



Original Article

A Study on Clinical Profile of Stroke Patients in a Tertiary Care Hospital

Bidith Ranjan Deb¹, Momtaz Begum², Md Fazle Bari³, Fahmida Akhter⁴

¹Associate Professor, Department of Medicine, Jalalabad Ragib-Rabeya Medical College, Sylhet.

²Professor, Department of Medicine, Jalalabad Ragib-Rabeya Medical College, Sylhet.

^{3,4}Assistant Professor, Department of Medicine, Jalalabad Ragib-Rabeya Medical College, Sylhet.

ABSTRACT

Stroke is a devastating and disabling cerebrovascular disease with a significant amount of residual deficit, leading to economic loss. Stroke is the third leading cause of death in Bangladesh. The World Health Organization ranks Bangladesh's mortality rate due to stroke as number 84 in the world. The objective of the study was to determine the clinical presentation, risk factors, and patterns of strokes and areas of the brain affected as per CT scan findings in patients with stroke. The cross sectional study was conducted by scrutinizing the records of the patients admitted to the department of Medicine at Jalalabad Ragib-Rabeya Medical College Hospital (JRRMCH), Sylhet, from January 2018 to December 2019. A total of fourteen hundred twenty cases were recorded, of which 59% were male and 41% were female, and the male to female ratio was 1.4:1. The majority of patients (27.5%) were between the ages of 51 and 60. Maximum patients came from rural areas (71.3%) and regarding patients' occupation, the maximum male patients were farmers (29.9%) and the maximum female patients were housewives (49.6%). The most common type of stroke was ischaemic (82.7%). The most common clinical presentation was hemiparesis 756 (53.2%) and the most common risk factor was hypertension (62.3%), followed by diabetes mellitus (55.2%), smoking (41.9%), dyslipidaemia (38.9%) and a past history of stroke (11.9%). Regarding topographic distribution, the most common site of infarction was the parietal lobe (24.9%) and the most common site of haemorrhage was the brain stem (17.6%). The cerebrovascular stroke cases had a male predominance, with hypertension being the most common risk factor, and the most common type of stroke was ischaemic.

Keywords: Stroke, Ischaemic, Haemorrhagic, Hypertension.

[Jalalabad Med J 2021; 18 (2): 40-46]

INTRODUCTION

Stroke is a devastating and disabling cerebrovascular disease with a significant residual deficit that leads to economic loss¹. Stroke is the second leading cause of death and the third leading cause of disability worldwide². Over the last four decades, the incidence of strokes in low and middle income countries has more than doubled. During the last decade, stroke incidence

has declined by 42% in high income countries³. South Asia is believed to be the highest contributor of stroke mortality in the world, probably accounting for more than 40% of global stroke deaths⁴. Limited data is available in relation to stroke prevalence in Bangladesh. According to one study, the overall prevalence is 3 per 1000 people, but it can reach 10 per 1000 in people over the age of 70⁵. Stroke is the third leading cause of death in Bangladesh. The World Health Organization (WHO) ranks Bangladesh's mortality rate due to stroke as number 84 in the world⁶.

Ischemic strokes are responsible for 50-85% of all strokes globally⁷. Haemorrhagic strokes are due to

Address of Correspondence:

Dr. Bidith Ranjan Deb, Associate Professor, Department of Medicine, Jalalabad Ragib-Rabeya Medical College, Sylhet.
Mobile: +8801819675416, Email: bidithdeb@gmail.com

subarachnoid haemorrhages or intracerebral haemorrhages. They account for 1 to 7% and 7 to 27%, respectively, of all strokes worldwide¹. Most South Asian studies have reported a higher percentage of haemorrhagic strokes (19-46%), when compared to Western countries. These findings could be related to the increased prevalence and poor control of hypertension in South Asia⁴. The prevalence of intracerebral haemorrhage is especially high in younger patients (15-45 years of age) with stroke (32-43%)⁸. The high frequency of intracerebral haemorrhage reported in Bangladesh^{4,6}.

Risk factors for stroke can be classified as modifiable and non-modifiable. Age, sex, family history and ethnicity are non-modifiable risk factors, whereas modifiable risk factors include hypertension, smoking, diet and physical inactivity³. The mean age of stroke onset in the South Asian region is lower than in western countries. This South Asian region is facing a double burden of tobacco exposure with 15-20% prevalence of smoking and up to 40% of people using chewing tobacco. A large number of chewing tobacco users are women⁴.

A vast gap in stroke knowledge, as well as in acute and long term stroke care, exists between South Asian and Western countries. Stroke prevention is not a priority for health care authorities in South Asia and organized stroke care is nonexistent across most of this region⁴. Under the diagnosis of hypertension and other risk factors, delayed presentation to the hospital, poor risk factor control and failure to adhere to the treatment are some of the major challenges to be addressed⁹. Etiologic investigation for stroke was infrequently performed due to the lack of systematic cardiological examinations and brain imaging, most of the time for economic reasons and unavailability of the instruments¹⁰. The availability of rehabilitation services is important for stroke recovery. Stroke rehabilitation has begun to gain attention in Bangladesh in recent years. Two nongovernmental organizations, Building Resources Across Communities (BRAC) and the Centre for the Rehabilitation of the Paralyzed (CRP), are actively involved in primary stroke prevention strategies and long-term stroke care, including rehabilitation^{4,6}. Hence, this study will generate evidence for improving the prevention strategy of stroke and guide health authorities to halt or reduce the devastating effect of stroke in different sectors of our community. The aim of the study was to find out the clinical presentation, risk factors, and patterns of strokes, as well as the areas of the brain affected as per CT scan findings in patients with stroke.

MATERIALS AND METHODS

This cross-sectional study was conducted by scrutinizing the previous records of the patients admitted to the department of medicine at Jalalabad Ragib-Rabeya Medical College Hospital, Sylhet, from January 2018 to December 2019. Data was collected from available information using record files. Patients having a computed tomography (CT) scan or magnetic resonance imaging (MRI) scan of the brain with definite features of stroke were included. Ambiguous, nonspecific or unconfirmed reports were excluded. The patient's age, sex, habitat, smoking habit, family history, and previous history of stroke were recorded from the history sheets. Patients were categorized as hypertensive on the basis of blood pressure recorded during their hospital stay and previous recorded blood pressure by a qualified physician. Patients were diagnosed with diabetes based on the findings of a previous reliable biochemical report of blood sugar, including HbA_{1c} measurement during their hospital stay, according to WHO guidelines. Dislipidaemia was recorded when the patients had an abnormal lipid profile defined by the Adult Treatment Panel Guidelines (ATP) III classification. The data was analyzed manually and presented in frequency and percentage. Microsoft Excel was used for the presentation of the outcome pictures.

RESULTS

The results showed that the age range was from 27 years to 100 years, with a mean age of 59.33. Out of 1420 patients, 837 (58.9%) were male and 583 (41.1%) were female (Figure-1) and the male to female ratio was 1.4:1. In the case of males, the incidence of stroke was maximum in the age group of 51-60 years and in the case of females, in the age group of 61-70 years, which comprised of 31% and 34.8% of total patients, respectively (Table-I). Regarding habitat, both in males and females, maximum number of patients came from rural area (71.3%) and regarding the occupation of patients, the maximum male patients were farmers (29.9%) and the maximum number of female patients were house wives (49.6%) (Table-I). In the current study, 1175 (82.7%) patients suffered from ischaemic stroke and 245 (17.3%) patients suffered from haemorrhagic stroke. Out of 1175 ischaemic strokes, 696 (59.2%) were male and 479 (40.8%) were female. Recurrent strokes were present in 11.9% of the patients (Table-II).

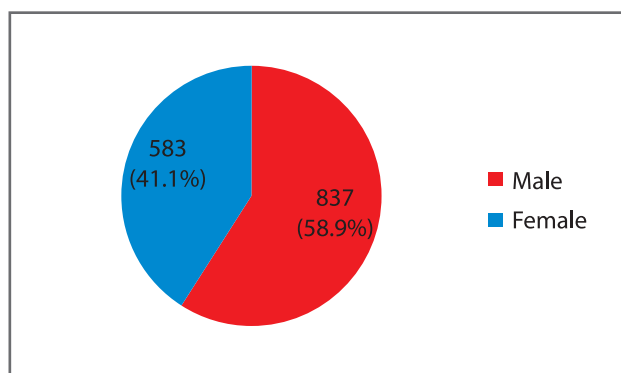


Figure-1: Sex distribution of stroke patients (n=1420).

Table-I: Socio-demographic characteristics of stroke patients (n=1420).

Characteristics		Male n (%)	Female n (%)	Total n (%)
Age group (In years)	20-30 years	03 (0.4)	0 (0)	3 (0.2)
	31-40 years	74 (8.8)	21 (3.6)	95 (6.7)
	41-50 years	202 (24.1)	96 (16.5)	298 (21)
	51-60 years	260 (31)	131 (22.5)	391 (27.5)
	61-70 years	144 (17.2)	203 (34.8)	347 (24.5)
	71-80 years	121 (14.5)	81 (13.8)	202 (14.2)
	81-90 years	20 (2.4)	26 (4.5)	46 (3.2)
	91-100 years	13 (1.6)	25 (4.3)	38 (2.7)
Habitat	Rural	572 (68.3)	441 (75.6)	1013 (71.3)
	Urban	265 (31.7)	142 (24.4)	407 (28.7)
Occupation of patients	Service Holder	188 (22.5)	62 (10.6)	250 (17.6)
	Retired	125 (14.9)	36 (6.2)	161 (11.3)
	Businessman	115 (13.7)	03 (0.5)	118 (8.3)
	Housewife	0 (0)	289 (49.6)	289 (20.4)
	Labourer	92 (11)	23 (3.9)	115 (8.1)
	Farmer	250 (29.9)	0 (0)	250 (17.6)
	Student	2 (0.3)	0 (0)	2 (0.1)
	Unemployed	53 (6.3)	144 (24.7)	197 (13.9)
	Others	12 (1.4)	26 (4.5)	38 (2.7)

Table-II: Profile of stroke patients (n=1420).

Characteristics		Number of Patients		Total, n (%)
		Male n (%)	Female n (%)	
Stroke types	Ischaemic	696 (83.1)	479 (82.2)	1175 (82.7)
	Haemorrhagic	141 (16.9)	104 (17.8)	245 (17.3)
Stroke onset	First Time	733 (87.6)	518 (88.9)	1251 (88.1)
	Recurrent	104 (12.4)	65 (11.1)	169 (11.9)

The most common clinical presentation was hemiparesis (53.2%) followed by speech involvement (49.4%), altered sensorium (31.3%), hemiplegia (16.1%), instability of gait (14.4%), vomiting (13.1%), vertigo (12.1%), convulsion (6.7%) and headache (6.7%) (Table-III).

Table-III: Clinical presentation of stroke patients (n=1420).

Clinical Presentations	Total Patients n (%)	Ischaemic Stroke n (%)	Haemorrhagic Stroke n (%)
Hemiparesis	756 (53.2)	615 (52.3)	141 (57.6)
Speech involvement	701 (49.4)	574 (48.9)	127 (51.8)
Altered Sensorium	445 (31.3)	365 (31.1)	80 (32.7)
Hemiplegia	228 (16.1)	189 (16.1)	39 (15.9)
Instability of gait	204 (14.4)	169 (14.4)	35 (14.3)
Vomiting	186 (13.1)	154 (13.1)	32 (13.1)
Vertigo	171 (12.1)	142 (12.1)	29 (11.8)
Convulsion	95 (6.7)	78 (6.6)	17 (6.9)
Headache	93 (6.7)	76 (6.5)	17 (6.9)

(One respondent considered more than one response)

In our study, the most common risk factor was hypertension (62.3%), followed by diabetes mellitus (55.2%), smoking (41.9%), dyslipidaemia (38.9%), past history of stroke (11.9%), history of ischemic heart disease (7.7%) and atrial fibrillation (2.4%) (Table-IV). Among 1420 patients, 22 patients had a history of ingestion of alcohol, and 15 female patients (2.6%) gave a history of taking oral contraceptive pills.

Table-IV: Risk factors of stroke patients (n=1420).

Risk Factors	Frequency	Percentage
Hypertension	884	62.3
Diabetes mellitus	784	55.2
Smoking	595	41.9
Dyslipidaemia	552	38.9
Previous history of stroke	169	11.9
History of ischemic heart disease	109	7.7
Atrial fibrillation	34	2.4

(One respondent considered more than one response)

Regarding topographic distribution, the most common site of infarction was the parietal lobe (24.4%), followed by the temporal lobe (20.5%) and the brain stem (20.4%) and the most common sites of haemorrhage were the brain stem (17.6%), parietal lobe (16.3%) and thalamus (15.5%) (Table-V).

Table-V: Topographic distribution of cerebral haemorrhage and infarction (n=1420).

Affected Areas of Brain on CT scan	Ischaemic n (%)	Haemorrhagic n (%)
Frontal lobe	152 (12.9)	27 (11)
Parietal lobe	286 (24.4)	40 (16.3)
Temporal lobe	241 (20.5)	35 (14.3)
Occipital lobe	60 (5.1)	6 (2.4)
Cerebellum	147 (12.5)	32 (13.1)
Brain stem	240 (20.4)	43 (17.6)
Thalamus	31 (2.7)	38 (15.5)
Basal ganglia	18 (1.5)	24 (9.8)
Total	1175 (100)	245 (100)

DISCUSSION

A uniform data system (UDS) for medical rehabilitation was maintained in the USA and published annually. No such system existed in Bangladesh¹¹. The purpose of this study was to determine the age, gender, occupation, habitat, and disease pattern of stroke patients attending the department of medicine at JRRMCH. In this study, 58.9% were male and 41.1% were female, and the male to female ratio was 1.4:1, which is similar to the study of Vaidya and Majmudar¹ (1.4:1). Male predominance was also found in different studies done by Eapen et al.¹², Chakraborty et al.¹³ and Bhattacharjee et al.¹⁴. The possible reasons might be increased risk factors such as cigarette smoking and alcohol consumption among males. In addition, endogenous estrogens provided no vascular protection in males¹⁰. Moreover, this figure could be skewed by the fact that women with strokes or cardiac arrest in the South Asian region of the world were less likely to be taken to hospital than men with these conditions⁴.

Strokes had a tendency to become more common as people got older. The incidence rose significantly starting in the 4th decade and then peaked in the 5th decade of life. In the present study, a maximum of 27.5% of the patients were from 51-60 years of age, followed by 24.4% of the patients from 61-70 years, which correlated with the studies done by Eapen et al.¹² and Chakraborty et al.¹³, who showed the incidence of stroke was maximum in patients aged 51-60 years, which comprised 28% and 27.93%, respectively, of the total patients. In our study, the mean age was found to be 59.33 years, which correlated with the studies of Vaidya and Majmudar¹ (Mean age of 63 years), and Maskey et al.¹⁵ (Mean age of 63.66 years). Most of the studied patients (71.3%)

came from rural areas; and from urban areas, it was 28.7%. These findings correlated with the studies done by Fekaduet al.¹⁰ and Kapoor et al.¹⁶ which showed that the majority of the patients were from rural areas. Contrary to this, Chakraborty et al.¹³ and Hossain et al.¹⁷ found that most of the patients were from urban areas. It was clear that hospital based patients differed from the types of people that came to the hospital. The location and catchment area of the hospital determined the category of patients visiting the hospital. The high burden of stroke in the rural population might also be due to reduced awareness and poor control of risk factors.

The majority of the patients were housewives (20.4%), farmers (17.6%) and service holders (17.6%), which correlated with the study done by Chakraborty et al.¹³ and Fekadu et al.¹⁰. Lack of information, ignorance of the risk factors, and inability to manage such risk factors might be responsible for this effect. Among the disease patterns, the first time onset of stroke was 88.1%, and recurrent cases were 11.9%. Vaidya and Majmudar¹ discovered a previous history of cerebrovascular accident in 15% of the patients, and Hossain et al.¹⁷ discovered it in 9% of stroke patients.

In our study, the most common type of stroke was ischaemic, which was 82.7%, and haemorrhagic stroke was 17.3%. This result correlated with a study done by Chakraborty et al.¹³ where 81.7% of the cases were ischaemic and 18.3% were haemorrhagic strokes. Our study did not correlate with the study done by Bodiuzzaman et al.¹⁸ who found 56.25% of cases of stroke due to cerebral infarction, and Kundu et al.¹⁹ found that 37.5% of patients developed haemorrhagic stroke and 62.5% of patients suffered an ischaemic attack.

In our study, the most common clinical presentation

was hemiparesis (53.2%), followed by speech involvement (49.4%) and altered sensorium (31.3%). Chakraborty et al.¹³ found hemiparesis was 97.25%, speech problems were 24.03%. Eapen et al.¹² showed that hemiparesis with facial weakness was 83%, speech abnormality was 48%, whereas Vaidya and Majmudar¹ stated that hemiparesis was 48%, speech abnormality was 25.1%, and altered sensorium was 13.1%.

This study also provided insight into risk factors for stroke. The most common risk factor identified was hypertension in 62.3% of cases, consistent with other findings that uncontrolled hypertension was the most important risk factor for stroke both in developing and developed countries^{1,10,12,14,18}. This led us to believe that hypertension was underdiagnosed and less treated in our study community due to a lack of an active screening program, failure to take routine blood pressure measurements, poor medical history taking and poor follow-up of the patients. Additionally, adherence to long-term treatment was a great challenge to achieving the optimum outcome as uncontrolled hypertension was usually asymptomatic and denial of the disease was common. Diabetes mellitus was a significant risk factor for atherosclerosis and an increased risk of stroke¹⁰. Diabetes mellitus was found in 784 (55.2%) of patients, which was much higher than reported by Bhattacharjee et al.¹⁴ (37.93%) but correlated with that reported by Alemayehu et al.²⁰ (57.7%). The number of smokers among stroke patients in the present study was 595 (41.90%), which correlates with Bhattacharjee et al. (48.43%)¹⁴ and Badiuzzaman et al. (53.79%)¹⁸. In this study, 552 (38.9%) patients had raised serum cholesterol, which correlates with Bhattacharjee 40.38%¹⁴, slightly lower than that reported by Bodiuzzaman et al.¹⁸ (48%), but higher than that reported by Hossain et al.¹⁷. In the present study, the maximum number of patients (56.3%) had a history of multiple risk factors, which correlated with Chakraborty et al.¹³ and Kundu et al.¹⁹ who found multiple risk factors in 58.8% and 55% cases, respectively.

The frequent co-existence of more than one and sometimes multiple potential risk factors for stroke is an important message. This study showed a higher rate of hypertension, diabetes mellitus, and dyslipidaemia. A large proportion of stroke patients have multiple risk factors, suggesting the presence of individuals with inadequate treatment. It could be attributed to a general lack of public awareness and knowledge of these metabolic diseases and their long-term effects on the cardiovascular and neurovascular systems. Therefore, improvement in health education and promotion for the

general population in developing countries should be emphasized. Additionally, all patients with evidence of risk factors for stroke deserve control and modification of these factors when possible.

In our study, the most common site of haemorrhage was the brainstem (17.6%), followed by the parietal region (16.3%) and the thalamus (15.5%), which did not correlate with the study done by Vaidya and Majmudar¹, who found the most common site of haemorrhage was the thalamus (24.7%), followed by ventricular (17.5%) and basal ganglia (13.4%). In this study, the most common site of infarction was the parietal lobe (24.3%), followed by the temporal lobe (20.5%) and the brainstem (20.4%). Vaidya and Majmudar¹ discovered that the most common site of infarction was parietal (56%), followed by frontal (16.7%), and basal ganglia (10.5%), whereas Eapen et al. discovered that the most common site was parietal, followed by basal ganglia and frontal lobe¹².

CONCLUSION

To conclude, strokes in our country are on the rise. The occurrence rises with age, with a peak between 50 and 60 years old. The study showed male predominance in both ischaemic and haemorrhagic stroke. Cerebral infarction was more common than haemorrhage, and hypertension was among the leading risk factors. The most common clinical presentation was hemiparesis, followed by speech involvement and altered sensorium. In cerebral infarction, the most common site was parietal, and in haemorrhage, the most common site was the brainstem.

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