**ORIGINAL ARTICLE**

# Modifiable risk factors among ischemic stroke patients attending Bahawal Victoria Hospital in Bahawalpur.

Raheel Khan[1], Sadaf Shafique[2], Saima Nasreen[3], Sara Reza[4]

**ABSTRACT… Objective:** To identify the prevalence of modifiable risk factors of ischemic stroke. **Study Design:** Cross Sectional Study. **Setting:** Department of Medicine, Bahawal Victoria Hospital, Bahawalpur. **Period:** July 2019 to December 2019. **Material & Methods:** Detailed history, clinical examination and CT scan (plain) of brain was performed and data was collected on pre-designed questionnaires. **Results:** Out of a total of 97 patients, there were 69.1% female and 30.1% male. Majority of the patients, 51.5% were aged more than 60 years. Hypertension was the most prevalent risk factor (56.7%) followed by ischemic heart disease (45.4%), diabetes mellitus (27.8%), dyslipidemia (26.8%) & smoking (34%). **Conclusion:** Modifiable risk factors of ischemic stroke should be identified in general population so that this disease can be prevented.

**Key words:** Ischemic Stroke, Hypertension, Diabetes Mellitus, Dyslipidemia.

## INTRODUCTION

Stroke is one of the major problems that the healthcare workers are facing worldwide. Stroke is known to be one of the most important causes of disability and mortality all around the globe.[1] There are two major types of stroke i.e. ischemic & Hemorrhagic. Stroke leads to functional impairments with out of 15-30 % persist throughout the life.[2] Compared to data available for coronary heart disease there is relatively less data available regarding he risk factors of stroke.[4] Certain modifiable risk factors have been identified which include hypertension, dyslipidemia, poorly controlled diabetes mellitus, atrial fibrillation and smoking.[1,3]

The aim of present study is to identify the prevalence of modifiable risk factors of ischemic stroke among the patients who are admitted to Bahawal Victoria Hospital, Bahawalpur.

## MATERIAL & METHODS

All the patients of both genders (male & female) of age above 18 years, admitted to Department of Medicine, Bahawal Victoria H ospital, Bahawalpur from July 2019 to December 2019. After Informed consent from patients or attendants, detailed history and clinical examination was done to make the diagnosis which was confirmed with CT-Scan Brain (plain) to rule out Hemorrhagic CVA, SOL brain, meningitis & encephalitis. The data was collected on pre-tested pre-designed questionnaire. The data was analyzed using SPSS v.23.0. For qualitative data, frequencies and percentages were calculated. For quantitative data, mean and standard deviation (SD) were estimated. Stratification was made to control confounding variables and post stratification chi-square test was applied considering p <0.05 as significant.

## RESULTS

Total 97 patients were included in the study. Mean age of presentation of patients was 57.15+15.426 years. Most of the patients belong to age group of more than 60 years (51.5%) (Figure-1). Majority of patients were female 67 (69.1%). Most of the patients belonged to rural population 71 (73.25).

1. MBBS, FCPS (Med), Senior Registrar Medicine, Bahawal Victoria Hospital, Bahawalpur.
2. MBBS, M.Phil (Histopath), FCPS (Chem. Path), Assistant Professor Pathology, Quaid-e-Azam Medical College, Bahawalpur.
3. MBBS, FCPS (Medicine), Associate Professor Medicine, Bahawal Victoria Hospital, Bahawalpur.
4. MBBS, FCPS (Chem. Path), Assistant Professor Pathology, Quaid-e-Azam Medical College, Bahawalpur.

**Correspondence Address:**
Dr. Raheel Khan
Senior Registrar Medicine
Bahawal Victoria Hospital, Bahawalpur.
multan.zahranazish@gmail.com
x_raheel@yahoo.com

Article received on: 13/12/2021
Accepted for publication: 19/09/2022

56.7 % had hypertension, 27.8 % had diabetes mellitus, 26.8 % had dyslipidemia, 34 % had history of smoking, 45.4% had Ischemic heart Disease, 21.6% had Atrial Fibrillation, 17.5 % had Valvular heart disease (Table-I). Statistical significance was seen between age groups with hypertension (Table-II), ischemic heart disease (Table-III) & gender with smoking (Table-IV), atrial fibrillation (Table-V), valvular heart disease (Table-VI).
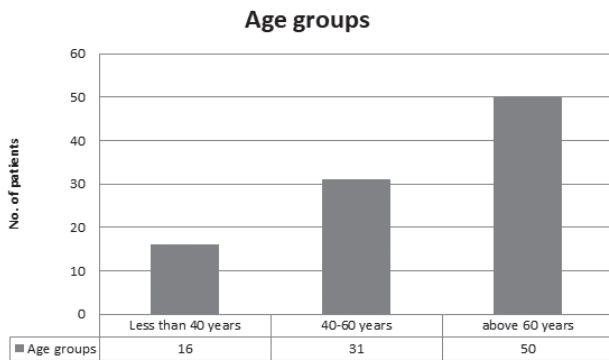


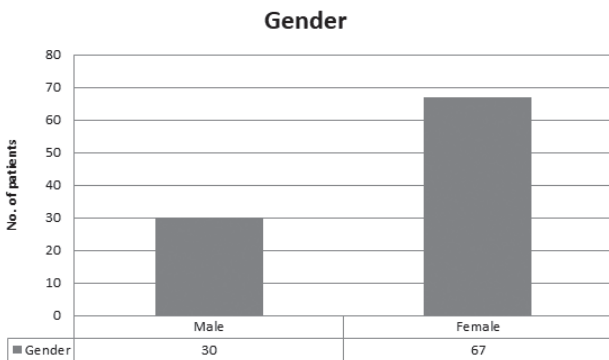**Figure-1. Age groups of patients**



**Figure-2. Gender of patients**

| Risk Factor | Frequency (n=97) % |
|---|---|
| Hypertension | 55 (56.7%) |
| Ischemic Heart Disease | 44 (45.4%) |
| Smoking | 33 (34%) |
| Diabetes mellitus | 27 (27.8%) |
| Dyslipidemia | 26 (26.8%) |
| Atrial Fibrillation | 21 (21.6%) |
| Valvular Heart disease | 17 (17.5%) |

**Table-I. Frequencies & percentages of non-Modifiable risk factors**

| | | Hypertension | | Total | P-Value |
|---|---|---|---|---|---|
| | | No | Yes | | |
| Age Groups | Less than 40 Years | 11 | 5 | 16 | |
| | 40-60 years | 15 | 16 | 31 | 0.028 |
| | Above 60 Years | 16 | 34 | 50 | |
| Total | | 42 | 55 | 97 | |

**Table-II. Hypertension & age groups**

| | | Ischemic Heart Disease | | Total | P-Value |
|---|---|---|---|---|---|
| | | No | Yes | | |
| Age Groups | Less than 40 Years | 14 | 2 | 16 | |
| | 40-60 years | 18 | 13 | 31 | 0.006 |
| | Above 60 Years | 21 | 29 | 50 | |
| Total | | 53 | 44 | 97 | |

**Table-III. Ischemic heart disease and age groups**

| | | Smoking | | Total | P-Value |
|---|---|---|---|---|---|
| | | No | Yes | | |
| Gender of patient | Male | 11 | 19 | 30 | |
| | Female | 53 | 14 | 67 | <0.001 |
| Total | | 64 | 33 | 97 | |

**Table-IV. Smoking and gender of patient**

| | | Atrial Fibrillation | | Total | P-Value |
|---|---|---|---|---|---|
| | | No | Yes | | |
| Gender of patient | Male | 27 | 3 | 30 | |
| | Female | 49 | 18 | 67 | 0.05 |
| Total | | 76 | 21 | 97 | |

**Table-V. Atrial fibrillation & gender of patient**

| | | Valvular Heart Disease | | Total | P-Value |
|---|---|---|---|---|---|
| | | No | Yes | | |
| Gender of patient | Male | 29 | 1 | 30 | |
| | Female | 51 | 16 | 67 | 0.01 |
| Total | | 80 | 17 | 97 | |

**Table-VI. Valvular heart disease & gender of patient**

## DISCUSSION

Variation exists regarding incidence and rates of mortality among different geographies of the world.[4] Incidence of stroke is more among Asians.[4] Our study showed incidence of stroke was high among elderly (age more than 60 years) and females. Previous study shows that incidence of stroke increases with age.[5] The mean age of acquiring stroke was little less than developed countries like USA.[6] This may be because of better awareness and health facilities provided to developed populations and shorter average life

span of Pakistani population.

Hypertension is also considered to an important risk factor for the development of stroke, with increased incidence throughout the world its effect is upon now on stroke disease. Control of hypertension reduces the incidence of stroke.[7] This study showed that 56.7 % patient was suffering from hypertension, which was almost similar to 60-61%.[8,9]

Dyslipidemia is another risk factor of stroke. It was present in 26.8% of our patients which is similar to other studies.[10,11] Both smoking and diabetes mellitus play role in causing dyslipidemia.[12,13] Diabetes mellitus was present in 27.8% patients in this study which is quite less than other studies (36-41%).[14,15]

Smoking is considered to be an important risk factor for ischemic stroke. We noted that 34% patients were smokers which are lower than different other studies. Smoking leads to thrombus generation in atherosclerosed vessels.[16]

## CONCLUSION
Results of this study depicted that hypertension, dyslipidemia, diabetes mellitus and smoking are important modifiable risk factors of ischemic stroke in population. Modifiable risk factors of ischemic stroke should be identified in general population so that this disease can be prevented. **Copyright@ 19 Sep, 2022.**

## REFERENCES
1. 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; 2(1):30-39. Published 2017 Feb 24. doi:10.1136/svn-2016-000041

2. Khealani BA, Hameed B, Mapari UU. **Stroke in Pakistan.** J Pak Med Assoc. 2008; 58(7):400-403.

3. Hashmi M, Khan M, Wasay M. **Growing burden of stroke in Pakistan: A review of progress and limitations.** Int J Stroke. 2013; 8(7):575-581. doi:10.1111/j.1747-4949.2012.00827.x

4. Kim AS, Johnston SC. **Global variation in the relative burden of stroke and ischemic heart disease.** Circulation. 2011; 124(3):314-323. doi:10.1161/CIRCULATIONAHA.111.018820

5. Wang W, Jiang B, Sun H, et al. **Prevalence, Incidence, and Mortality of Stroke in China: Results from a Nationwide Population-Based Survey of 480687 Adults.** Circulation. 2017; 135(8):759-771. doi:10.1161/CIRCULATIONAHA.116.025250

6. Pistoia F, Sacco S, Degan D, Tiseo C, Ornello R, Carolei A. **Hypertension and Stroke: Epidemiological Aspects and Clinical Evaluation.** High Blood Press Cardiovasc Prev. 2016; 23(1):9-18. doi:10.1007/s40292-015-0115-2

7. Ashkanani, A., Hassan, K. and Lamdhade, S. **Risk factors of stroke patients admitted to a general hospital in Kuwait.** International Journal of Neuroscience. 2012; 123(2):89-92.

8. Guzik A, Bushnell C. **Stroke epidemiology and risk factor management.** Continuum (Minneap Minn). 2017; 23(1, Cerebrovascular Disease):15-39. doi:10.1212/CON.0000000000000416

9. Blum B, Wormack L, Holtel M, et al. **Gender and thrombolysis therapy in stroke patients with incidence of dyslipidemia.** BMC Womens Health. 2019; 19(1):11. Published 2019 Jan 16. doi:10.1186/s12905-018-0698-6

10. Barkas F, Milionis H. **Treating dyslipidemia for the primary and secondary prevention of stroke.** Semin Neurol. 2017; 37(3):286-293. doi:10.1055/s-0037-1603511

11. Mooradian AD. **Dyslipidemia in type 2 diabetes mellitus.** Nat Clin Pract Endocrinol Metab. 2009; 5(3):150-159. doi:10.1038/ncpendmet1066

12. Shi J, Bai Y, Qiu S, et al. **Classified status of smoking and quitting has different associations with dyslipidemia in residents in northeast China.** Clin Chim Acta. 2018; 486:209-213. doi:10.1016/j.cca.2018.08.001

13. Hill MD. **Stroke and diabetes mellitus.** Handb Clin Neurol. 2014; 126:167-174. doi:10.1016/B978-0-444-53480-4.00012-6

14. Chen W, Pan Y, Jing J, et al. **Recurrent stroke in minor ischemic stroke or transient ischemic attack with metabolic syndrome and/or diabetes mellitus.** J Am Heart Assoc. 2017; 6(6):e005446. Published 2017 Jun 1. doi:10.1161/JAHA.116.005446

15. Shah RS, Cole JW. **Smoking and stroke: The more you smoke the more you stroke.** Expert Rev Cardiovasc Ther. 2010; 8(7):917-932. doi:10.1586/erc.10.56

16. Epstein KA, Viscoli CM, Spence JD, et al. **Smoking cessation and outcome after ischemic stroke or TIA.** Neurology. 2017; 89(16):1723-1729. doi:10.1212/ WNL.0000000000004524

## AUTHORSHIP AND CONTRIBUTION DECLARATION

| No. | Author(s) Full Name | Contribution to the paper | Author(s) Signature |
|-----|---------------------|---------------------------|---------------------|
| 1 | Raheel Khan | Conception & design, acquisition of data, Analysis & interpretaion of data, Drafting the article, Revising it critically for important intellectual content. | |
| 2 | Sadaf Shafique | | |
| 3 | Saima Nasreen | | |
| 4 | Sara Reza | | |