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# FACTORS INFLUENCING SEVERITY IN ACUTE ISCHEMIC STROKES

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**Abstract:**

***Introduction:*** *Acute ischemic stroke is one of the major causes of disability and death worldwide. Effective prevention remains the best approach for reducing the burden of stroke.* ***Objectives:*** *The aim of this work was to study the prevalence of stroke risk factors and the possible relation between such risk factors and the disease severity.* ***Material and methods:*** *This cross-sectional study was conducted in Civil hospital Karachi during June 2019 to March 2020. The data was collected from 150 patients of stroke. All subjects were subjected to history taking, clinical, laboratory, and radiological evaluation. Stroke severity and disability were evaluated by National Institute of Health Stroke Scale (NIHSS) and the modified Rankin Scale (mRS) respectively.* ***Results:*** *Hypertension was detected in 104 patients (62.3%), dyslipidemia was detected in 46 patients (58.1%). Diabetes mellitus was detected in 58 patients (34.7%) with high prevalence of cardio-embolic risk factor, 36 patients (21.6%) had rheumatic heart, and 44 patients (26.3%) had atrial fibrillation. Disease severity score was significantly higher in patients with age > 45 years old ($P < 0.001$), hypertension ($P < 0.001$), cardio-embolic risk factor ($P = 0.044$), and carotid stenosis ≥50% ($P = 0.017$).* ***Conclusions:*** *It is concluded that the most common risk factor for stroke was hypertension followed by dyslipidemia and then smoking with higher incidence of rheumatic heart diseases due to lowered living conditions. Age, hypertension, cardio-embolic risk factors, and carotid stenosis ≥50% have negative impact on stroke severity and disability.*

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## INTRODUCTION:

Ischemic stroke has many causes, clinical presentations, risk factors, courses, and outcomes. Management and prognosis of patients with ischemic stroke is directly related to specific mechanisms of the ischemic stroke. In the acute phase of stroke, the most important predictors of outcome are stroke severity and patient age[1]. Severe strokes seem to be more frequently caused by cardiac emboli and less frequently by large-artery occlusive mechanisms. Functional status prior to stroke onset, presence of comorbid medical conditions, cognitive impairment, and reduced consciousness at onset may also predict a worse prognosis after stroke, although with weaker evidence[2].

Stroke is considered as a disease which can be developed by long-lasting exposure to risk factors related to lifestyle. Modification of such risk factors should greatly affect the incidence of stroke and even mortality rates. Primary prevention is particularly important because 77% of strokes are first events[3]. The risk of a first stroke can be lowered by 80% in people who practice a healthy lifestyle compared with those who do not. Different modifiable and non-modifiable risk factors have been recognized for stroke[4]. Non-modifiable risk factors are gender, age, ethnicity, heredity, and race. Modifiable risk factors include, but are not limited to, hypertension, dyslipidemia, diabetes mellitus, atrial fibrillation, smoking, drug abuse, and alcoholic intake[5].

**Objectives:**

The aim of this work was to study the prevalence of stroke risk factors and the possible relation between such risk factors and the disease severity.

## MATERIAL AND METHODS:

This cross-sectional study was conducted in Civil hospital Karachi during June 2019 to March 2020. The data was collected from 150 patients of stroke. The data was collected through a questionnaire which include questions related to stroke. All subjects were subjected to history taking, clinical, laboratory, and radiological evaluation. Stroke severity and disability were evaluated by National Institute of Health Stroke Scale (NIHSS) and the modified Rankin Scale (mRS) respectively. Through general and neurological examination including detailed cardiological assessment and neurovascular examination according to the cerebrovascular stroke assessment sheet of hospital. Routine laboratory test, CBC, LFT's, RFT's, blood glucose concentration and lipid profile were measured.

**Statistical analysis**

The data was collected and analysed using SPSS 18. All the values were expressed in mean and standard deviation.

## RESULTS:

The data was collected from 150 patients. Age range of selected patients was 20 to 80 years and mean age was $58.3 \pm 12.45$ years. Hypertension was detected in 95 patients (62.3%), dyslipidemia was detected in 26 patients (58.1%). Diabetes mellitus was detected in 38 patients (34.7%) with high prevalence of cardio-embolic risk factor, 36 patients (21.6%) had rheumatic heart, and 44 patients (26.3%) had atrial fibrillation. Disease severity score was significantly higher in patients with age $>45$ years old ($P<0.001$), hypertension ($P<0.001$), cardio-embolic risk factor ($P=0.044$), and carotid stenosis $\geq 50\%$ ($P=0.017$).

**Table 01:** Distribution of risk factors in ischemic stroke patients

| Risk factors | Number |
|---|---|
| Hypertension | 95 |
| Diabetes | 38 |
| Smoking | 69 |
| Alcohol intake | 0 |
| Positive family history | 23 |
| History of TIA | 9 |
| History of previous stroke | 46 |
| Stress | 9 |
| Obesity | 20 |
| Cardio-embolic | 60 |
| Significant carotid stenosis (≥ 50%) | 6 |
| Dyslipidemia | 27 |
| Migraine | 4 |
| Pregnancy and postpartum | 3 |

| | |
|---|---|
| Oral contraceptive | 2 |

**Table 02:** Characteristics of quantitative variables in patients with mild/ moderate or severe depression

| Variable | Mild or moderate depression | Severe depression | P |
|---|---|---|---|
| Age | 58.3 ± 12.45 | 59.3 ± 13.67 | 0.1 |
| QOLS | 70 (58.7; 80) | 30 (26.2; 38.7) | <0.001 |
| NIHSS | 8 (6.7; 11) | 15 (11.2; 18.7) | <0.001 |
| MMSE | 27 (24; 29) | 25.4 (19; 27.7) | 0.08 |

**Table 03:** Distribution of additional risk factors

| Risk factors | Total number = 15 | |
|---|---|---|
| | Number | Percent |
| Auto-immune vasculitis | 1 | 1 |
| Antiphospholipid syndrome | 1 | 8.3 |
| Protein C deficiency | 2 | 16.7 |
| Protein S deficiency | 1 | 8.3 |
| Antithrombin III deficiency | 2 | 2 |
| Factor V Leiden mutation | 9 | 75.0 |
| Patent foramen ovale | 1 | 8.3 |
| Undetermined | 1 | 8.3 |

## DISCUSSION

The most important predictors of outcome in the acute phase of stroke are stroke severity and the age of patient. Stroke severity can be assessed clinically, based on various parameters of neurologic impairment (e.g., altered mentation, motor deficit, language, visual field deficit, behavior) and the size and location of the infarction on neuroimaging with MRI or CT[6]. Ischemic stroke mechanism, epidemiologic factors, comorbid conditions, and complications of stroke are other important factors that have an influence on stroke outcome[7].

Different mechanisms can explain the negative impact of hypertension in a cerebrovascular autoregulation which likely include a combination of the changes on the mechanical characteristics of cerebral blood vessels induced by remodeling and stiffening and effects on myogenic tone[8]. These changes in autoregulation are particularly damaging the periventricular white matter, which is located at the boundary zone between different arterial territories and more liable to hypoperfusion.

Stroke is one of the main causes of morbidity and mortality worldwide. In addition, as stroke is a main cause of disability in adults, there is a huge interest in improving the recovery of patients post-stroke[9]. A wide variety of factors are known to influence the outcome after stroke, most of which are clinical variables related with the disease (stroke severity, etiology, etc.), cardiovascular risk factors (hypertension, heart failure, etc.) and other demographic variables (age, sex, etc.). However, there are studies that present contradictory results, making the relationship between clinical variables and stroke outcome not so clear[10].

In addition, ischemic stroke is a complex disease with a substantial genetic component, the heritability of which ranges from 16% to 40%[11]. Several genome-wide association studies (GWAS) have found genes associated with stroke risk and have been confirmed in independent studies[12]. However, with the exception of two recent GWAS [7,8], the studies performed to find genetic variables associated with stroke outcome are candidate gene studies that have not been consistently replicated[13].

## CONCLUSIONS

It is concluded that the most common risk factor for stroke was hypertension followed by dyslipidemia and then smoking with higher incidence of rheumatic heart diseases due to lowered living conditions. Age, hypertension, cardio-embolic risk factors, and carotid stenosis ≥ 50% have negative impact on stroke severity and disability.

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