Original Article

Sociodemographic Factors and Risk Assessment in the Patients with Stroke in a Tertiary Care Hospital in Bangladesh

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Abstract

Background: *Stroke, a leading cause of global mortality, includes ischemic and hemorrhagic types, with ischemic strokes being the most prevalent. There are some modifiable and nonmodifiable risk factors of stroke. This aim of the study was to evaluate the sociodemographic factors and assess the stroke risk factors in a tertiary care hospital.* ***Materials and Methods:*** *This prospective observational study was conducted at Eastern Medical College & Hospital from July 2023 to June 2024, involving 120 patients with stroke. Stroke was diagnosed by clinical evaluation, imaging studies (CT/MRI) and neurological examination. Institutional ethical clearance was obtained. Data was collected with informed consent from patients or their guardians, including demographic details and stroke risk factors and then analyzed using SPSS V23.0.* ***Results:*** *Among the 120 participants, the highest stroke incidence was in the 51-60 years (25.83%) and 41-50 years (21.67%) age groups, with a mean age of 24.19 years. Altered consciousness was observed in 24.17% of patients followed by limb weakness in 20%. Hypertension (35%), diabetes mellitus (17%) and dyslipidaemia (17%) were common pre-existing conditions. Tobacco use emerges as the most prevalent risk factor, affecting 45% of the patients, followed by an overweight 31%.* ***Conclusion:*** *This study highlights the significant role of sociodemographic factors and modifiable risk factors in the development of stroke. The high prevalence of hypertension, diabetes, smoking, and physical inactivity among stroke patients in this study underscores the need for targeted prevention strategies.*

Keywords: Sociodemographic factors, Risk assessment, Stroke.
Received: August 24, 2024; **Accepted:** October 02, 2024
https://doi.org/10.3329/emcj.v10i1.82564

Introduction

Stroke is a neurological disorder characterized by blockage of blood vessels. Clots form in the brain and interrupt blood flow, clogging arteries and causing blood vessels to break, leading to bleeding[1]. Stroke is the second most common cause of mortality worldwide and the third most common cause of disability[2]. The majority of strokes, approximately 80%, are ischemic, while the remaining stem from primary hemorrhages, either intracerebral or into the subarachnoid space. Acute ischemic stroke occurs due to thrombosis or embolism and is more prevalent than hemorrhagic stroke. Ischemic strokes make up 85-87% of all cases[3]. There are some modifiable and nonmodifiable risk factors of stroke. Nonmodifiable risk markers for initial ischemic stroke include age, sex, family history and race/ethnicity. Modifiable risk factors for ischemic stroke include hypertension, diabetes, hyperlipidemia, cigarette smoking, alcohol abuse, physical inactivity, asymptomatic carotid stenosis and transient ischemic attack[4].

Spontaneous intracerebral hemorrhage and subarachnoid hemorrhage make up most hemorrhagic strokes, with the remainder of cases falling into these categories. Diabetes elevates the risk of ischemic cerebrovascular disease by 2-4 times when compared to individuals without diabetes[5]. Individuals experiencing hyperglycemia during the onset of an acute stroke have demonstrated increased mortality rates and worse outcomes following stroke[6]. While atherosclerosis stands as the primary contributor to cerebral ischemia in diabetes, other factors such as chronic cerebral blood flow and autoregulation impairment, diminished red cell flexibility, increased blood viscosity, endothelial dysfunction, and compromised prostaglandin synthesis might also influence the condition[7]. Research indicates that

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smoking is a separate risk factor for ischemic stroke in both men and women across all age groups[8], with heavy smokers have a relative risk of stroke 2-4 times greater than non-smokers[9]. A recent study revealed that 7% of admissions to medical facilities and 45% to neurological units were attributed to stroke. The fatality rate was 9% upon discharge from the hospital and increased to 20% by the 28th day[10].

Hypertension is another most important risk factor for stroke, based on data from 30 studies, and has been reported in about 64% of patients with stroke[11]. Untreated hypertension increases the risk of stroke 7 times[12]. Dyslipidemia and valvular heart disease are another major modifiable risk factors of stroke. Research indicated that dyslipidemia in individuals with ischemic stroke was around 15.6%[13]. Whereas elevated LDL-C levels are mostly associated with an increase in the risk of hemorrhagic stroke[13]. The incidence of stroke increases with age, doubling after the age of 55 years. In hemorrhagic stroke patients, the incidence increases after the age of 45[14]. The objective of this prospective observational study was to evaluate the sociodemographic factors and assess the stroke risk factors in Eastern Medical College & Hospital.

Materials and Methods

This prospective observational study was conducted at Eastern Medical College & Hospital from July 2023 to June 2024. The study included adult patients diagnosed with ischemic stroke, who were admitted to the hospital during the study period. Patients were eligible for inclusion if they had a confirmed diagnosis of stroke based on clinical evaluation, imaging studies (CT/MRI), and neurological examination. Patients who met the inclusion criteria and whose relatives or caregivers provided written informed consent were enrolled in the study. By convenience sampling method 120 patients were selected. Patients who were unconscious and whose relatives or caregivers were unable to provide consent were excluded from the study. Data was collected using a structured questionnaire. Details personal and medical history were taken and complete physical examinations of all the patients were carried out. Risk factors for stroke, including hypertension, diabetes, smoking, dyslipidemia, family history of stroke, and physical inactivity, were also documented. Data was analyzed by SPSS V23.0. For continuous data, mean±SD was used, whereas frequency (%) was used for categorical data. The unpaired student's test and chi-square test were applied as appropriate. A p-value of less than 0.05 was considered statistically significant.

Results

Table I shows that the highest frequency of age lies within the range of 51-60 years (25.83%) closely followed by the age range of 41-50 years (21.67%). On the contrary, individuals aged 21-30 represent the lowest proportion at 12.50%. The mean age of the sample is reported as 24.19 years. In the distribution of individuals across various occupational categories. Private service and businessmen are the two prominent categories, representing 25.83% and 24.17% of the sample, respectively. Students account for 17.50% of the population, while individuals classified under the 'Others' categories constitute the largest proportion at 32.50%.

Table-I: Demographical data of the patients (n=120)

Age	Frequency	Percentages (%)
21-30	15	12.50
31-40	21	17.50
41-50	26	21.67
51-60	31	25.83
61-70	27	22.50
Mean ± SD	24.19±5.51	
Gender		
Male	73	60.83
Female	47	39.17
Occupation		
Private service	31	25.83
Businessman	29	24.17
Students	21	17.50
Others	39	32.50

Figure-1 shows the clinical presentations observed among the patients. The data reveals the frequency and corresponding percentages for each clinical manifestation. Among the reported symptoms, difficulties to speak are observed in 12.50% of the cases, followed by facial weakness at 15.83% and limb weakness at 20%. Notably, altered consciousness is reported in 24.17% of the patients, indicating a significant proportion experiencing this symptom. Additionally, a category labeled 'Others' encompasses symptoms not specifically listed, representing 27.50% of the cases.

Table-II shows that hypertension emerges as the most prevalent past medical issue, affecting 35% of the patients, followed by diabetes mellitus at 17%. Additionally, a subset of patients presents with hypertension combined with ischemic heart disease (IHD) (9%) or with dilated cardiomyopathy (DCM) (12%) and dyslipidaemia in the 17%. Ten percent of the patients had reported no significant past medical history.

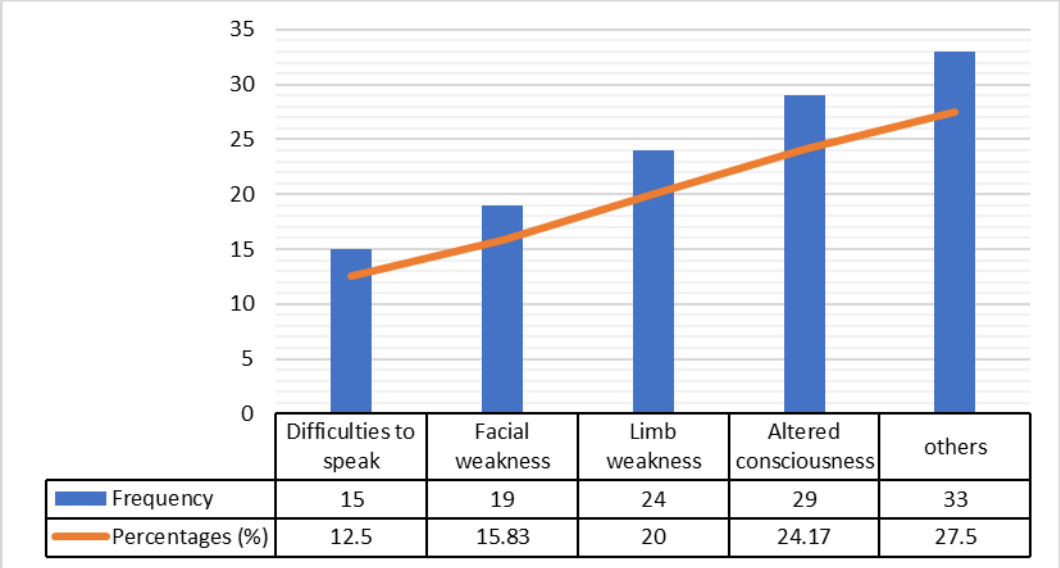

Figure-1: Clinical presentation of the patients (n=120)

Table-II: Past medical history of the study cases (n=120)

Past medical history	Frequency (n)	Percentages (%)
Hypertension	42	35
Diabetes mellitus	21	17
Dyslipidaemia	20	17
Hypertension with DCM	14	12
Hypertension with IHD	11	9
No past medical history	12	10

Figure-2 shows the prevalence of various risk factors among stroke patients. Tobacco use emerges as the most prevalent risk factor, affecting 45% of the patients, followed by an overweight 31%. Additionally, sedentary lifestyle was reported in 17% cases and alcohol abuse was in 7% cases.

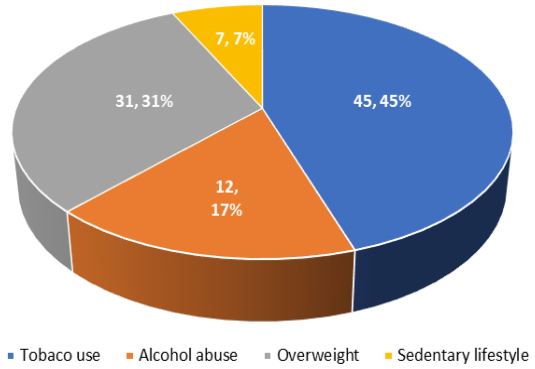

Figure-2: Risk factors among patients (n=120)

Discussion

Disease and population distribution patterns, life expectancy, mortality, causes of death, and socio-demographic factors continue to change across the world, including ageing of populations and changes in the prevalence of risk factors for non-communicable disorders[15]. Despite the progress of stroke prevention and treatment, it remains a major health problem in low- and middle-income countries (LMICs). Although the number of deaths caused by stroke decreased in high-income countries from the years 2010 to 2019[16]. This study showed highest frequency of age lies within the range of 51-60 years (25.83%) closely followed by the age range of 41-50 years (21.67%). Aging is the most robust non-modifiable risk factor for incident stroke, which doubles every 10 years after age 55 years[17]. The higher percentage of stroke in male patients (60.83%) over females (39.17%) was in line with other previous studies[18]. The possible reason may be increased risk factors such as cigarette smoking and alcohol consumption among males.

Among the reported symptoms, difficulties to speak are observed in 12.50% of our cases, followed by facial weakness at 15.83% and limb weakness at 20%. Notably, altered consciousness is reported in 24.17% of the patients, indicating a significant proportion experiencing this symptom. In another study the most common clinical presentation was headache complained by 87 (75.0%) patients followed by aphasia 70 (60.3%) and hemiparesis 62 (53.4%). In that study most ischemic stroke patients were presented with headaches (71.7%), aphasia (60.0%) and facial palsy (58.3%)[19]. In this study, among the admissions for stroke, hypertension was the most common risk factor. The prevalence of hypertension among the stroke cases was one of the highest among South, East and South-East Asia[20]. For acute stroke, hypertension is a major risk factor and thus maintaining optimal blood pressure during the management of stroke is important for the outcome[21]. Similar to this study, another study by

Tan, et al.[22] showed hypertension was the most common risk factor and was documented in 47.2% of the patients.

Diabetes mellitus is one of the major risk factors for the development of atherosclerosis and the excess risk of stroke. In our study 17% of patients had a history of diabetes. The prevalence of diabetes in stroke was 25.9% by Sarkar, et al.[23] and 23.8% by Desalu, et al.[24] study. Lipid profile analysis plays a critical role in assessing stroke risk. In our study, 17% of patients had dyslipidemia. In a recent study published by another center in Nepal, the prevalence of dyslipidemia based on the same criteria as this study was 46.05% among patients with ischemic strokes[25]. These findings underscore the importance of managing lipid abnormalities to mitigate stroke risk of these patients.

Smoking, physical inactivity and being overweight were also common among the participants in our study. Smoking is a well-established risk factor for stroke, contributing to atherosclerosis, increasing blood pressure and promoting thrombogenesis[26]. Our study found that 45% of stroke patients were current smokers, which is consistent with findings from studies showing that smoking is a modifiable risk factor that significantly contributes to the incidence of stroke[27]. Similarly, sedentary lifestyle and being overweight, which was reported by 17% and 31% of patients in our study are another important risk factor. Lack of physical activity is associated with increased risk for obesity, hypertension and diabetes, all of which are stroke risk factors[28,29].

Limitations

Our study has several limitations that must be considered. First, the cross-sectional design of this study restricts our ability to establish causality between sociodemographic factors, risk factors, and stroke occurrence. Second, the use of convenience sampling may limit the generalizability of the findings, as patients in a tertiary care hospital may not be representative of the general stroke population. Lastly, data regarding lifestyle factors, such as diet and physical activity, were self-reported, which may introduce recall bias.

Conclusion

Our study highlights the significant role of sociodemographic factors and modifiable risk factors in the development of stroke. The high prevalence of hypertension, diabetes, smoking, and physical inactivity among stroke patients in this study underscores the need for targeted prevention strategies. Further longitudinal studies are required to explore the causal relationships between these factors and stroke outcomes and to evaluate the effectiveness of early intervention programs in reducing stroke incidence.

Conflict of interest

The authors declared that they have no conflict of interest.

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Citation of this article
Hossen M, Khan EK, Haq MN, Islam MS, Pervin S. Sociodemographic Factors and Risk Assessment in the Patients with Stroke in a Tertiary Care Hospital in Bangladesh. Eastern Med Coll J. 2025; 10 (1): 40-4.