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Research Article

## STUDY TO DETERMINE THE RISK FACTORS IN ACUTE ISCHEAMIC STROKE PATIENTS

<sup>1</sup>Dr.Muhammad Haseeb, <sup>2</sup>Dr.Qasim Aziz, <sup>3</sup>Dr.Muhammad Ans Asif

Lahore Medical and Dental College, Lahore

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**Abstract:**

**Objective:** Stroke is extremely common in our set up, it is associated with high risk of mortality, morbidity and permanent disability but very little is known about it by the general public in a developing country like Pakistan. So the main objective of the study was to find out the clinical presentation and the risk factors associated with acute ischemic stroke and to know about the general public awareness about stroke.

**Study Design:** Descriptive /cross-sectional study

**Place and Duration of Study:** This study was conducted at the Medical Units of Mayo Hospital Lahore for the duration of six months from January 2020 to July 2020.

**Materials and Methods:** Adult 183 male and female patients of acute ischemic stroke admitted through emergency and medical OPD in medical units of Mayo Hospital Lahore were included in study. Following detailed history and clinical examination they were subjected to relevant investigations and CT brain. Patients with finding of bleed on CT and those having venous infarct were excluded.

**Results:** Hyperlipidemias, hypertension, diabetes and smoking were the major risk factors causing ischemic stroke in our sample of patients. Other risk factors given in detail below were also present, atrial fibrillation was found to be common risk factor in elderly population. 24% of patients presented with re stroke.

**Conclusion:** It was concluded that majority of patients were unaware of the risk factors causing stroke, so if we as a professional not only treat them but also educate them the incidence of stroke can be considerably reduced in society.

**Key Words:** Ischemic stroke, risk factors of ischemic stroke, stroke and diabetes.

**Corresponding author:**

**Dr.Muhammad Haseeb,**

Lahore Medical and Dental College, Lahore

QR code



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## INTRODUCTION:

Stroke is a leading cause of death and disability throughout the world and causes a considerable burden due to its mortality, morbidity and permanent disability. It is one of the commonest conditions and a serious public health problem encountered in medical units of our set up. Despite the high seriousness of disease ordinary people know very little about the clinical presentation and associated risk factors causing it. So the purpose of this study was to evaluate the risk factors, clinical presentation of ischemic stroke among the adult patients and then to educate them properly regarding their disease so that they can lead a normal life and are prevented from re-stroke. It not only adversely influences the life of the patients but also has got worse effects on their families and care takers<sup>1</sup>. Data from global burden of diseases, injuries and risk factors study group (GBD) of 2010 has declared stroke as a major cause of morbidity and mortality in developing countries<sup>2</sup>. Due to advancement in the management of stroke and control of risk factors causing it mortality from stroke have been reduced<sup>3</sup>. The advance treatment and management such as the use of intravenous tissue type plasminogen activator and certain other interventional management in certain cases of acute ischemic stroke, the effective prevention still remains the best management of stroke<sup>4</sup>. Greater the duration of exposure to risk factors of stroke higher the chance of getting it<sup>3</sup>. Effectively controlling these risk factors not only reduces the occurrence or re-occurrence of stroke but also the mortality rates<sup>5</sup>. 77% of strokes are primary so controlling the risk factors highlights the importance of primary prevention<sup>3</sup>. People living a healthy life style have 80% less chance of developing stroke than those who do not<sup>6</sup>. Risk factors for developing stroke are modifiable which can be controlled and permanent which are uncontrollable. The non-modifiable or permanent risk factors include sex, old age, race, heredity and ethnicity. Modifiable risk factors include hypertension, diabetes, dyslipidemia, atrial fibrillation, smoking, alcohol.

## MATERIALS AND METHODS:

This was a cross-sectional descriptive study including 183 patients presented to us with acute ischemic stroke of twenty-four hours or of less duration. Adult patients of both genders were included in study, ranging between 15 to 90 years of age. Those who sustained stroke due bleed or venous infarct were excluded. Verbally informed consent was followed by written consent from the patients or their attendants. Approval of the study was taken from local ethical committee of the hospital. Detailed

history was followed by clinical examination; history taking was mainly focus on:

**Diabetes Mellitus:** patients either on oral hypoglycemic drugs / insulin or fasting blood sugar more than 126 mg / dl or random blood sugar of 200 mg /dl or more on two occasions or were having HbA<sub>1c</sub> 6.5 % or more<sup>8, 9, 10, 11</sup>.

**Hyperlipidemia:** either patient was already on statins / fibrates, or total cholesterol equal to or more than 200 mg /dl, LDL cholesterol equal to or more than 100 mg /dl, HDL cholesterol less than 40 mg /dl in men or less than 50 mg / dl in women or serum triglyceride equal to or more than 150 mg / dl<sup>9, 12</sup>.

**Hypertension:** patients were already on anti-hypertensive or BP > 140/90 on two measurements<sup>8,9,10,11</sup>.

**Obesity:** BMI > 30 kg/m<sup>2</sup>, while central obesity was taken as waist circumference of more than 102 cm in men and 88 cm in women<sup>10</sup>.

**Smoker:** current smokers were who smoked two cigarettes / day for men and for women it was one cigarette / day since 1 year and ex-smokers were taken as patients who were not smoking since 1 year<sup>13</sup>.

Routine base line investigations including FBC, LFTs, RFTs, PT/INR, daily FBS, RBS, HbA<sub>1c</sub>, ECG, LIPID PROFILE were done on all patients, Radiological assessment of the patients included CT brain, echocardiogram, carotid Doppler and certain immunological test such as ANF, Anti ds DNA, antiphospholipid, protein s and c, anti thrombin111, and factor v Leiden were also done in few selected cases.

## RESULTS:

These were the different clinical presentation of stroke depending upon the area of brain involved. Headache, hemi paresis /hemiplegia and speech disturbance were the common clinical presentation of acute ischemic stroke. Facial palsy was also presented in 87 cases and was mainly of UMN type though LMN type also occurs in few cases of brainstem infarct. Elderly patients presented with convulsion along with stroke. In this study majority of patients were male mainly illiterate belonging to lower socioeconomic groups, it was less common in educated people and younger age group of less than 45 years of age as evident in tables. HTN, DM, hyperlipidemias, smoking and atrial fibrillation (mainly in elderly) were the common risk factors to be found associated with stroke in this study. Relative percentage of other risk factors is given in table.

**Table No.1: Clinical Presentation of Stroke**

<b>Particulars</b>	<b>No. of Patients (N=183)</b>	<b>%Age</b>
Headache	131	71.58%
Speech disturbance	104	56.83%
Hemiparesis / Hemiplegia	99	54.10%
Unconsciousness/Coma	15	8.20%
Confessional State	71	38.80%
Facial Palsy	87	47.54%
Convulsion/Seizure	19	10.38%
Visual Field Defect	6	3.28%
Ataxia/Gait abnormality	24	13.11%
Vertigo/dizziness	24	13.11%
Diplopia	10	5.46%
Monoparesis/Monoplegia	4	2.19%
Dysphagia	36	19.67%

**Table No.2: Individual Characteristics of Stroke Patients**

<b>Particulars</b>	<b>Numbers</b>	<b>%Age</b>
<b>Age</b>		
< 45	13	7.10%
45 – 60	122	66.67%
> 60	48	26.23%
<b>Sex</b>		
Male	129	70.49%
Female	54	29.51%
<b>Educational Qualification</b>		
Illiterate	87	47.54%
Only able to Read & Write	77	42.08%
Higher Secondary School (10-12 Classes)	11	6.01%
Graduation or Above	8	4.37%

**Table No.3: Risk Factors in Individuals with Stroke (N=183)**

<b>Risk Factor</b>	<b>Number</b>	<b>%Age</b>
Hyperlipidemia	112	61.20%
HTN	110	60.11%
DM	76	41.53%
Smoking	69	37.70%
Atrial Fibrillation	52	28.42%
Re-Stroke	44	24.04%
Obesity	25	13.66%
History of TIA	13	7.10%
Family History	11	6.01%
Carotid Stenosis	10	5.46%
Cardiac Emboli	9	4.92%
Stress	7	3.83%
Pregnancy	3	1.64%

**DISCUSSION:**

This study included 183 adult patients ranging from 15 years to 90 years of age with mean age of 57.40. 129 male and 54 female patients making 70.49% and

29.5% respectively of the sample studied. This is in accordance with the several studies in the past which also demonstrated high prevalence of stroke in males than in females<sup>14</sup>. Protective role of female

hormones, high level of exposure to stressful conditions and also higher incidence of smoking in males may account for this.

Our study demonstrated that the incidence of ischemic stroke increases with advancing age. It was found in this study that under the age of 45 the incidence of ischemic stroke was 7.1%, between 45-60 years of age it was 66.66% and in patients above 60 years of age it was 26.22%. A linear relationship between ischemic stroke and age was also demonstrated by marwat et al and Grau et al<sup>15, 16</sup>. Hypertension was found to be a common risk factor for ischemic stroke and was found in 60.1% of patients. Several studies done in the past also demonstrated hypertension as a common risk factor of ischemic stroke<sup>14,16</sup>. This may be mainly due to high prevalence of essential hypertension in our society and also high blood pressure co exists with diabetes mellitus and smoking. This is further compounded by non-compliance with anti-hypertensive drugs mainly due to economic reasons and also due to low literacy rates in our set up. There is a linear relationship between HTN and stroke and a study showed a reduction of 10 mm of Hg in blood pressure was associated with 33% reduction in stroke risk<sup>17</sup>. Hyperlipidemia was found to be another common risk factor associated with stroke and was present in 60.2% of cases in our study. This was considerably higher than the study done by Grau et al who found its association with ischemic stroke in 35.1% of cases in his study<sup>16</sup>, while it was slightly higher than El Tallawi et al who demonstrated it in 54.21% of cases in his study<sup>14</sup>. Grau et al conducted their study in 2001 at that time the junk fast food was not as common as it is now days that may be the reason for less percentage of hyperlipidemia in his study as compared to El Tallawi et al who conducted their study in 2015 and ours in 2020. The risk of stroke can be reduced by treating hyperlipidemias with statins<sup>16,14</sup>. Diabetes was the third common risk factor associated with ischemic stroke in our study and was found in 41.53% of the sample studied. El Tallawi et al found this risk factor in their study in 54.2% of cases<sup>14</sup>, while Essa et al found this risk factor to be associated in their sample studied in 66.8% of cases<sup>19</sup>. People becoming more aware of diabetes and its management and this may be the reason for low percentage of diabetes in our study than the above mentioned studies done in past. Coagulation factors, insulin levels are increased in diabetes both of which accounts for causing microangiopathic stroke and is also responsible for accelerating atherosclerotic process in large cerebral arteries and leading to macroangiopathic stroke<sup>19</sup>. Diabetes is also associated with HTN in

majority of cases and this may have got an additive effect with it in causing ischemic stroke. Smoking was found in our study in 37.7% of cases. Association of smoking with atherosclerosis is known since long. Framingham study showed the risk of stroke in male smokers was 2.3 and in female smokers it was 3.1 times more than in nonsmokers. It also concluded that heavy smokers have double risk of stroke when compared with light smokers. When a smoker abstains from smoking for 5 years the risk of stroke returns to that of nonsmokers level<sup>20</sup>. Shinton found smoking as a risk factor in his study in 55% of cases<sup>21</sup>, which was considerably higher than our study. This is a good point meaning that people are becoming more aware of hazardous effects of smoking and it is decreasing among them. Atrial fibrillation was found to be present in 28.41% of cases as a risk factor for ischemic stroke in our study which is comparable to the study done by Soliman et al<sup>3</sup>. Majority of stroke patients secondary to atrial fibrillation in our study were elderly and were having lone atrial fibrillation, though few cases of rheumatic heart disease were also found mainly in young patients. 24% of patients in our study presented to us with re-stroke, which is nearly equal to the study done by Altafi who found it in 26% of cases<sup>22</sup>. Majority of patients with re-stroke were non-compliant with medicines mainly due to socioeconomic reasons and low literacy rates of our country. Overall incidence of stroke in our study was higher among illiterate people than those who have attained higher school/inter level education while it was extremely low among graduates.

## CONCLUSION:

Clinical presentation of stroke in our study was similar to the other studies done in the past. Common clinical presentation was headache and motor symptoms (speech disturbance and motor weakness of one half of body). Majority of the patients in this study were uneducated middle aged male belonging to lower socioeconomic class. Hypertension, hyperlipidemias, diabetes, smoking and atrial fibrillation were the common risk factors associated with stroke. Most of the patients with diabetes, HTN, were non-compliant with medicines mainly due to illiteracy and socioeconomic reasons.

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