

## ORIGINAL ARTICLE

### Evaluation of Risk factors in Newly Diagnosed Stroke Patients

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#### Abstract:

*Stroke is the major cause of death and disability in the world. The endemicity in Bangladesh is increasing. This hospital-based cross-sectional study was done to assess the risk factors responsible for acute stroke. It was carried out in the Medicine, Neurology, and Neurosurgery department of Holy Family Red Crescent Medical College Hospital, Dhaka from August 2010 to January 2011. A total of 116 admitted cases were included in this study. During the period of study, 16 patients died. So, ultimately 100 cases were included in the study. A detailed history was taken, and clinical examination and relevant investigations were done. Out of 116 patients 77(66.4%) were ischemic, 23(19.8%) were haemorrhagic and 16(13.8%) were died. Among them 67(67%) were male and 33(33%) were female. So male to female ratio was 2:1. The age of the patients ranged from 15-96 years. The more than 50 years age group was highest at 49(63.6%) in ischemic, and 41-50 years age group was highest at 10(hemorrhagic) patients. Patients of the sedentary group were more affected in both ischemic 39(50.6%) and hemorrhagic 13(56.5%) strokes. Out of 100 cases, 35(45.5%) were hypertensive in ischemic stroke and 22(94.7%) were hypertensive in haemorrhagic stroke, 21(27.3%) were diabetic in ischemic stroke and 4(17.4%) were diabetic in haemorrhagic stroke, 17(22.1%) were smoker in ischemic stroke and 2(8.7%) were a smoker in haemorrhagic stroke, hyperlipidaemia occurs 17(22.1%) cases in ischemic stroke and 13(56.5%) were in haemorrhagic stroke. Thromboembolic manifestations only occur in 12(52.2%) cases in haemorrhagic stroke patients.*

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#### Introduction:

“Stroke is defined as a rapidly developing global or focal neurological deficit of more than 24 hours or causing death without clear causes other than vascular origin”<sup>1</sup>. Also, stroke can be defined as rapid damage in brain function caused by decreased or stopped blood supply by brain arteries<sup>2</sup>. It is divided into two types: most commonly ischemic and hemorrhagic.

Stroke is the most common cause of functional disability and long-term neurologic deficit globally<sup>3-6</sup>. The common clinical manifestations of stroke are the sudden weakness of one side (arm, face,

or leg) of the body, blurring of vision in one or both eyes, sudden difficulty in walking, slurred speech, and sudden severe headache<sup>7</sup>. In 2010, the prevalence of stroke worldwide was 33 million, and the first stroke happened in 16.9 million people. The second-leading cause of death in the world behind heart disease was a stroke, accounting for around 11.13%<sup>8</sup>.

A review reported that the incidence of stroke has in low-to-middle-income countries. And in high-income countries, stroke incidence has decreased in the last four decades<sup>9</sup>. On the contrary, the severity of stroke has not been changed in this period.

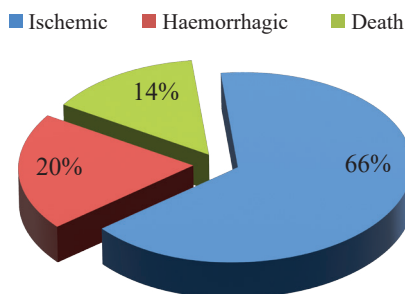
Now, there are many established risk factors for stroke. These factors are divided into non-modifiable and modifiable. They have been identified as risk factors for ischemic stroke such as: diabetes mellitus, asymptomatic carotid stenosis, hypertension (HTN), age, dyslipidemia, smoking, and non-valvular atrial fibrillation<sup>10-11</sup>. The most factors linked to intracerebral hemorrhage are HTN and oral anticoagulation therapy<sup>12</sup>. Prevention plays an important role in avoiding mortality and morbidity associated with stroke. Around 50% of stroke can be prevented by changing lifestyle factors and controlling modifiable risk factors<sup>13</sup>. The purpose of the present study was to evaluate the risk factors in acute stroke patients in a tertiary hospital in Dhaka.

**Materials and method:**

This prospective study was carried out on admitted patients of acute stroke in the medicine, neurology, and neurosurgery department of Holy Family Red Crescent Medical College Hospital from August 2010 to January 2011. Patients with recurrent stroke and head trauma were excluded from this study. Written consent was taken from the patient before inclusion in the study. The stroke was diagnosed according to WHO criteria and confirmed by a CT scan. Data were collected in the specified questionnaire and analyzed in the appropriate statistical formulas

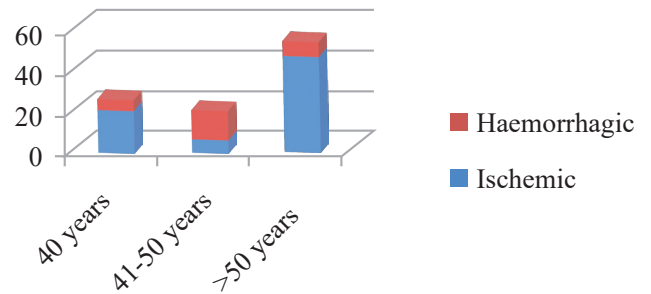
**Results:**

A total number of 116 patients with stroke from August 2010 to January 2011 were studied from the beginning and during the period of study 16 died. So, ultimately 100 cases were included in the study. The distribution of study patients is shown in Fig-1.



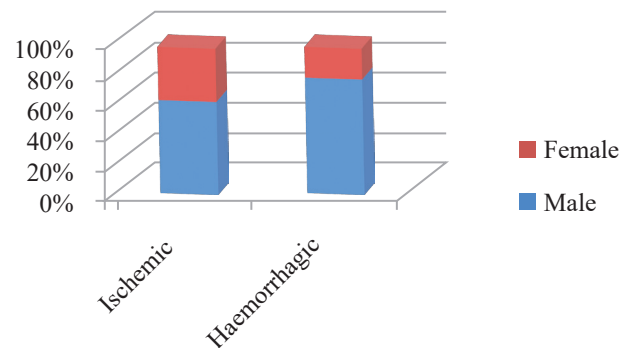
**Fig 1: Distribution of study patients**

Age distribution of the study patients are shown in fig-2 shows that maximum number was found in >50 years in group I and between 41-50 years in group II.



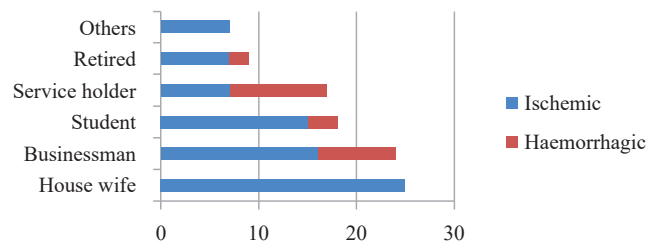
**Fig 2: Age distribution of study patients**

Male patients were 49, 18 and female were 28, 5 in ischemic stroke and haemorrhagic stroke respectively. Male to female ratio was 2:1 which has shown in Fig-3.



**Fig 3: Sex distribution of study patient**

Majority of the patients were housewife in ischemic stroke and most of the patients were service holder in haemorrhagic stroke which has shown in fig-4.



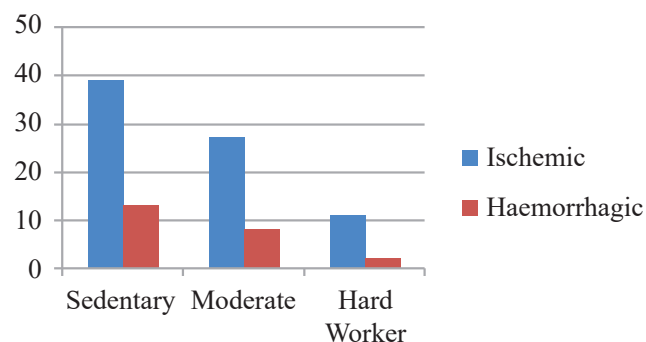
**Fig 4: Occupation distribution of patients**

Most of the patients were from low-middle class group.

**Table-I: Socio-economic status of the patients**

Class	Ischemic	Haemorrhagic
Low income	13 (16.7%)	7 (28.6%)
Low-middle	64 (83.3%)	13 (57.1%)
Upper-middle	0	0
High income	0	3 (14.3)

Among all patients shows more than a half of them involved in sedentary work in both ischemic and haemorrhagic stroke shown in Fig-5.

**Fig 5: Nature of work of the study subject****Table-II: Distribution of the study subjects according to different risk factors.**

Risk factors	Ischemic	Haemorrhagic	P value
<b>Hypertension</b>			
Yes	35 (45.5)	22 (94.7)	0.001 <sup>S</sup>
No	42(54.5)	1(5.3)	
<b>Diabetes mellitus</b>			
Yes	21(27.3)	4(17.4)	0.336 <sup>NS</sup>
No	56(72.7)	19(82.6)	
<b>Smoking</b>			
Yes	17(22.1)	2(8.7)	0.151 <sup>NS</sup>
No	60(77.9)	21(91.3)	
<b>Hyperlipidaemia</b>			
Yes	17(22.1)	13(56.5)	0.001 <sup>S</sup>
No	60(77.9)	10(43.5)	
<b>Thromboembolic manifestation</b>			
Yes	0(0.0)	12(52.2)	0.001 <sup>S</sup>
No	77(100)	11(47.8)	
<b>Associated diseases</b>			
RHD	7(9.1)	0(0.0)	0.151 <sup>NS</sup>
IHD	7(9.1)	0(0.0)	0.151 <sup>NS</sup>
Bronchial asthma	7(9.1)	0(0.0)	0.151 <sup>NS</sup>
Phobic disorder	0(0.0)	2(8.7)	0.051 <sup>NS</sup>
Syncopal attack	0(0.0)	1(4.3)	0.230 <sup>NS</sup>
<b>Others</b>	14(18.2)	8(34.8)	0.092 <sup>NS</sup>

S = Significant, NS = Not significant. p value reached from chi square test

Table II shows that hypertension was found 35(45.5%) and 22(94.7%) in ischemic and haemorrhagic stroke, Diabetes mellitus 21(27.3%) in ischemic and 4(17.4%) in haemorrhagic stroke group. Smoker 17(22.1%) in ischemic and 2(8.7%) in haemorrhagic group. Hyperlipidaemia 17(22.1%) in ischemic and 13(56.5%) in haemorrhagic stroke patients. Thromboembolic manifestations were not observed as risk factors in ischemic but 12(52.2%) were found in haemorrhagic stroke group. Hypertension, Hyperlipidaemia, and Thromboembolic manifestations were significant ( $p < 0.05$ ) between the two groups but others were not significant ( $p > 0.05$ ) in chi-square test.

### Discussion:

This hospital based prospective study was carried out to evaluate and to assess the association of risk factors in acute stroke patients. Different risk factors were recorded and analyzed for their association with ischemic and haemorrhagic stroke. Among the non-modifiable risk factors age and sex distribution were being studied. Elderly people were the most vulnerable group for developing stroke. In the present study, mean age was  $61.1 \pm 23.8$  years with range from 15 to 96 years and  $49.8 \pm 12.6$  years with range from 35 to 70 years in ischemic and haemorrhagic stroke patients respectively. Maximum (63.6%) number of ischemic stroke patients was found in  $>50$  years and (43.5%) between 41-50 years in haemorrhagic stroke patients. The mean age was significantly ( $p < 0.05$ ) higher in ischemic stroke patients. Habib Khan et al found in their study that 50% developed stroke in more than 60 years, which is similar with the present study<sup>14</sup>.

In this study it was observed in case of ischemic stroke incidence was found 63.6% and 36.4% in male and female respectively whereas haemorrhagic stroke incidence was observed 78.3% and 21.7% in male and female respectively. The male to female ratio was 2:1 in the present study. This study correlates with that of Chowdhury et al.<sup>15</sup>

In this study most patients were housewife (32.5%) among ischemic stroke patients and service holder

(43.5%) in haemorrhagic stroke patients. However, businessman was 20.8%, student 19.5% and service holder, retired person and other professional were found 9.1 % among ischemic stroke patients. In haemorrhagic stroke patient, businessman was found more than one third (34.8%), student (13.0%) and retired personal 8.7%, which similar to previous study, where the author found 24.0% patients were housewife and 31.0% were service holder.

Most of the study patients came from low-middle class group in both groups which was 83.3% in ischemic stroke patients and 57.1% in haemorrhagic stroke patients. High income was only found 14.3% in haemorrhagic stroke patients. Low-middle class group was significantly ( $p < 0.05$ ) higher in ischemic stroke patients. In addition 16.7% and 56.0% came from low income group in ischemic and haemorrhagic stroke group, which indicates that the incidence of stroke was higher in low and low-middle class groups and the trends, was prominent in ischemic stroke patients. A systematic review found an increase in the stroke incidence in low-to-middle income countries more than 100% and decrease in incidence of stroke in the last four decades in high-income countries about 42% which was documented by Feigin et al<sup>16</sup>.

The nature of work was observed that more than half (50.6%) of the patients involved in sedentary work in ischemic stroke patients and (56.5%) in haemorrhagic stroke patients. Moderate was observed in 35.1% and 38.8% in ischemic and haemorrhagic stroke patients respectively. Hard worker was found 14.3% in ischemic and 8.7% in haemorrhagic stroke patient. The difference was not significant ( $p > 0.05$ ) between two groups. Mollah et al showed those who worked hard physically were affected comparatively less and comparatively housewife and service holder are affected more.

In this study 45.5% and 94.7% had hypertension in ischemic and haemorrhagic stroke respectively. A WHO collaborative study found association of hypertension with stroke was 75%, which is almost similar with the present study<sup>1</sup>. A study at BIRDEM showed 50.3% of NIDDM patients with stroke had

associated hypertension<sup>17</sup>.

Diabetes Mellitus was found 27.3% in ischemic and 17.4% in haemorrhagic stroke patients respectively. The Copenhagen stroke study showed 20% stroke patient has diabetes mellitus. Another study has shown that 10 to 14 percent of stroke patients were diabetic<sup>18</sup>. Which is lower with the present study.

Smoking appears as an important risk factor in both ischemic and haemorrhagic stroke in this study. Smoking found 22.1% and 8.7% in ischemic and haemorrhagic stroke patients respectively. Habib Khan et al found 38% of stroke patients were found to be smoker<sup>14</sup>, duration of smoking varied among the study group. In two separate studies, Yano K et al has shown strong association between smoking and stroke<sup>19</sup>. Macfarlane et. Al had concluded that combination of raised systolic blood pressure and cigarette smoking resulted in a more than ten-fold increase risk of developing stroke compared with that in normotensive and non smoker<sup>20</sup>. In this study there is also a significant association of smoking with stroke.

In this study 22.1% and 56.5% were hyperlipidaemic in ischemic and haemorrhagic stroke respectively. Thromboembolic manifestations were not found in ischemic stroke patients but were found 52.2% in haemorrhagic stroke patients. Regarding the associated diseases RHD, IHD and Bronchial asthma were identically (9.1%) distributed only in ischemic stroke patients. In haemorrhagic stroke patients 8.7% had a phobic disorder and 4.3% had the syncopal attack. Other risk factors were found 18.2% in ischemic stroke patients and 34.8% in haemorrhagic stroke patients. Hypertension, Hyperlipidaemia and Thromboembolic manifestations were significantly ( $p < 0.05$ ) associated with haemorrhagic stroke patients. Some previous studies also found smoking as an important risk factor for stroke<sup>20,21</sup>. Another study shown hypertension 69.4%, smoking 30.9% and atrial fibrillation 33% were the most prevalent risk factors<sup>22</sup>.

### Conclusion:

This hospital based prospective study was done to

evaluate the risk factors responsible for acute stroke. The mean age was significantly ( $p < 0.05$ ) higher in ischemic stroke patients. Stroke was predominant in male subjects and more common amongst service holders, house wives, low-middle class income groups, sedentary workers, hypertensive patients, diabetics, smokers and hyperlipidaemic patients.

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