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RISK FACTORS OF INTRACEREBRAL HEMORRHAGE – A CROSS SECTIONAL STUDY

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ABSTRACT

Background and Objective:

Stroke is the major cause of disability and one of the top causes of death in the globe. Though the rate is decreasing in the West, it is most likely growing in Asia. In Pakistan, the burden of stroke risk factors is substantial. Although data on the incidence and prevalence of stroke in Pakistan is limited, there are several published case studies demonstrating major disparities in stroke epidemiology, risk factors, kinds, and patterns. This study aims to identify risk factors of intracerebral hemorrhage among patients presenting to a teaching hospital.

Methods:

From August 2019 to February 2020, 103 patients from DHQ Teaching Hospital Abbottabad's medical units participated in this prospective cross-sectional research. A CT scan of the brain was performed in all patients to identify intra cerebral hemorrhage and was used to diagnose cerebrovascular events. In patients with intracerebral hemorrhage, detailed histories and medical records were thoroughly examined in order to identify risk factors such as uncontrolled hypertension. To detect poorly managed diabetes and hyperlipidemia, fasting blood glucose, fasting serum cholesterol, and fasting triglycerides were measured. SPSS 20 was used to evaluate the data obtained on a standardized proforma.

Results:

The majority of the patients (n=41) were over 70 years old, with 71 (68.93%) males and 32 (31.07%) females. Intracerebral hemorrhage was reported in 8.74 percent (n=9) of patients with acute cerebrovascular accidents, with 66.67 percent (n=6) having uncontrolled hypertension, 44.44 percent (n=4) having diabetes, and 33.33 percent (n=3) having hyperlipidemia.

Conclusion:

Intracerebral hemorrhage is prevalent in individuals who have had a cerebrovascular accident, and hypertension is the most common risk factor for this consequence.

Key Words: Acute cerebrovascular accident, intracerebral hemorrhage, hypertension, diabetes mellitus, hyperlipidemia.

INTRODUCTION

In many nations, stroke is one of the leading causes of death and disability. Stroke is defined as "Rapidly acquired clinical evidence of focal or global disruption of brain function, lasting more than 24 hours or until death, with no clear non-vascular etiology," according to the World Health Organization.¹ According to statistics, there were almost 25.7 million stroke survivors, 6.5 million stroke fatalities, 113 million

disability-adjusted life-years (DALYs) lost due to stroke, and 10.3 million new cases of stroke in 2013.²

Stroke is a severe disease that leaves countless crippled and kills a considerable fraction of the global population. With roughly 795,000 stroke episodes in the US each year, it is the largest cause of long-term adult impairment and the fifth highest cause of death.³ Stroke has become more common in Asia in recent

years. Pakistan has a considerable burden of this debilitating disease among Asian countries, which adds to resource expenditures in terms of money, community personnel, health services, and the economy as a whole. In Pakistan, the current prevalence of stroke is unknown. Several case studies in the literature have revealed considerable variations in stroke epidemiology and risk factors for various stroke types. However, actual data are still not available. According to one study, Pakistan has the highest rate of stroke per capita in the world, with 250 strokes per 100,000.⁴

Ischemic and hemorrhagic strokes are the two most fundamental types of stroke. Ischemic stroke account for the majority of strokes (about 80%), while the proportional burden of hemorrhagic vs ischemic stroke varies by population. Intraparenchymal and subarachnoid hemorrhagic strokes are the two types of hemorrhagic strokes.⁵ When compared to Western countries, most South Asian studies show a greater rate of hemorrhagic stroke (19–46 percent). This finding might be due to a higher prevalence of hypertension and inadequate control in South Asia. Intra cerebral hemorrhage is more common in younger individuals (15–45 years old) who have had a stroke (32–43 percent).⁶ Another research of 261 patients in Hyderabad found that 172 (66 percent) had ischemic stroke and 89 (34 percent) suffered hemorrhagic stroke.⁷

Identification of modifiable risk factors and proof of the efficacy of risk reduction initiatives can lower the burden of stroke in the community. There are a variety of risk factors for stroke, including both modifiable (e.g., diet, comorbid diseases) and non-modifiable risk factors (e.g., age, race). Short-term hazards or triggers (e.g., infectious events, sepsis, stress), intermediate-term risk factors (e.g. hypertension, hyperlipidemia), and long-term risk factors (e.g., sex, race). Risk factors for stroke in the young also likely differ from those in older patients.⁵

Ischemic and hemorrhagic strokes have similar risk factors. There are some significant distinctions, as well as risk factors, across the many etiologic types of ischemic stroke. Hypertension is a major risk factor for hemorrhagic stroke, but it also contributes to atherosclerosis, which can lead to ischemic stroke.⁸ In the general population, hypertension has been demonstrated to be a better predictor of hemorrhagic strokes than ischemic strokes.⁹ There is evidence that

developing nations, where the frequency of hypertension diseases is higher, have a higher proportion of hemorrhagic stroke than ischemic stroke.⁷ Another key risk factor for strokes is hyperlipidemia, which is caused by atherosclerosis of extracranial and intracranial blood vessels.⁸

In Asian nations, traditional and well-known stroke risk factors such as diabetes and hypertension are on the rise. Similarly, the prevalence of stroke is increasing. According to a newly released study, a large fraction of Pakistan's population suffers from diabetes, hypertension, or both.¹⁰ In developed countries, the incidence of hypertensive intracranial hemorrhage has reduced with better blood pressure control.¹¹ However, in developing countries, this incidence has not been decreased owing to the greater incidence and poor control of risk factors particularly hypertension.¹²

The aim of this study is to find out how often intra cerebral hemorrhage is in individuals who have had a cerebrovascular accident and what variables contribute to it. This study emphasizes the relevance of common intracerebral hemorrhage risk factors, and how regulating them can help avoid this severe condition.

METHODS

Study Design: Prospective cross-sectional observational study.

Place and duration of study: Patients were recruited from DHQ Teaching Hospital Abbottabad medical units and admitted through OPD and casualty from August 2019 to February 2020 for this study.

Sample size: A total sample of 103 patients was calculated to determine the frequency of intracerebral hemorrhage and common factors leading to it among patients presenting with acute cerebrovascular accidents.

Sampling Technique: Non-probability consecutive sampling.

Data Collection: Patients of both gender and age above 18 years were considered. Diagnosis of cerebrovascular accident was made on focal neurological deficit and confirmed by CT scan brain plain to detect intracerebral hemorrhage. Those patients who had intracranial space occupying lesions like tumor or brain abscess on CT scan, previous history

of stroke, patients with history of head injury, patients with symptoms and signs of meningitis like fever with neck stiffness and confirmed on CSF examination or those patients with previous history of bleeding disorders were excluded from the study.

A complete history was gathered of those patients who had intracerebral hemorrhage, and medical records were carefully analyzed to look for common causes of intracerebral hemorrhage, such as uncontrolled hypertension. Uncontrolled diabetes and hyperlipidemia were detected using fasting blood glucose, fasting serum cholesterol, and fasting triglycerides.

Data Analysis: The results were analyzed by using SPSS version 20.

RESULTS

A total of 103 patients fulfilling the inclusion/exclusion criteria were enrolled to determine the frequency of intracerebral hemorrhage and common factors leading to it among patients presenting with acute cerebrovascular accidents.

Majority of the patients i.e. 39.81%(n=41) with >70 years of age followed by 26.21% (n=27) between

61-70 years, 16.50%(n=17) were between 51-60 years, 7.77%(n=8) were between 41-50 years, 6.80%(n=7) were between 31-40 years and only 2.91%(n=3) were between 18-30 years, mean and standard deviation of age was calculated as 57.63+5.76 years. (Figure 1)

Gender distribution of the patients shows that majority of the patients were 68.93%(n=71) were male and 31.07%(n=32) were female. (Table 1)

Intracerebral hemorrhage was found in 8.74 percent (n=9) of patients who presented with acute cerebrovascular accidents. In nine patients of intracerebral hemorrhage, six (66.67%) had history of uncontrolled hypertension, four (44.44%) had diabetes and three (33.33%) had hyperlipidemia, whereas some of the patients had more than one risk factors. (Figure 2).

Stratification of age and gender for intracerebral hemorrhage was done in Table 2, where no patient was recorded between 18-50 years of age while one male was recorded between 51-60 years, two males and one female were in 61-70 years group while in >70 years of age category there were three (33.33%) male patients and two (22.22%) female patients of intracerebral hemorrhage.

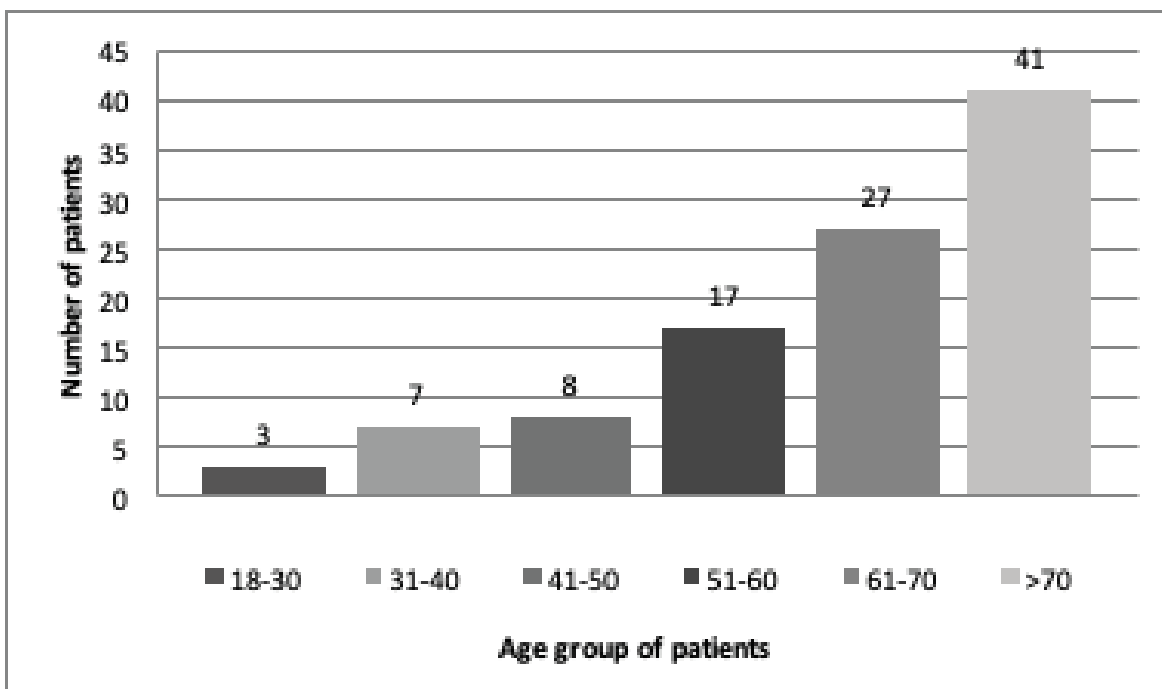


Figure 1: Age distribution of patients

Table No. 1: Gender distribution of the patients (n=103)

Gender	No. of patients	%
Male	71	68.93
Female	32	31.07
Total	103	100

Table No. 2: Age and gender distribution for intracerebral hemorrhage (n=9)

Age(in years)	Male(%)	Female(%)	No. of patients(%)
18-30	-	-	-
31-40	-	-	-
41-50	-	-	-
51-60	1(11.11)	-	1(11.11)
61-70	2(22.22)	1(11.11)	3(33.33)
>70	3(33.33)	2(22.22)	5(55.55)
Total	6(66.67)	3(33.33)	9(100)

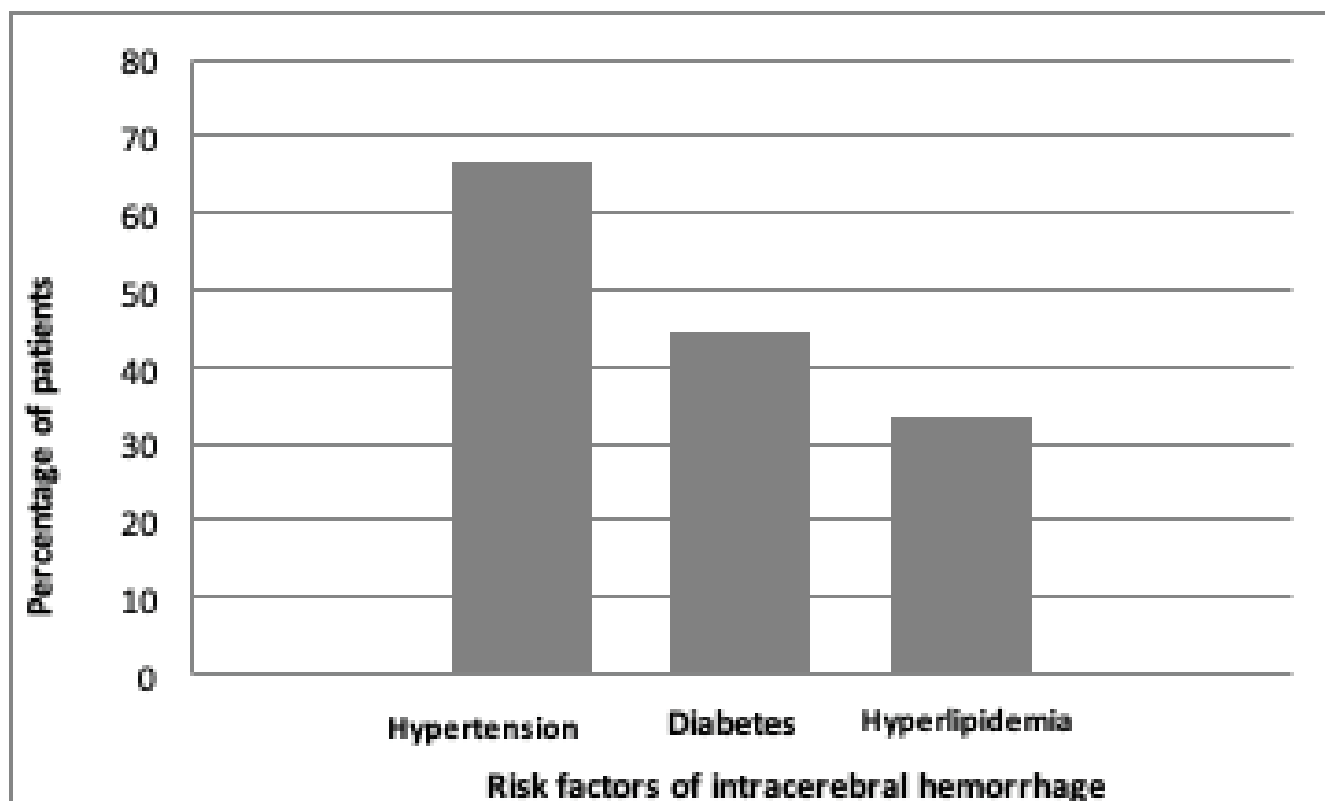


Figure 2: Frequency of risk factors of intracerebral hemorrhage

DISCUSSION

Stroke is a prominent cause of death and disability around the world. Although the prevalence is declining in the west, it is most likely growing in Asia. In Pakistan, the burden of stroke risk factors is substantial. According to the IDF Diabetes Atlas 9th Edition, the prevalence of diabetes in Pakistan has risen to 17.1%, a 148 percent increase over prior estimates. In 2019, it was predicted that over 19 million individuals in Pakistan have diabetes, placing them at risk of life-threatening complications.¹³ Hypertension affects every third person over the age of 45. Unfortunately, the majority of these people are completely ignorant of their illness. This is exacerbated further by the fact that the majority of identified patients have poorly regulated blood pressure as a result of non-adherence to medications and clinicians' lack of up-to-date information.

There is a lack of indigenous epidemiological data in Pakistan. In Pakistan, the current incidence and prevalence of stroke are unknown. Many case studies have been published that show considerable variations

in stroke epidemiology, risk factors, and stroke subtypes.⁴

The majority of the patients in this study were over 70 years old, with 68.93 percent of men and 31.07 percent of women. Intracerebral hemorrhage was found in 8.74 percent of patients with acute cerebrovascular accidents, with 66.67 percent having uncontrolled hypertension, 44.44 percent having diabetes, and 33.33 percent having hyperlipidemia.

The findings of the research are consistent with those of El-Saed A and colleagues, who found a 13% prevalence of intracerebral hemorrhage among CVA patients.¹⁴ A study by Alam I recorded risk stratification in 100 patients of acute stroke, mean age was 59±11.63 years, intracerebral hemorrhage was found in 31% of the patients which is in contrast of this study.¹⁵ According to this study, the prevalence of risk factors such as hypertension, diabetes, and hyperlipidemia was 60%, 28%, and 28%, respectively. Memon AR (61%), Basharat RA (59%), Kaul S (62%), Kase (58%), and Al-Roomi(58.9%) have all published

research that show an elevated risk of hypertension.¹⁶⁻²⁰

Intracerebral hemorrhage is increased by a history of poor medication compliance and poor management of hypertension on insufficient therapy, which can be highlighted via health education programs on stroke related morbidity and death at health care centers and through electronic or print media.

The purpose of this study was to evaluate the frequency of intra cerebral bleed in patients with cerebrovascular accidents and the major risk factors that contribute to it. This goal was justified by documenting the frequency of this complication in agreement with other studies. The research might help provide local data on intracerebral hemorrhage and the common conditions that cause it.

REFERENCES

1. Sacco RL, Kasner SE, Broderick JP, Caplan LR, Connors JJ, Culebras A, et al; An updated definition of stroke for the 21st century: a statement for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. 2013 Jul;44(7):2064-89.
2. Feigin VL, Krishnamurthi RV, Parmar P, Norrving B, Mensah GA, Bennett DA, et al; GBD 2013 Writing Group; GBD 2013 Stroke Panel Experts Group. Update on the Global Burden of Ischemic and Hemorrhagic Stroke in 1990-2013: the GBD 2013 study. *Neuroepidemiology* 2015;45:161-176.
3. Roger VL, Go AS, Lloyd-Jones DM, Adams RJ, Berry JD, Brown TM, et al. Heart disease and stroke statistics - 2011 update. *Circulation*. 2011;123:e18-e209.
4. Khan MI, Khan JI, Ahmed SI, et al. The Epidemiology of Stroke in a Developing Country (Pakistan). *J Neurol Stroke* 2018 Jan; 8(1): 1-6.
5. Boehme AK, Esenwa C, Elkind MS. Stroke Risk Factors, Genetics, and Prevention. *Circ Res*. 2017 Feb 3;120(3):472-495. *Circ Res*. 2017 Feb 3; 120(3): 472-495.
6. Wasay M, Khatri IA, Kaul S. Stroke in South Asian countries. *Nat Rev Neurol*. 2014 Mar;10(3):135-43.
7. Memon TF, Lakhair MA, Shaikh M, et al. Socio-demographic risk factors for hemorrhagic and ischemic stroke: a study in tertiary care hospital of Hyderabad. *Pak J Neurol Sci* 2016;11:24-9.

The findings of the study might lead to more investigation into the relationship between intracerebral hemorrhage risk factors and fatality rates among these individuals.

CONCLUSION

Intracerebral hemorrhage is prevalent in people who have had a cerebrovascular accident, and hypertension is the most common risk factor for intracerebral hemorrhage. Male patients and patients more than 70 years of age are more commonly affected by this complication. The results of the study may be useful in opening further ways of research work in determining the association between the risk factors of intracerebral hemorrhage along with frequency of mortality among these patients. The study's drawback was that we did not include the frequency of death among these individuals, which might be useful in raising awareness about adequate hypertension care to reduce morbidity.

8. Tirschwell DL, Smith NL, Heckbert SR, Lemaitre RN, Longstreth WT Jr, Psaty BM. Association of cholesterol with stroke risk varies in stroke subtypes and patient subgroups. *Neurology*. 2004 Nov 23;63(10):1868-75.
9. Hatleberg CI, Ryom L, Kamara D, De Wit S, Law M, Phillips A et al. Predictors of Ischemic and Hemorrhagic Strokes Among People Living With HIV: The D:A:D International Prospective Multicohort Study. *E Clin Med*, 13 (2019), 91-100.
10. Nomani AZ, Nabi S, Badshah M, Ahmed S. Review of acute ischaemic stroke in Pakistan: progress in management and future perspectives. *Stroke Vasc Neurol* 2017 Feb 24;2(1):30-39.
11. Hong KS, Bang OY, Kang DW, Yu KH, Bae HJ, Lee JS, et al. Stroke statistics in Korea: part I. Epidemiology and risk factors: a report from the Korean stroke society and clinical research center for stroke. *J Stroke*. 2013;15:2-20.
12. Krishnamurthi RV, Moran AE, Forouzanfar MH, Bennett DA, Mensah GA, Lawes CM, et al. The global burden of hemorrhagic stroke: a summary of findings from the GBD 2010 study. *Glob Heart*. 2014;9:101-106.
13. Saeedi P, Petersohn I, Salpea P, Malanda B, Karuranga S, Unwin N, et al. IDF Diabetes Atlas Committee. Global and regional diabetes prevalence estimates for 2019 and projections for 2030 and 2045: Results from the International Diabetes Federation Diabetes Atlas, 9th edition. *Diabetes Res Clin Pract*. 2019 Nov;157:107843.
14. El-Saed A, Kuller LH, Newman AB, Lopez O, Costantino J, McTigue K. Geographic variations in

- stroke incidence and mortality among older population in four US communities. *Stroke* 2006;37:175-99.
15. Alam I, Haider I, Wahab F, Khan W. Risk factors stratification in 100 patients of acute stroke. *JMPI* 2004;18:583-91.
16. Memon AR, Hussain T, Qureshi MS. Haemorrhagic stroke incidence, risk factors and mortality. *J Coll Phys Surg Pak* 1995;5:267-9.
17. Basharat RA, Elahi A, Tariq M, Saeed A. One-month audit of stroke at PIMS. *Pak J Neurol* 1999;5:12-5.
18. Kaul S, Venkateswamy P, Meena AK, Sahay R, Murthy JM. Frequency, clinical features, outcome and risk factors of lacunar infarction (data from a stroke registry in south India). *Neurol India* 2000;48:116-9.
19. Kase CS. Intracerebral haemorrhage: non hypertensive causes. *Stroke* 1986;17:590-5.
20. al-Roomi K, Heller RF, Holland T, Floate D, Wlodarczyk J. The importance of hypertension in the aetiology of infarctive and haemorrhagic stroke. *The Lower Hunter Stroke Study. Med J Aust.* 1992 Oct 5;157(7):452-5.

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Author's contribution:

Mir Jalal-ud-din; concept, data collection, data analysis, manuscript writing, manuscript review

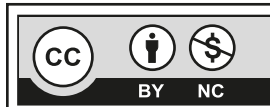
Raheel Jehangir Jadoon; concept, data collection, data analysis, manuscript writing, manuscript review

Syed Affan Ali; concept, data analysis, manuscript review

Samia Wazir Khawaja; data analysis, manuscript writing, manuscript review

Zahid Gul Jadoon; concept, data analysis, manuscript review

Ibtisam; concept, data analysis, manuscript review



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