

## Ischemic stroke review - Nepal

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### ABSTRACT

The prevalence of stroke in the Nepalese population over the years has shifted from a higher age group, over 60 years to below 45 years of age, most common being ischemic stroke with the cardioembolic origin and predominantly in the male population. Smoking, diabetes, hypertension, dyslipidemia are the main predisposing factors. A very small percentage of patients (5-20%) presenting in the emergency department is thrombolysis eligible due to late arrival to which lockdown also has some effect. Endovascular recanalization has also shown good outcomes. Complications of stroke included aspiration pneumonia. Mortality was more in patients with low Glasgow Coma Scale (GCS) at presentation and was not affected by the presence of Atrial Fibrillation. National Institutes of Health Stroke Scale (NIHSS) score is reliable and can be used to predict outcomes.

**Keywords:** ischaemic, Nepal, stroke

### BACKGROUND

This article summarizes the findings of 13 different studies related to Ischemic Stroke in Nepal, conducted from 2010 to 2020. The articles were searched in google scholar using the key words stroke in Nepal. Among the suggested articles only full text articles were included in the studies and since there were limited studies specific to hemorrhagic stroke those articles were not included. In total 13 articles were included among which 6 were prospective studies, 6 retrospective studies and 1 cross sectional study with variables ranging from epidemiological profile to outcomes after management. Specific inclusion or exclusion criteria were not applied.

### DISCUSSION

To begin with, a retrospective study conducted at Tribhuvan University Teaching Hospital (TUTH) from 1996-2000 showed the highest prevalence among mean age of 59-62 years and males. Smoking, hypertension, and diabetes were the main predisposing factors. Ischemic stroke accounted for 63% of cases.<sup>1</sup> Another study done in National Academy of Medical Science from June 2010-July 2011 showed a similar finding of the predominance of ischemic stroke (57.62%) and in males (59.20%) out of 286 patients included. Besides the factors mentioned in an earlier study, dyslipidemia, alcohol intake, and valvular heart disease were other identified risk factors.<sup>2</sup> However, a study done at Kathmandu Medical College Teaching Hospital (KMCTH) from June 2012 to November 2015 has highlighted the changing trends of the epidemiological pattern. The result showed that 31.9% of patients presenting with stroke were below 45 years of age and hemorrhagic stroke accounted for 50.3% of cases.<sup>3</sup>

For ischemic stroke, the Middle cerebral artery was the most commonly involved as the finding of the study from Lumbini Medical College Teaching Hospital which included 200 stroke patients from September 2015-March 2016. Clinical findings matched with Computed Tomography (CT) head reports in 75% of the case.<sup>4</sup> Regarding the etiology, an observational study was done at Nobel Medical College from January 2017-June 2018 showed that 44% of ischemic stroke were cardioembolic among which 71% had AF. Hospital Mortality was not significantly different among the AF group. However, in patients with Dilated Cardiomyopathy with Left Ventricular Ejection fraction of <50% significant difference was seen in mortality. Left-sided weakness was found to be more common in AF compared to sinus rhythm in the study.<sup>5</sup>

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Out of 228 patients with ischemic stroke visiting the Emergency department of TUTH over a period of a year from August 2017-2018, only 46 (20%) arrived within the time frame for thrombolysis.<sup>6</sup> Among them, 16 didn't receive Alteplase due to economic constraints. Factors associated with early presentation included the daytime onset of symptoms, facial deviation, slurred speech, direct presentation, awareness of stroke treatment, education level above +2, and distance <20km.<sup>6</sup> Similar studies conducted at Annapurna Neuro Hospital from 2016-February 2018 had findings showing only 15 (5%) were eligible for thrombolysis out of 300 cases. Among the eligibles, NIHSS score ranged from 6-18, which changed to 1-10 post tissue plasminogen activator. Door to needle time was 1.5 hours on average. Lack of public health awareness was one of the major reasons for seeking treatment on time.<sup>7</sup> Recent study comparing the impact of lockdown in patient presentation due to COVID 19 pandemic at Grande International hospital showed that in preceding 3 months, 27 cases presented with ischemic stroke and 12 were eligible for mechanical thrombectomy (median time of presentation from symptom onset=6 hours) whereas during lockdown 18 cases presented and only 3 were eligible for mechanical thrombectomy (median time=8 hours).<sup>8</sup>

Endovascular recanalization is one of the recent advances in the management of ischemic stroke involving large vessels and only a few centers in Nepal provide it. The outcome after endovascular recanalization was observed in Grande International Hospital in 22 patients involving large vessels confirmed by CT angiography. 20 of them had good angiographic recanalization and 17 had good functional independence at 3 months. 2 patients had Subarachnoid Hemorrhage on follow-up CT however, none had a symptomatic intracerebral hemorrhage.<sup>9</sup>

The mean duration of hospital stay was found to be 7.36 days at KMCTH in a cross-sectional descriptive study from July -December 2018 involving 96 patients. Other findings were fifty-two (54.2%) patients had NIHSS in the range of 5 to 14 representing moderate stroke and seven (7.3%) of the patients had severe stroke. 62 (64.6%) patients developed at least one complication during a hospital stay. Pneumonia and Urinary Tract Infection (UTI) were seen in 22.9% of patients followed by a pressure sore and Deep Venous Thrombosis (DVT).<sup>10</sup> Aspiration pneumonia (25.9%) was the most common complication noted among stroke patients, followed by raised Intracranial

Pressure, pressure sore, UTI, seizure, and DVT in another study conducted at BPKIHS from 2012-2016 which included total of 278 patients. The mortality rate was 18.7% with a significant association with aspiration pneumonia and raised ICP.<sup>11</sup> Another study done at B.P Koirala Institute of Health Sciences (BPKIHS) during the same time period involving 257 cases, looked into factors predicting in-hospital mortality in stroke cases showed the in-hospital mortality rate of 20.5%. The patients with in-hospital mortality had a lower Glasgow coma scale (GCS) score (9 vs. 12,  $P < 0.001$ ) compared to those who survived. During admission, a patient with in-hospital mortality had significantly lower arterial oxygen saturation (92 vs. 95,  $P < 0.001$ ), higher pulse rate (91 vs. 83,  $P = 0.009$ ), and higher respiratory rate (24 vs. 21,  $P < 0.001$ ) than those patients with acute ischemic stroke who survived.<sup>12</sup>

NIHSS scoring system has been widely used to predict the severity and outcome in stroke patients. A study done at College of medical sciences, Chitwan used NIHSS to predict the outcomes of ischemic stroke in 54 patients meeting the inclusion criteria from May to August 2014. NIHSS score was found to be higher (17.5) in stroke due large artery and cardioembolic (17.5) etiology compared to small vessel (9) involvement.<sup>13</sup> Though small vessel stroke was most common subtype, large vessel and cardioembolic causes led to poorer outcome at 3 months. Thus, subtype of stroke and baseline NIHSS can predict the death or disability.<sup>13</sup>

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