

## ORIGINAL ARTICLE

# Various Risk Factors in Stroke Patients at Military Hospital Rawalpindi

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## ABSTRACT

**Objective:** To determine the frequency of various risk factors of stroke.

**Study Design:** A descriptive study.

**Place and Duration of Study:** Military Hospital Rawalpindi, from January 2011 to January 2012.

**Materials and Methods:** Three hundred diagnosed patients with stroke were probed into for different risk factors, based on history, clinical examination and laboratory methods.

**Results:** Nineteen percent were female and eighty one percent were male patients. The mean age of the patients was 59 years. Minimum age was 38 years and maximum age was 90 years in the patients under study. Physical inactivity was the most common risk factor (78%) followed by hypertension (72%), obesity (67%), type 2 diabetes mellitus (42%), smoking (42%) etc.

**Conclusion:** Physical inactivity is the most common risk factor followed by hypertension which contribute to the pathology of stroke.

**Keywords:** Stroke, Risk factors, Hypertension, Obesity.

## Introduction

Stroke is a medical emergency and can cause permanent neurological damage, complications and death. It is one of the leading causes of disability in our country and around the globe.<sup>1</sup> Patients presenting with stroke have history of one or more risk factors which contribute directly or indirectly to the pathogenesis of stroke. Increased awareness and prophylactic measures against stroke have contributed a lot to decline in the annual incidence and death rate for stroke.<sup>2,3,4</sup> Due to multiple risk factors responsible for development of stroke, prevention against stroke need co-ordinated and effective strategy to decrease morbidity and mortality related to stroke. Prevalence of stroke rate is different in different countries of the world depending upon demographic, environmental and other risk factors.<sup>4,5</sup> Pathologically Stroke has been divided into ischemic and hemorrhagic types. however based on clinical grounds we cannot differentiate between these two types.<sup>3,5</sup> Weight reduction, promotion of regular exercise, reducing alcohol consumption, smoking cessation and co-ordinated control over other risk factors have proved effective in control of the devastating frequency of stroke in various countries of the world.<sup>1,5</sup> The role of

health education, preventive medication or carotid endarterectomy cannot be neglected as useful tool of preventing stroke.<sup>2,6</sup> Ischemic stroke results from thrombotic or embolic occlusion of a major vessel in the brain leading to infarction of the area of brain supplied by that vessel and results in ischemic stroke. If oxygen supply to brain is compromised for more than 60 to 90 seconds its function is impaired and irreversible damage to brain occurs if blood supply is halted for more than three hours which can lead to death even.<sup>4,5,6</sup> The resulting deficit depends upon the area involved and extent of occlusion and status of collateral circulation. As a result of ischemia, different excitatory and neuropeptides are released that augment calcium influx into neurons which cause cell death and increase in neurological deficit.<sup>3,7</sup>

Spontaneous and non-traumatic intracerebral bleed with no evidence of vascular anomaly (aneurysm and angioma) is usually due to hypertension. Presence of micro aneurysm that develop on perforating branches is the pathologic basis for hemorrhagic stroke.<sup>5</sup> Hemorrhagic strokes result in tissue injury and commonly involve basal ganglia, pons, thalamus, cerebellum and white matter.<sup>2,3</sup> Different risk factors for intracerebral bleed include hypertension, vascular anomaly, bleeding disorders, leukemia's. haemophilia, thrombocytopenia, liver failure, renal failure, DIC, alcohol intake, primary or secondary brain tumors etc.<sup>3,7</sup> Distortion and injury to the brain tissue due to hematoma result in loss of blood supply

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to affected tissue with resulting infarction. Blood released as a result of hemorrhage is itself has direct toxic effects on brain tissue and vasculature.<sup>4</sup>

The purpose of this study was to determine the frequency of different risk factors which cause stroke in patients who present to emergency department or medical wards at Military Hospital Rawalpindi. So that in future proper strategies regarding primary and secondary prevention of various risk factors of stroke can be made to decrease morbidity and mortality due to stroke.

### Materials and Methods

It was a descriptive study carried out from January 2011 to January 2012. A total of 300 patients admitted to medical wards/reported at emergency department at the Military Hospital Rawalpindi, with the diagnosis of stroke. These patients were investigated for the presence of different risk factors which include hypertension, type 2 diabetes mellitus, obesity, hyperlipidemia, smoking, ischemic heart diseases, valvular heart diseases, atrial fibrillation, physical inactivity. The data was analyzed using SPSS 15.

### Inclusion Criteria

1. Patients of age  $\geq 30$  years of both sexes
2. Diagnosed patients of stroke presenting within 24 hours of onset of symptoms
3. CT Scan brain confirmed cerebral infarction/hemorrhage

### Exclusion Criteria

1. Patients of stroke with pathology other than infarction/hemorrhage like tuberculoma, and SOL.
2. Clinically unstable patients requiring respiratory/intensive care or those who could not be moved for relevant investigations eg CT brain to confirm diagnosis.

All the patients included in the study were admitted in medical ward. Detailed history with special emphasis on different risk factors like Diabetes mellitus, hypertension, ischemic heart disease, previous stroke/TIA, smoking, obesity, valvular heart disease, alcohol use, amount of physical activity and in female patients use of contraceptive pills were taken. It was followed by thorough physical examination to confirm the diagnosis. Diagnosis was further supported by all necessary investigations like blood complete picture, lipid profile, liver function

tests, prothrombin time, serum albumin, urine routine examination, ECG, chest X-rays, renal function tests, blood sugar (fasting and 2 hours after breakfast) and ultrasound KUB and abdomen, CT scan/MRI brain, carotid doppler and 2D Echo were done to look for the cause of stroke. All the patients were followed for their duration of stay in the hospital. Their clinical condition was daily determined to look for the improvement.

### Results

During the study period, data of 300 patients fulfilling the inclusion criteria were recorded. Out of three hundred patients 243(81%) were male and 57(19%) were female. The mean age of the patients was 59 years. Minimum age was 38 years and maximum age was 90 years (SD  $\pm 10.41$ ).

**Table I: Frequency of risk factors of stroke**

S. No.	Risk factors	No. of patients (%)
1	Physical inactivity	(78%)234
2	Hypertension	(72%)216
3	Diabetes Mellitus	(42%)126
4	Hyperlipidemia	(12%)36
5	IHD	(17%)51
6	Smoking	(42%)126
7	Obesity	(67%)201
8	Family history of stroke	(23%)69
9	Atrial fibrillation	(9%)27
10	Valvular Heart Disease	(4%)12
11	Misc a. Hypothyroidism	(1%)3

There were 213 patients in whom more than one risk factors were present, Mortality rate was 11% (33 out of 300 died) and was more seen in patients who presented with haemorrhagic stroke, sepsis and aspiration pneumonia and massive ischemic infarcts. Also all the mortality was more in patients above 50 years of age and more in male 24(8%) as compared to female 9(3%) patients.

**Table II: Frequency of multiple risk factors in study patients**

No. of risk factors	No. of patients (%)
One	87(29%)
Two	51(17%)
Three	93(31%)
Four	42(14%)
Five and more	27(9%)

## Discussion

Diabetes mellitus, raised cholesterol levels, cigarette smoking (active and passive), heavy alcohol consumption, drug use, lack of exercise, obesity, alcohol, processed red meat consumption etc are some of the most common and important risk factors for stroke.<sup>8</sup> Some risk factor eg alcohol has multiple effects which cause stroke. Regular and excessive use of alcohol predispose to ischemic stroke, and intracerebral and subarachnoid hemorrhage via multiple mechanisms such as raised blood pressure, atrial fibrillation, rebound thrombocytosis, increased platelet aggregation and abnormal clotting mechanisms.<sup>9,10</sup> Amphetamines, cocaine, over-the-counter cough and cold drugs containing sympathomimetics are some of the drugs causing intracerebral bleed.<sup>9</sup> Prevalence of stroke is more in blacks and Hispanics (about twice the risk of whites), and men have about a 40% higher incidence of stroke than women do.<sup>3,7</sup> After the age of 55 The rate of stroke approximately doubles with each decade. In hypertensive patients the risk is increased by four-fold. Smoking and diabetes mellitus have also been proven to be the aggravating factors for stroke.<sup>4</sup> Similarly other risk factors as mentioned before have been also found to aggravate stroke.<sup>8,11</sup> In our study the most common risk factor was physical inactivity followed by hypertension, obesity, diabetes mellitus etc. Different studies done in our country and abroad have also showed that the prevalence of different risk factors of stroke in various communities are different but unfortunately is increasing.<sup>1,5,6</sup> Although no large scale study has been done in our country so we cannot apply the result of this study on our whole population. However the results of studies done before in our countries showed some variations. As we also came to know that majority of stroke patients had more than one risk factors so it is recommended that proper strategy about health education and prevention of these risk factors on large scale of population should be arranged to prevent this highly morbid and lethal complication.<sup>7,9,12</sup> Stroke patients also have very poor quality of life afterwards due to various complications which is a great burden both on family and society and also require rehabilitation services which is not available everywhere in developing countries like Pakistan.<sup>8</sup> Government and private

health sectors /NGO's should in this regard plan and execute proper short and long term health policies to educate the masses and help them in prevention of stroke and quick and easy availability of treatment.<sup>7</sup>

As per the result and comparison of our study with different other studies done on same subject (as shown in table III) it is quite obvious that hypertension, diabetes mellitus, smoking, obesity etc are the most common risk factors which can precipitate stroke.<sup>3,9,13</sup>

## Conclusion

As per the results of our study, it is evident that majority of the stroke patients presented due to common and reversible precipitating factors, out of which physical inactivity was the commonest followed by hypertension, obesity, diabetes mellitus type 2 etc.<sup>14</sup> Therefore it is the need of the day that all the patients and their relatives should be briefed in details about the prevention of these precipitating factors and care of the patients at home. This will help in the follow up and evaluation of such patients.<sup>15</sup> If we just prevent these factors by proper health education of the patients we can reduce the prevalence of stroke and also can decrease the morbidity and mortality.

## REFERENCES

**Table III: Comparison of our results with other studies**

Risk factors	Ahmed A <sup>13</sup>	Marwat MA <sup>9</sup>	Mughal SA <sup>10</sup>	Almani SA <sup>11</sup>	Khan NI <sup>12</sup>	Present study
Hypertension	70.8	75	58	59.3	65	72
Diabetes mellitus	39.2	54.5	65	55.2	36.3	42
IHD	28.8	36.3	50	62.5	9	17
Smoking	26	13.6	-	94.7	32	42
Hyperlipidemia	-	13.6	-	-	32.7	12
Vulvular heart disease(MS/M R/AR/AS etc)	-	6.8	60	-	3.6	4
Physical inactivity	-	-	-	-	-	78
Atrial fibrillation	-	-	-	-	-	9
Obesity	-	-	-	-	-	67

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