

A Study on Demographic Profile and Risk Factors of Hospitalized Stroke Patients in a Rural Tertiary Care Medical College Hospital, Kishoreganj

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Abstract

Background: Stroke is the most common neurological emergency with significant morbidity and mortality. Stroke is the third most common cause of death in developed country after ischemic heart disease and cancer. This study was aimed to find out the demographic profile and risk factors of hospitalized stroke patients in a rural tertiary care medical college hospital, Kishoreganj.

Materials and Methods: A prospective observational study of 200 patients with clinically and CT scan proven stroke was undertaken in medicine department of Jahurul Islam Medical College Hospital, Kishoreganj from January 2020 to December 2020. Patients with age <18 years and patients with brain tumor, encephalitis, head injury, metabolic coma (hypoglycemia) that could explain focal neurological deficits were excluded.

Results: In this study, 39.5% of the patients were in between 51-60 years age group followed by 61-70 years age group (29%). According to CT scan findings, 62% of the patients had ischemic stroke and 38% of the patients had hemorrhagic stroke. In case of ischemic stroke maximum numbers (58) of the patients were in 51-60 years age group whereas in case of hemorrhagic stroke maximum numbers (34) of the patients were in 61-70 age group. In this study, 66.5% were male and 33.5% were female. In case of ischemic stroke male female ratio was 2.35:1. In case of hemorrhagic stroke male female ratio was 1.53:1. In this study, most of the patients were from rural area (61.84% in hemorrhagic stroke and 60.48% in ischemic stroke). Middle class group comprised the largest group both in hemorrhagic and ischemic stroke 72.37% (55) and 70.16% (87) respectively. Hemiparesis or hemiplegia was the most common presentation in both ischemic (79%) and hemorrhagic stroke (90.79%). Most of the patients presented with right sided hemiparesis in both type of stroke. In case of ischemic stroke majority (50%) of the patients were in grade 2 level of unconsciousness at presentation and in case of hemorrhagic stroke majority (54.55%) were in grade 3 level of unconsciousness. Age (86.25% in ischemic stroke and 80% in hemorrhagic stroke) and hypertension (85.48% in ischemic stroke and 89.47% in hemorrhagic stroke) were the most common risk factors of patients of both types of stroke. Among the ischemic stroke patients most of the infarct was in the basal ganglia (22.58%) Among the hemorrhagic stroke patients most of the hemorrhage was in the thalamoganglionic region (44.74%).

Conclusion: Stroke, being one of the most common cerebrovascular diseases, has drawn attention of researchers all over the world. As our knowledge continues to evolve about pathogenesis and therapeutic options, epidemiological aspects and risk factors associated with stroke remain as important as ever. Targeting these risk factors for preventing cerebrovascular accidents in the first place will help reducing the burden of this often disabling disease.

[Shaheed Syed Nazrul Islam Med Col J 2021, Jul; 6 (2):216-224]

Keywords: Demographic profile, Risk factors, Stroke

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Introduction

Stroke is the most common neurological emergency with significant morbidity and mortality in both developed as well as developing countries like ours.^{1,2} Stroke is the third most common cause of death in developed country after ischemic heart disease and cancer.² The AHA estimates that 780000 strokes occur in each year; 600000 of these are new strokes and 180000 are recurrent strokes.³ In Bangladesh about 40%-50% of beds are occupied by stroke patients in the neurology ward of most of the medical college hospitals. The clinical picture and epidemiology of stroke is variable depending on the site and extent of lesions.⁴ In developed countries various endeavors are in the way for early diagnosis and appropriate management to reduce stroke related mortality and morbidity. But the scenario in our country is different. In many cases, we have to depend largely on clinical diagnosis.

It is difficult to differentiate clinically the type of stroke in the majority of patients as there are no specific differentiating features. Computed tomography (CT) scan brain (plain) is an accurate, safe and noninvasive procedure for differentiating between ischemic stroke and hemorrhagic stroke. It also shows site of lesion which helps in prognosis, outcome, occupational and therapeutic strategies.⁵ The detailed analysis of clinical picture, epidemiology and CT scan correlation of clinical diagnosis will help us to take appropriate measures accordingly.

There are some non modifiable risk factors and modifiable risk factors those precipitate strokes in all age groups. Among the non modifiable risk factors of stroke age, sex (male > female, except in the very young and very old), heredity, previous vascular event, e.g. myocardial infarction, stroke, TIA or peripheral embolism and high fibrinogen are important. Modifiable risk factors of stroke

are high blood pressure, heart disease (atrial fibrillation, heart failure, endocarditis), diabetes mellitus, hyperlipidaemia, smoking, excess alcohol consumption, polycythaemia, oral contraceptives in case of female and sometimes social deprivation.

The purpose of the study was to find out the demographic profile and risk factors of hospitalized stroke patients in a rural tertiary care medical college hospital in kishoreganj.

Methods

A prospective observational study of 200 patients with stroke was undertaken in medicine department of Jahurul Islam Medical College Hospital, Kishoreganj from January 2020 to December 2020. Inclusion criteria was patients having WHO definition criteria for stroke "Rapidly developing clinical signs of focal neurological dysfunction with symptoms lasting more than 24 hours or longer or leading to death with no history of trauma and no apparent causes other than that of vascular origin" admitted in medicine deptment of Jahurul Islam Medical College Hospital, Kishoreganj. Patients with age <18 years and patients with brain tumor, encephalitis, head injury, metabolic coma (hypoglycemia) that could explain focal neurological deficits were excluded. After obtaining a detailed history, general physical examination and systematic examination, patients were subjected to do relevant investigations. The area of brain involvement was assessed by clinical determination of focal neurological deficits as well as CT scan of brain. A standard protocol was prepared to collect the necessary information. Cases were recorded irrespective of age and sex.

Qualitative data were expressed in the form of numbers and percentages. All calculations were carried out using a standard statistical package (SPSS version 19, Inc. in Chicago, USA).

Results

A total of 200 patients fulfilling inclusion criteria were studied over a period of 1 year. In this study, 39.5% of the patients were in between 51-60 years age group followed by 61-70 years age group (29%). According to CT scan findings, 62% of the patients had ischemic stroke and 38% of the patients had hemorrhagic stroke. Among the ischemic stroke patients most of the infarct was in the basal ganglia (22.58%) followed by parieto-temporal region (16.94%). Lacunar infarct was 14.54% and cerebellar infarct was 8.87 % in this study. Among the hemorrhagic stroke patients most of the hemorrhage was in the thalamoganglionic region (44.74%) followed by parieto-temporal region (15.79%). Subarachnoid hemorrhage was 6.57% in this study.

In case of ischemic stroke maximum numbers (58) of the patients were in 51-60 years age group whereas in case of hemorrhagic stroke maximum numbers (34) of the patients were in 61-70 age group. In this study, 66.5% were male and 33.5% were female. In case of ischemic stroke male female ratio was 2.35:1. In case of hemorrhagic stroke male female ratio was 1.53:1. In case of hemorrhagic stroke number of patients from rural area was 47 (61.84%) and in case of ischemic stroke it was 75 (60.48%). Middle class group comprised the largest group both in hemorrhagic and ischemic stroke 72.37% (55) and 70.16% (87) respectively. In case of hemorrhagic stroke most of the patients (23, 30.26%) were housewife in occupation. 2nd, 3rd ,4th and 5th common occupation in hemorrhagic stroke patients are medium to large businessman (19, 25%), small businessman (15, 19.74%) service holder (11, 14.47%) and retired person (8, 10.53%) respectively. In ischemic stroke most of the patients (43, 34.68%) were housewife in occupation. 2nd, 3rd ,4th and 5th common occupation in ischemic stroke patients were

service holder (27, 21.77%), medium to large businessman (23, 18.55%), small businessman (17, 13.71%) and agricultural worker (14, 11.29%) respectively.

Hemiparesis or hemiplegia was the most common presentation in both ischemic (79%) and hemorrhagic stroke (90.79%). Most of the patients presented with right sided hemiparesis in both type of stroke. Second and third common presentations in ischemic stroke were dysarthria (61.29%) and impaired consciousness (51.61%) and in hemorrhagic stroke were impaired consciousness (86.84%) and motor dysphasia (73.68%). Headache was present in 63.16% (48) patients of hemorrhagic stroke and 20.16% (25) patient of ischemic stroke. Vomiting was present in 38.16% (29) patients of hemorrhagic stroke and 11.29% (14) patients of ischemic stroke. Vertigo was present in 42.11% (32) patients of hemorrhagic stroke and 29.03% (36) patients of ischemic stroke. 39.47% patients of hemorrhagic stroke presented with convulsion whereas only 5.65% patients of ischemic stroke presented with convulsion. Among the study patients impaired consciousness was found in 86.84% patients of hemorrhagic stroke and 51.11% patients of ischemic stroke. In case of ischemic stroke majority (50%) were in grade 2 level of unconsciousness at presentation and in case of hemorrhagic stroke majority (54.55%) were in grade 3 level of unconsciousness.

Analysis of risk factors revealed that age (86.25% in ischemic stroke and 80% in hemorrhagic stroke) and hypertension (85.48% in ischemic stroke and 89.47% in hemorrhagic stroke) were the most common risk factors of patients in both types of stroke. Others risk factors of patients of ischemic stroke were dyslipidemia (76.61%), DM (70.16%), smoking (61.29%), previous H/O CVD and TIA (18.55%), previous H/O IHD (17.75 %) and oral contraceptive pills

(4.03%) respectively. Other risk factors of patients of hemorrhagic stroke were dyslipidemia (64.47%), DM (50%), smoking

(46.05%), previous H/O CVD and TIA (18.42%), anti platelet drugs (11.84%) and previous H/O IHD (6.58%) respectively.

Table I: Age distribution of patients (n=200)

Age (year)	No of patients (%)	Ischemic Stroke	Hemorrhagic Stroke
0-20	0 (0%)	0	0
21-30	3 (1.5%)	3	0
31-40	10 (5%)	7	3
41-50	29 (14.5%)	18	11
51-60	79 (39.5%)	58	21
61-70	58 (29%)	24	34
>70	21 (10.5%)	14	7
Total	200 (100%)	124 (62%)	76 (38%)

Table II: Sex distribution of patients (n=200)

Sex	No of patients (%)	Ischemic Stroke	Hemorrhagic Stroke
Male	133 (66.5%)	87	46
Female	67 (33.5%)	37	30
Total	200 (100%)	124 (62%)	76 (38%)

Table III: Various clinical presentation of stroke patients (n=200)

Presentation	Ischemic stroke (124 patients)	Hemorrhagic stroke (76 patients)
Hemiparesis/ Hemiplegia	98(79%)	69(90.79%)
Dysarthria	76(61.29%)	35(46.05%)
Motor dysphasia	52(41.94%)	56(73.68%)
Sensory dysphasia	3(2.42%)	2(2.63%)
Impaired consciousness	64(51.61%)	66(86.84%)
Headache	25(20.16%)	48(63.16%)
Vertigo	36(29.03%)	32(42.11%)
Vomiting	14(11.29%)	29(38.16%)
Convulsion	7(5.65%)	30(39.47%)
Visual abnormality	5(4.03%)	2(2.63%)

Table IV: Level of consciousness at presentation (n=130)

Type of stroke	Total no of patients	Grade 1 (GCS 13-15)	Grade 2 (GCS 9-12)	Grade 3 (GCS 4-8)	Grade 4 (GCS 3)
Ischemic	64(49.23%)	29 (45.31%)	32 (50%)	(4.69%)	0
Hemorrhagic	66(50.77%)	9 (13.64%)	18 (27.27%)	36 (54.55%)	3 (4.55%)
Total	130		50	39	3

Table V: Association of stroke with different risk factors (n=200)

Risk factors	Ischemic stroke (124 patients)	Hemorrhagic stroke (76 patients)
Age	114 (86.25%)	73 (80%)
HTN	106 (85.48%)	68 (89.47%)
DM	87 (70.16%)	38 (50%)
Dyslipidemia	95 (76.61%)	49(64.47%)
Smoking	76(61.29%)	35(46.05%)
Previous H/O CVD, TIA	23(18.55%)	14 (18.42%)
Previous H/O IHD	22 (17.75%)	5 (6.58%)
Anti platelet drugs	0	9(11.84%)
Oral contraceptive pills	5 (4.03%)	0

Table VI: Area of brain involved in ischemic stroke in CT scan of brain (n=124)

Site of infarct	Right side	Left side	Both side	Total (%)
Parietal lobe	2	3	0	5 (4.03%)
Temporal lobe	2	4	0	6 (4.84%)
Parieto temporal lobe	9	12	0	21 (16.94%)
Occipital lobe	2	2	0	4 (3.22%)
Internal capsule	4	2	0	6 (4.84%)
Basal ganglia	12	16	0	28 (22.58%)
Thalamus	1	5	0	6 (4.84%)
Lacunar infarct	4	9	5	18 (14.52%)
Pons	0	0	3	3 (2.42%)
Cerebellum	4	7	0	11 (8.87%)
Multiple area	0	0	6	6 (4.84%)
Fronto parietal lobe	3	4	0	7 (5.64%)
Occipito parietal lobe	1	2	0	3 (2.42%)
Total	44	66	14	124 (100%)

Table VII: Site of hemorrhage in CT scan of brain (n=76)

Site of hemorrhage	Right side	Left side	Both side	Total (%)
Parietal lobe	3	6	0	9 (11.84%)
Parieto temporal lobe	5	7	0	12 (15.79%)
Frontal lobe	1	2	0	3 (3.95%)
Thalamoganglionic region	15	19	0	34 (44.74%)
Basal ganglia	1	2	0	3 (3.95%)
Thalamus	2	1	0	3 (3.95%)
Cerebellum	3	1	0	4 (5.26%)
Mid brain	0	0	1	1 (1.32%)
Pons	0	0	1	1 (1.32%)
Subarachnoid	0	0	5	5 (6.57%)
Multiple area	0	0	1	1 (1.32%)
Total	30	38	8	76 (100%)

Discussion

The present study was done over a period of 1 year, included 200 patients of > 18 years of age with stroke. In this study, maximum number of patients (39.5%) was in between 51-60 years age range. Bevan H. et al. in their study of stroke also found similar picture.⁶ A hospital based study done in DMCH showed that only 1% stroke occurred in <20 years, 26% in 20-45 years and majority were above 45 years of age.⁷

CT scan findings of the studied patients showed that majority (62%) of the patients had ischemic stroke and 38% of the patients had hemorrhagic stroke. This finding is similar with the study of Alam B et al.⁸ In a study at Government Lady Reading Hospital, cerebral infarction accounted for 58% of patients of stroke and cerebral hemorrhage in 42%.⁹ Our findings are very close to this study. Among the ischemic stroke patients, most of the infarct was in the basal ganglia (22.58%) and parieto-temporal region (16.94%). Bhowmik NB et al. in their study found common area of infarct in parietal region in 57% patients.¹⁰ Among the hemorrhagic stroke patients, most of the hemorrhage was in thalamoganglionic region (44.74%) and temporo-parietal region (15.79%). Eapen RP et al. in their study found common site of intracerebral hemorrhage was basal ganglia (46.88%) and thalamus (18.75%).¹¹

In the current study, commonest neurological deficit was hemiparesis or hemiplegia in both hemorrhagic (90.79%) and ischemic (79%) stroke. This result correlates with Davidson and Framingham study and study of department of Neurology, Nizams institute of medical science, Hyderabad where hemiplegia was also found to be the commonest presentation.^{12, 13} Among the other clinical presentations of stroke, motor dysphasia was found in 73.66% cases of

hemorrhagic and 41.94% cases of ischemic stroke. Dysarthria was found in 61.29% cases of ischemic stroke and 46.05% cases of hemorrhagic stroke. Among the associated features of stroke, headache (63.16%), vertigo (42.11%), vomiting (38.16%) and convulsion (39.67%) were more marked in cases of hemorrhagic stroke. Headache in most cases preceded the onset of stroke and sometimes followed the incident. It is apparent from this study that headache and vomiting has got greater association with hemorrhagic stroke. This study correlates well with that of Scott and Miller, showing marked association of headache and vomiting with hemorrhagic stroke.¹⁴

Impaired consciousness was found in 86.84% patients of hemorrhagic stroke and 51.11% patients of ischemic stroke. In case of ischemic stroke majority (50%) were in grade 2 level of unconsciousness at presentation and in case of hemorrhagic stroke majority (54.55%) were in grade 3 level of unconsciousness. This finding correlates with that of Scot and Miller.¹⁴

In this study, rural people outnumbered urban people in stroke in incidence. But incidence should be still higher, as two third of our population lives in village and all of the patients of stroke hailing from village could not afford to do CT scan of brain. With this limitation this requires further evaluation as most of our people are out of screening for risk factors (hypertension, diabetes mellitus, and smoking) of stroke.

Socioeconomic basis of stroke was also studied. It showed that in hemorrhagic (55 cases, 72.37%) and ischemic stroke (87cases, 70.16%) middle class people are the most sufferer. This study correlates with that of Chapman et al.¹⁵ From this study we get the impression that poor and rich are less sufferer of stroke. But this may not be true in case of

poor, as many of the patients are not brought to hospital or could not afford to do CT scan, whereas in case of rich people they might have got better options for taking this medicare, than to be admitted to Jahurul Islam Medical College Hospital, Kishoreganj. So the actual trend of incidence might be different.

Different risk factors were recorded and analyzed for their association with haemorrhagic and ischemic stroke. Among the non-modifiable risk factors age and sex were studied. Elderly people are the most vulnerable group for developing stroke. In this study, it is seen that in both hemorrhagic and ischemic stroke most of the sufferers were in the 51-60 years age group. The next group suffered mostly was 61-70 years age group. No case was recorded below the age of 20 years. So it is clear from this study that both hemorrhagic and ischemic stroke occur more commonly in elderly. In this study, 66.5% were male and 33.5% were female i.e., male incidence is higher than female which coincide with the study of Chowdhury et al.¹⁶ The higher male preponderance in this study may be due to the fact, that women are neglected part of the society and they are not brought to hospital, if not otherwise seriously ill. The actual ratio may be slightly different with only slight male excess.

In this study hypertension emerges as the most important and common risk factor in both hemorrhagic and ischemic stroke. The association is more with hemorrhagic stroke. Most of the female patients with hemorrhagic stroke stopped antihypertensive drugs when they became well after medication. The result correlates with that of a study in the urban population of Calcutta in 2001, where hypertension was found to be the most important risk factor.¹⁷

Dyslipidemia was an strong risk factor both for ischemic stroke (76.61%) and hemorrhagic stroke (64.47%). It indicates our bad dietary habit and life style that should be modified to prevent stroke.

In this study, association of stroke with underlying heart disease was analyzed. Out of 124 patients of ischemic stroke, 22 patients (17.5%) had underlying heart disease, which acted as the potential source of cerebral embolism. So it is obvious from this study that any finding suggestive of underlying heart disease in a patient of stroke should raise the suspicion of ischemic stroke.

Smoking appears as an important risk factor in both hemorrhagic and ischemia stroke in this study. 46.05% patients of hemorrhagic stroke and 61.29% patients of ischemic stroke were smokers. This study correlates with Donnan et al, who found smoking as a strong risk factor for SAH and cerebral infarction.¹⁸

Diabetes mellitus has long been recognized as a risk factor for vascular disease as well. It doubles the risk of stroke compared with non-diabetics. In this study, 70.16% patients of ischemic stroke and 50% patients of hemorrhagic stroke had diabetes mellitus. This finding is similar to the finding found in Framingham study.¹²

23 patients (18.55%) of cerebral infarction and 14 patients (18.42%) of cerebral hemorrhage had previous history of stroke or TIA. It is seen in this study that previous history of stroke or TIA is more common in case of infarction. Actually TIA is a major risk factor for disabling stroke, implying a 13 fold increased risk of stroke in the next 1 year.¹⁹

Conclusion

Stroke, being one of the most common cerebrovascular diseases, has drawn attention of researchers all over the world. As our knowledge continues to evolve about pathogenesis and therapeutic options, epidemiological aspects and risk factors associated with stroke remain as important as ever. Targeting these risk factors for preventing cerebrovascular accidents in the first place will help reducing the burden of this often disabling disease.

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Stroke, being one of the most common cerebrovascular diseases, has drawn attention of researchers all over the world. As our knowledge continues to evolve about pathogenesis and therapeutic options, epidemiological aspects and risk factors associated with stroke remain as important as ever. Targeting these risk factors for preventing cerebrovascular accidents in the first place will help reducing the burden of this often disabling disease.

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