role in developing stroke and also tend to increase the disability and slow the recovery. Hence there is significant association of the risk factors with the rise in incidence of cerebrovascular accidents, not only the older age group but also the younger age group, necessitating the effective control of these risk factors to prevent stroke and its recurrence.

Cerebrovascular accidents being one of the major causes of mortality raise a concern. In our study there was no in-hospital mortality. Also patients, with or without the risk factors like diabetes, admitted in the hospital tend to develop nosocomial infections. In this study only one

patient out of 50 subjects had developed bed sores and was treated appropriately. Overall this shows a good prognosis and quality of patient care.

5. CONCLUSION

Cerebrovascular accidents are in the phase of rise these days. The incidence of stroke is becoming relatively more common in the young age groups, though old aged individuals are also affected. This is not only attributed by age and male predominance but also risk factors like hypertension, diabetes, dyslipidemia, smoking and alcohol. Though hypertension is the most common risk factor associated with stroke, smoking, diabetes, dyslipidemia and alcohol are also of major concern in the young individuals. They not only predispose to stroke but also affect the patient recovery and recurrence of stroke. Hence proper treatment, lifestyle modifications and management of these risk factors is advised to prevent mortality and morbidity caused by cerebrovascular accidents.

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s). Written consent form was obtained from all patients.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Patne SV, Chintale KN. Study of clinical profile of stroke patients in rural tertiary health care centre. *Int J Adv Med.* 2016;3(3):666-70.

2. Vaidya CV, Majmudar DK. A retrospective study of clinical profile of stroke patients from GMERS medical college and hospital, Gandhinagar, Gujarat. *Int J Clin Trials.* 2014;1(2):62-6.
3. Akbar DH, Mushtaq M. Clinical profile of stroke: The experience at King Abdulaziz University Hospital. *SQU Journal for Scientific Research-Medical Sciences.* 2001;3(1):35.
4. Vaidya C, Majmudar D. A study on clinical profile of stroke in young and elderly in GMERS Medical College and Hospital, Gandhinagar, Gujarat. *International Journal of Research in Medical Sciences.* 2014;2(4):1446.
5. Chitrambalam P, Baskar D, Revathy S. A Study on Stroke in Young and Elderly in Rajiv Gandhi Government General Hospital, Chennai. *International Journal of Clinical Medicine.* 2012;03(03):184-189.
6. Jebasingh YK, Sivanesan P. Clinical Profile of Stroke Patients in South Tamil Nadu Tertiary – A Cross-sectional Study. *Int J Sci Stud* 2019;7(6):83-86.
7. Kuriakose D, Xiao Z. Pathophysiology and treatment of stroke: present status and future perspectives. *International journal of molecular sciences.* 2020;21(20):7609.
8. Iqbal M, Astik SK. Study on Clinical Profile and Risk Factors Of Cerebrovascular Accident With Special Reference To CT Scan Findings Of Brain. *Paripex-Indian Journal of Research.* 2020;9(4):1-4.
9. Burgess RE, Kidwell CS. Use of MRI in the assessment of patients with stroke. *Current neurology and neuroscience reports.* 2011;11(1):28-34.
10. Birenbaum D, Bancroft LW, Felsberg GJ. Imaging in acute stroke. *Western Journal of Emergency Medicine.* 2011;12(1):67.
11. Alrabghi L, Alnemari R, Aloteebi R, Alshammari H, Ayyad M, Al Ibrahim M, Alotayfi M, Bugshan T, Alfaifi A, Aljuwayd H. Stroke types and management. *International Journal of Community Medicine and Public Health.* 2018;5(9): 3715.
12. Upoyo AS, Setyopranoto I, Pangastuti HS. The modifiable risk factors of uncontrolled hypertension in stroke: A systematic review and meta-analysis. *Stroke Research and Treatment;* 2021.
13. Lakshmikumar MT, Bettegowda S, Vuyyuru S. Research Article Clinical Profile

- of Patients with Cerebrovascular Accident: A Study from Rural Hospital. *Scholars Journal of Applied Medical Sciences*. 2015;3(9B):3253-3264.
14. Andrade C. The P value and statistical significance: misunderstandings, explanations, challenges, and alternatives. *Indian journal of psychological medicine*. 2019;41(3):210-5.
 15. Wajngarten M, Silva GS. Hypertension and stroke: update on treatment. *European Cardiology Review*. 2019;14(2):111.
 16. Sayyed B, Shaik MA, Kamitkar S, Shaik M, Govindarajan N. A Prospective Study on Clinical Profile with Special Reference to Etiology, Management and Drug Utilisation Review on Cerebrovascular Accident with Ischemic and Hemorrhagic Stroke. *Indian Journal of Pharmacy Practice*. 2020;13(1):27.
 17. Ahangar AA, Saadat P, Heidari B, Taheri ST, Alijanpour S. Sex difference in types and distribution of risk factors in ischemic and hemorrhagic stroke. *International Journal of Stroke*. 2018; 13(1):83-6.
 18. Shah RS, Cole JW. Smoking and stroke: the more you smoke the more you stroke. *Expert review of cardiovascular therapy*. 2010;8(7):917-32.

© 2021 Ashwathy and Deepthi; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:
<https://www.sdiarticle4.com/review-history/74897>