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Clinical Profile in Acute Ischemic Stroke

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Abstract: ***Background:*** Ischemic stroke is a significant cause of morbidity and mortality worldwide, often leading to hospital admissions and imposing a substantial burden on healthcare systems. ***Method:*** The study was conducted at Dhaka Medical College Hospital from July to December 2010, enrolling 100 hospitalized patients diagnosed with acute ischemic stroke. Demographic data, clinical presentations, and risk factor profiles were collected using standardized forms and analyzed using descriptive statistics. Results: Ischemic stroke was found most commonly in the 51-60 age groups (49%) and then the 61-70 age groups (24%). Most of the patients were male. The male-female ratio is 1.56:1. Most patients were from rural areas (69%). 58% of patients with ischemic stroke presented with a Glasgow coma scale (GCS) 9-15 and 42% with GCS <9. Cranial nerve palsy 20% of cases. Plantar reflexes were extensor in 80% of cases mostly on the left side. The commonest presentation was hemiplegia or hemiparesis (90%). Headache was present in 40%, vomiting in 20%, and convulsion in 23% of cases. Among patients with ischemic stroke, hypertension was found in 76% of cases, followed by dyslipidemia (46%), smoking (37%), diabetes mellitus (25%), heart disease (23%), and family history of stroke (21%). 71% of patients were on irregular use of antihypertensive drugs. Cortical infarction was found in 58% of cases. ***Conclusion:*** The findings underscore the importance of recognizing the demographic and clinical characteristics of ischemic stroke patients for early intervention and prevention strategies. Addressing hypertension as a key modifiable risk factor could significantly reduce the burden of ischemic stroke.

Keywords: Ischemic stroke, Risk factors, Hypertension, Rural population, Morbidity, Mortality, Early intervention.

Original Research Article

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Article at a glance:

Study Purpose: *To investigate the clinical profile and risk factors of ischemic stroke patients in a hospital-based setting.*

Key findings: *The majority of patients were aged 51-60, with hypertension as the most common risk factor. There was a higher prevalence of male patients. Rural residents constituted a significant portion, highlighting socioeconomic implications.*

Newer findings: *The study underscores the importance of addressing hypertension and raising public awareness, contributing to stroke prevention strategies.*

Abbreviations: *DM - Diabetes Mellitus, IHD - ischemic heart disease, HDL - High-Density Lipoprotein, LDL - Low-Density Lipoprotein, TG - Triglycerides.*

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INTRODUCTION

Stroke is a formidable global health challenge, significantly impacting both developed and developing nations. Its clinical manifestations and epidemiology exhibit considerable variability, contingent upon the location and severity of

cerebral lesions.[1] Defined by the World Health Organization (WHO) as "rapidly developing signs of focal or global disturbance of cerebral or intracranial neuronal function with symptoms lasting for more than 24 hours or leading to the death of the patient with no apparent cause other than that of vascular origin," stroke represents a critical area of focus for healthcare systems worldwide.[2] Globally, an estimated 20 million individuals suffer from stroke annually, resulting in 5 million deaths and leaving 15 million survivors grappling with disabilities.[3] The economic ramifications of stroke are staggering, with healthcare and disability management for stroke survivors in the United States alone costing approximately $17.1 billion annually (Reference). In developing countries like India, stroke has emerged as a significant public health concern, with rising incidence and prevalence rates documented across various regions.[4]

Community surveys conducted in India reveal a crude stroke prevalence rate of approximately 203 per 100,000 population aged 20 years and above, translating to nearly 1 million cases nationwide.[5] Despite such prevalence, a marked disparity exists in reported rates across different countries and even within communities within the same nation. Modifiable risk factors such as hypertension, smoking, elevated blood lipid levels, and diabetes mellitus have been identified as key contributors to ischemic stroke in India.[6] However, data on the proportion of ischemic versus hemorrhagic strokes remains limited due to a lack of comprehensive neuroimaging studies.In neighboring Pakistan, the burden of stroke is similarly substantial, with an estimated annual incidence of 250 per 100,000 population, resulting in 350,000 new cases each year.[7] The prevalence of major modifiable risk factors mirrors global trends, with diabetes mellitus and hypertension emerging as predominant contributors to ischemic stroke.[8] Other notable risk factors include dyslipidemia, smoking, ischemic heart disease, and previous stroke or transient ischemic attacks.

In Bangladesh, a developing nation with limited healthcare resources, strokes impose a significant burden on individuals, families, and society at large.[9] Stroke ranks as the leading neurological disorder among adults, accounting for approximately 50% of neurological diseases among adult hospital admissions. The burden of stroke is particularly pronounced among Bangladeshi men, who exhibit high prevalence rates of diabetes, smoking, physical inactivity, and dyslipidemia. Socioeconomic deprivation and other novel risk factors further compound the elevated risk of stroke among Bangladeshis, necessitating heightened awareness and targeted interventions.[10] In the study, stroke represents a pressing global health issue that demands concerted efforts to address its multifaceted challenges. Understanding the epidemiology and modifiable risk factors associated with stroke, healthcare systems can implement effective prevention and management strategies to mitigate its impact on individuals and societies worldwide.

OBJECTIVES

General objective

To evaluate the clinical profile in acute ischemic stroke.

Specific objectives

To know the various presentations in acute ischemic stroke patients.

To know the demographic profile in acute ischemic stroke patients.

To identify the modifiable/non-modifiable risk factors association.

To know the clinical-radiological association in acute ischemic stroke.

MATERIAL AND METHODS

Study Design

This observational study was conducted at Dhaka Medical College Hospital from July to December 2010. It employed a hospital-based, randomized purposive sampling technique to study 100 patients from all medicine units of the hospital. The study aimed to investigate the clinical profiles of ischemic stroke patients admitted to the hospital. Data collection included patient evaluation, imaging studies, and biochemical tests, with ethical approval obtained before commencement.

Inclusion Criteria

Confirmation of infarction on CT scan or MRI of the brain.

Admission to Dhaka Medical College Hospital with symptoms and signs consistent with stroke as defined by WHO criteria.
Provision of informed consent by the patient or their relatives.

Exclusion Criteria

Presentation with non-infarctive stroke.
Experience of transient ischemic attack.
Refusal of consent for participation in the study by the patient or their relatives.

Data Collection

Upon suspicion of stroke, patients underwent evaluation by the duty doctor, followed by assessment by the study physician. A thorough neurological examination was conducted, and patients meeting clinical criteria for stroke underwent CT scans. Upon confirmation of infarction, patients were enrolled after obtaining informed consent. The study physician completed a pre-structured case record form, and blood samples were collected for routine biochemical tests, including random blood sugar, complete blood count, lipid profile, and creatinine.

Data Analysis

The collected data were analyzed using Statistical Package for the Social Sciences (SPSS) version 23. Descriptive statistics, including frequencies and percentages, were calculated to summarize demographic characteristics, clinical presentations, and risk factors among ischemic stroke patients. Inferential statistics, such as chi-square tests, were used to explore associations between variables. Additionally, subgroup analyses were performed to examine differences in clinical profiles based on demographic and clinical characteristics.

Ethical considerations

Ethical approval for this study was obtained from the Ethical Review Committee of Dhaka Medical College prior to data collection. Written informed consent was obtained from all participants or their legal guardians before enrollment in the study. Participants were assured of confidentiality, and their rights were protected throughout the study process. Any potential risks or discomforts associated with participation were minimized, and participants were allowed to withdraw from the study at any time without penalty.

RESULTS

The study meticulously examined 100 ischemic stroke patients through detailed history-taking and clinical examinations, complemented by appropriate investigations. The demographic distribution revealed that most patients fell within the 51-60 age group (49%), followed by those aged 61-70 (24%). The incidence was higher in males across all age groups. Socioeconomic analysis indicated that 69% of patients hailed from rural areas. These findings underscore the multifactorial nature of ischemic stroke, emphasizing the importance of comprehensive risk factor management and targeted interventions. Further details are presented in the tables below.

Table 1: Demographic Characteristics of Study Participants according to age group

Variable	Number of Cases	Percentage (%)
Age Group		
20-30	3	3%
31-40	0	0%
41-50	6	6%
51-60	49	49%
61-70	24	24%
71-80	15	15%
81-90	3	3%
Gender		
Male	61	61%
Female	39	39%
Male Female ratio was 1.56:1		

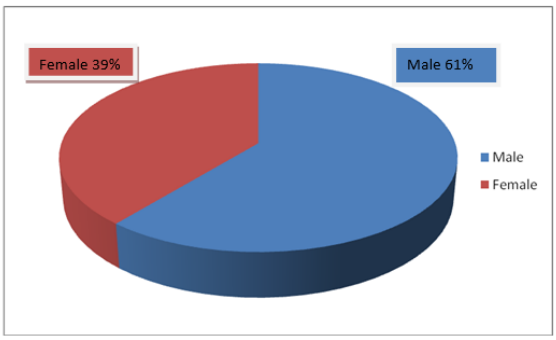

Figure 1: Sex distribution in ischemic stroke patient

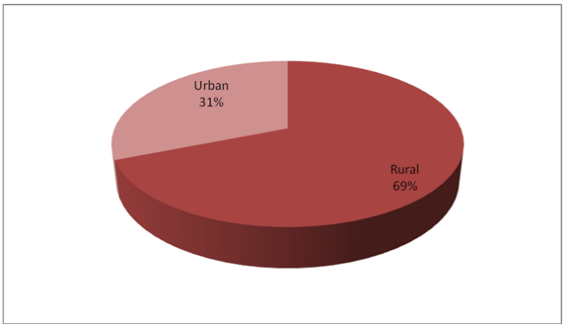

Figure 2: Distribution of habitat in ischemic stroke

Table 2: Prevalence of Risk Factors in Ischemic Stroke Patients

Risk Factor	Number of Cases	Percentage (%)
Hypertension	76	76%
Dyslipidemia	35	35%
Smoking	37	37%
Diabetes Mellitus	25	25%
Heart Disease History	23	23%
Family History of Stroke	21	21%

The prevalence of major risk factors in acute ischemic stroke patients was examined. Hypertension affected 76% of cases, while smoking was present in 37%, with males being notably higher. Diabetes mellitus was observed in 25% of patients, primarily among males. Ischemic heart disease was detected in 23%, with a similar gender distribution. Family history of stroke was evident in 21%, slightly higher among males. These findings emphasize the importance of gender-specific risk factor management strategies and targeted interventions to alleviate the burden of stroke in the population.

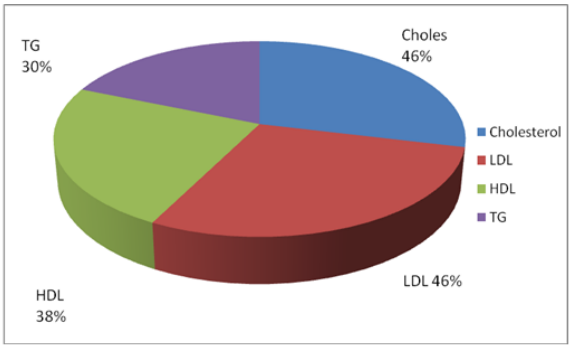

Figure 3: Percentage of dyslipidemia in acute ischemic stroke

Hypertension emerged as the predominant risk factor, affecting 76% of patients, with irregular medication intake prevalent among 71% of them. Dyslipidemia was notable, with abnormalities in HDL (38%), LDL (46%), triglycerides (30%), and total cholesterol (46%). Smoking prevalence stood at 37%, predominantly among males. Diabetes mellitus affected 25% of patients, while 23% had a history of heart disease. A family history of stroke was present in 21% of cases.

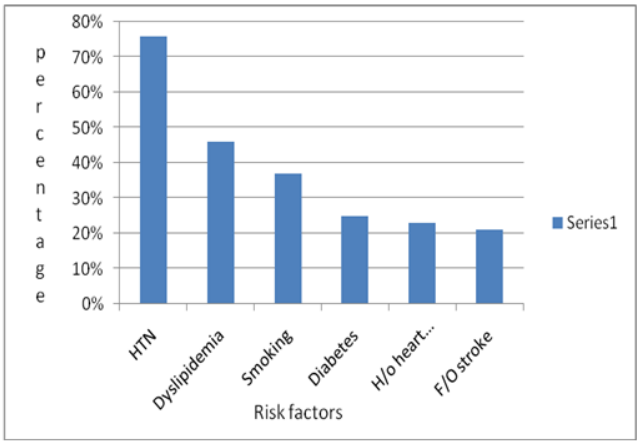

Figure 4: Percentage of risk factors in acute ischemic stroke

Table 3: Clinical Presentation of Ischemic Stroke Patients

Clinical Feature	Number of Cases	Percentage (%)
Hemiplegia/Hemiparesis	90	90%
Increased Muscle Tone	80	80%
Extensor Plantar Reflex	80	80%
Cortical Area Involvement	58	58%

Clinical features among acute ischemic stroke patients were assessed. Hemiplegia/hemiparesis was predominant in 90% of cases, followed by increased muscle tone and extensor plantar reflex at 80%. Cortical area involvement was observed in 58% of patients. These findings highlight common neurological manifestations associated with ischemic stroke.

Table 4: Level of Consciousness in Ischemic Stroke Patients

Glasgow Coma Scale	Number of Cases	Percentage (%)
9-12	58	58%
Less than 9	42	42%

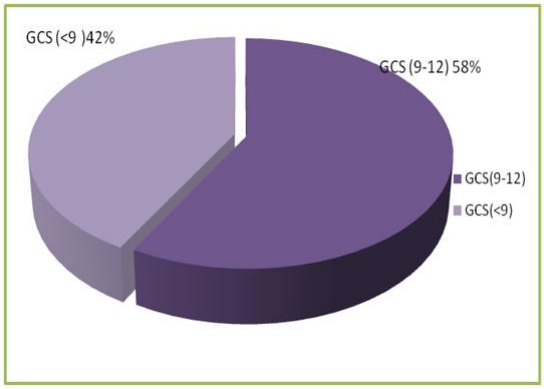

Figure 5: Level of consciousness in acute ischemic stroke patient

Glasgow Coma Scale assessments were conducted among ischemic stroke patients. Scores of 9-12 were recorded in 58% of cases, while scores less than 9 were found in 42%. These results indicate varying levels of consciousness impairment among patients presenting with acute ischemic stroke.

DISCUSSION

The study conducted on ischemic stroke patients, drawn from various Medicine units of Dhaka Medical College Hospital, shed light on pertinent demographic and clinical aspects of the condition. Notably, the majority of patients fell within the age brackets of 51-60 years (49%) and 61-70 years (24%), with a diminishing incidence observed beyond the seventh decade. A similar study highlighted a similar age distribution among stroke patients.[11,12] Furthermore, our study revealed a male predominance, with 61% of stroke patients being male and 39% female, consistent with trends observed in neighboring countries such as Pakistan and previous investigations within Bangladesh.[13] The higher male preponderance observed in our study may be attributed to societal factors such as gender disparities in healthcare access.

Interestingly, a significant proportion of patients hailed from rural areas (69%), indicating potential socioeconomic influences on stroke prevalence. Hypertension emerged as the most prevalent risk factor, affecting 76% of patients, with a notable proportion being newly diagnosed post-stroke.[14] However, irregular medication adherence among hypertensive individuals underscores the need for improved management strategies to mitigate stroke risk. Additionally, hypercholesterolemia (35%), low HDL cholesterol (29%), and hypertriglyceridemia (23%) were prevalent among the patient cohort, highlighting the significance of lipid abnormalities in ischemic stroke pathogenesis. Smoking, predominantly among males, was also prevalent, implicating cultural factors in smoking habits. Furthermore, diabetes mellitus (25%) emerged as a noteworthy risk factor, albeit with a lower incidence compared to Western countries.[15,16] These findings underscore the multifactorial nature of ischemic stroke etiology and emphasize the importance of targeted interventions addressing modifiable risk factors to reduce the burden of stroke in Bangladesh.

The incidence of diabetes mellitus (DM) among the studied ischemic stroke patients was found to be 25%, which closely resembles the prevalence reported (20%) in a previous study. Additionally, 23% of patients presented with heart disease, predominantly valvular heart disease, and ischemic heart disease with atrial fibrillation, with a higher prevalence among males (26%) compared to females (18%). These findings are consistent with research conducted in Pakistan, where ischemic heart disease was prevalent in 36.3% of cases, possibly due to its association with diabetes and hypertension, as well as the advanced age of affected individuals. Moreover, family history of stroke was identified in 21% of cases, with a stronger correlation observed with sibling history compared to parental history, suggesting a potential role of shared environmental factors in addition to genetic predisposition.[17-22]

Glasgow Coma Scale (GCS) assessments revealed that 58% of patients presented with scores between 9-12, consistent with previous findings. Cranial nerve palsy, particularly involving the

seventh cranial nerve, was observed in 20% of cases, while hemiplegia/hemiparesis, predominantly on the left side, was the most common presentation (90%).[18] Headache (40%), convulsion (23%), and vomiting (20%) were less common manifestations, indicating a distinction from hemorrhagic stroke presentation. Furthermore, increased muscle tone and deep tendon reflexes were noted in 80% of cases, with an extensor plantar response observed in the majority (80%). Cortical area involvement was the most frequent finding (58%), followed by basal ganglia (16%), internal capsule (10%), cerebellum (10%), and thalamus (3%). These clinical characteristics contribute to a comprehensive understanding of acute ischemic stroke presentations and underscore the importance of prompt recognition and management strategies.

CONCLUSION

Stroke, a prevalent cerebrovascular ailment, warrants ongoing research. While our understanding of its pathogenesis and treatments advances, the significance of epidemiology and risk factors remains paramount. Our study on acute ischemic stroke patients, though limited, underscores the need for early diagnosis and management to mitigate its socioeconomic impact.

Recommendations

Enhance public awareness of stroke risk factors and symptoms.

Improve access to healthcare services, especially in rural areas.

Foster collaboration among stakeholders for effective stroke prevention and management.

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