

Krishna Dhungana MD, DM
Department of Neurology
Kathmandu Medical College
Sinamangal, Kathmandu, Nepal

Address for Correspondence:

Krishna Dhungana MD, DM
Department of Neurology
Kathmandu Medical College
Sinamangal, Kathmandu, Nepal
Email:dhungana.krish@gmail.com
Phone No. 9841413975

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The World Health Organization (WHO) has defined stroke as, 'rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin.'¹⁸

Demographic characteristics of stroke in a tertiary care hospital in Nepal

Our aim is to find out the demographics of the patients with stroke who undergo in-patient rehabilitation in a tertiary care hospital setting. We also aim to find the frequency of different types of stroke and the frequency of stroke in different vascular territories.

Using data collected prospectively over a period of 1 year, we studied 180 individuals admitted with stroke. The demographic features of patients with stroke were collected and analyzed. Stroke was broadly stratified into hemorrhagic and ischemic stroke. Furthermore, ischemic stroke was subdivided according to the vascular territories involved: anterior cerebral artery, middle cerebral artery (MCA), posterior cerebral artery, brain-stem, cerebellar, small-vessel strokes and stroke occurring in more than one vascular territory.

The most common risk factor was hypertension which was present in 50% of patients. The most common ischemic stroke groups were MCA stroke (39.4%) and small vessel stroke (17.2%). The most common type of hemorrhage was basal ganglia hemorrhage which was present in 15% of patients.

In regards with Western literature, patients with stroke in our setting also had similar risk factors.

The proportion of hemorrhagic stroke in our country was higher than in the western world. A large proportion of patients were in the age group less than 65. However, the frequency of distribution of different types of stroke and frequency of stroke in different territories were similar.

Keywords: Hypertension, Ischemic, MCA

Stroke is classically characterized as; a neurological deficit attributed to an acute focal injury of the central nervous system (CNS) by a vascular cause, including cerebral infarction, intracerebral hemorrhage (ICH) and subarachnoid hemorrhage (SAH), and is a major cause of disability and death worldwide.¹³

Demographic characteristics of stroke

Since, we do not have much data regarding stroke in our setting, we aim to find the demographic characteristics of stroke. We also aim to find out the relative frequencies of different types of stroke and stroke in different vascular territories in our setting.

Material and methods:

This study was done in a tertiary care hospital in Nepal in TUTH. One hundred and eighty patients who were clinically diagnosed as stroke and later confirmed by CT scan or MRI were selected randomly, over a period of one year from February 1st 2013 to February 1st 2014.

Data was collected from all the patients, included gender, age, cerebrovascular risk factors, duration of hospital stay and vascular territory involved.

For this study, stroke data from eligible patients were extracted, and cases were grouped into 7 lesion location categories based on previously reported criteria in neuroanatomical, neurology, and rehabilitation literature.^{1,4,5} These were anterior cerebral artery (ACA), middle cerebral artery (MCA), posterior cerebral artery (PCA), brain-stem, cerebellar, small-vessel stroke and stroke in more than one vascular territory (MVT).

Cerebrovascular risk factors that were charted included hypertension, diabetes mellitus, cigarette-smoking, arrhythmias and ischemic heart disease.

RISK FACTORS	STATUS	
	YES	NO
Hypertension	80(50%)	80(50%)
Diabetes Mellitus	11(8.3%)	169(91.7%)
Cigarette smoking	65(35.1%)	115 (64.9%)
Arrhythmia	22 (12.2%)	158 (87.8%)
Ischemic disease	5 (2.8%)	175(97.2%)

Table 1. Percentage of patients with different risk factors

Results:

Out of total 180 patients, 92 (51.1%) of patients were male and 88(48.9%) patients were female.

The age group of patients was divided in accordance to above or below 65. Ninety-five (52.8%) patients were in the age group of more than 65 whereas, 85 (47.2%) of patients were of 65 years or younger.

Out of the total 180 patients, 69(38.3%) of patients were from within the Kathmandu valley and remaining 111(61.7%) of patients were from outside the valley.

The commonest risk factor was hypertension which was present in 50% of patients. Smoking was seen in 35.1% of patients. Table 1 shows the percentage of patients with different risk factors.

Out of all patients, 27(15%) of patients reached the hospital within three hours whereas, 153(85%) of patients reached the hospital after 3 hours (Chart 1).

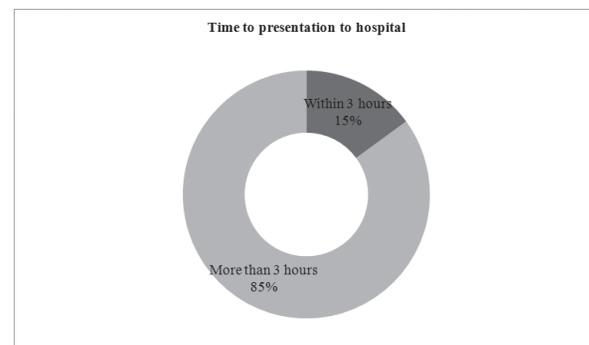


Chart 1: Time to presentation to hospital

The duration of hospital stay ranged from 1 to 33 days with mean of 6.11 days and median of 7 days.

Hemorrhagic type of stroke was seen in 43(23.9%) and ischemic type of stroke was seen in 137(76.1%) out of total 180 stroke patients.

Fifteen patients have had a history of previous stroke and 165(91.7%) of patients did not have any history of stroke (Chart 2).

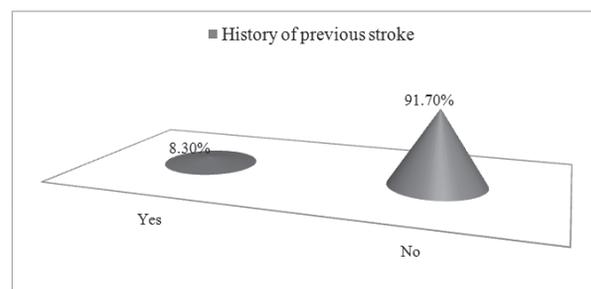


Chart 2: History of previous stroke

National Institute of Health Stroke Score (NIHSS) of stroke patients at the time of admission was calculated to find out the stroke severity. The frequency of severity of stroke according to NIHSS is shown in the following chart (Chart 3).

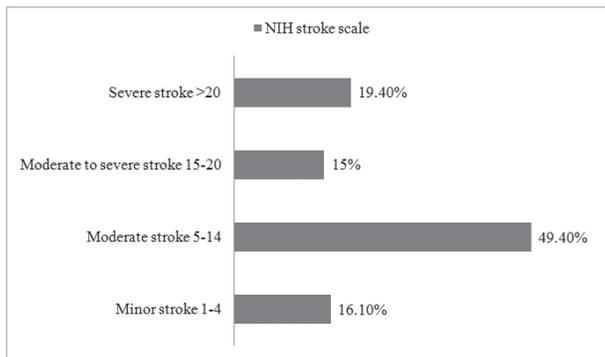


Chart 3: NIH stroke scale of stroke patients

The most common stroke subtype was MCA stroke (50.8%) followed by small-vessel stroke (12.8%) and brain-stem stroke (11.4%). MCA cortical infarct was the most common, seen in 39.4 % of patients. Out of hemorrhagic strokes, basal ganglia hemorrhage was the most common which was seen in 15% of patients (Chart 4).

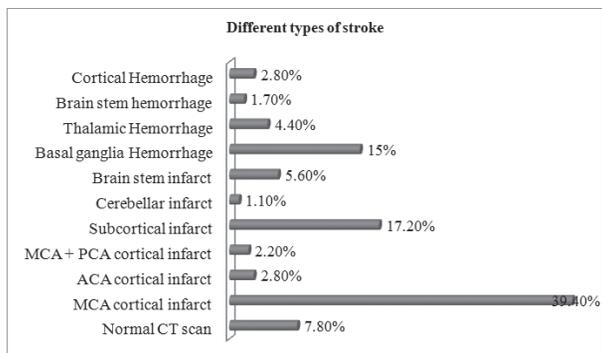


Chart 4. Bar diagram showing relative frequencies of stroke in different territories

Discussion:

Stroke is a major global health problem. Someone in the US has a stroke about once every 40 seconds. Each year, about 795,000 people experience a new or recurrent stroke. Approximately 610,000 of these are first attacks, and 185,000 are recurrent attacks. Stroke is a leading cause of serious long-term disability in the US. In 2015, stroke deaths accounted for 11.8% of total deaths worldwide, making stroke the second leading global cause of death behind heart disease.²

Our data showed a higher proportion of patients with hemorrhagic stroke than cited in the western literature. The statistics from AHA showed that of all strokes, 87% are ischemic and 10% are ICH strokes, whereas 3% are SAH strokes (GCNKSS, NINDS, 1999).²

In western literature, each year ≈55,000 more females than males have a stroke (GCNKSS, NINDS).⁷ Females have a higher lifetime risk of stroke than males. In the FHS, lifetime risk of stroke among those 55 to 75 years of age was 1 in 5 for females (95% CI, 20%–21%) and ≈ 1 in 6 males (95% CI, 14-17%).¹⁴ Our data showed a slight predominance of stroke among males.

Approximately 10% of all strokes occur in individuals 18 to 50 years of age.¹⁴ Though we did not divide patients in different age groups, our data showed 47.2% of stroke in age group 65 years or younger. Due to the fact that, rheumatic heart disease is still at large in our setting, cardioembolic strokes and strokes in young are quite frequent in our country.

High blood pressure is a potent determinant of risk for both ischemic stroke and intracranial hemorrhage. From a meta-analysis, 9 trials showed high strength evidence that BP control to < 150/90 mm of Hg reduces stroke.¹⁶ Accordingly, the most common risk factor of stroke in our study was also found to be hypertension, accounting for 50% of the patients. In our study, smoking as a risk factor was present in 35.1% of patients with stroke. Current smokers have a 2 to 4 folds increased risk of stroke as compared to non-smokers or those who quit for more than 10 years.¹⁶ Cigarette smoking is a major risk factor for ischemic stroke and SAH.^{6,9,15}

A study done by Oli et al from 1996 to 2000 in 684 patients with stroke showed that ischemic stroke accounted for 63 % of cases of which 53% of the patients were male. The mean age of patients was 59 years. Hypertension was found in 42%, smoking in 28.5%, alcoholism in 18.4%, and diabetes mellitus in 10.8%.¹²

A study done by Devkota et al. in a teaching hospital in Kathmandu from April 2000 to March 2005, found that 68.1% of patients had ischemic stroke, with hemorrhagic stroke affecting the rest of the patients. Again, the majority of stroke-sufferers were male (58.3%). The predisposing factors were smoking, hypertension and alcohol consumption, with the mean age of stroke reported to be 61.7 years.³

A study was done by Pathak et al. at Nepal Medical College, Kathmandu on 72 stroke patients admitted between April 2003 and March 2005. The incidence of

ischemic stroke was higher (68%) as compared to the incidence of hemorrhagic stroke (32%). The mean age of stroke was 61 years, 60% of patients also had hypertension and 61% were smokers, indicating that both hypertension and cigarette-smoking are the key predisposing factors for stroke.¹¹

Out of our patients, 27 (15%) patients reached the hospital within three hours, whereas 153 (85%) patients reached the hospital after 3 hours. The number of patients who fail to reach the hospital within three hours is, due to the fact that, most patients in Tribhuvan University Teaching Hospital are from outside the valley as mentioned before and they initially go to local hospital, also the time is lost as the transportation facilities are dire.

The incidence of anterior circulation stroke (ACA and MCA stroke) is twice that of posterior circulation stroke (PCA, brain-stem and cerebellar stroke) and small vessel stroke in acute hospital settings.^{8,10} Our cohort study had similarly far more anterior circulation strokes.

Conclusion:

Our study showed that hemorrhagic stroke is more common in Nepal than in the western countries. There were a large proportion of patients in the age group less than 65 years. The risk factors and the distribution of stroke in different territories were similar as to that quoted in the western literature.

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