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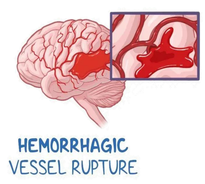
# ASSESSMENT OF STROKE PATTERNS AND RISK FACTORS IN NORTHEAST INDIA: A HOSPITAL-BASED PROSPECTIVE STUDY

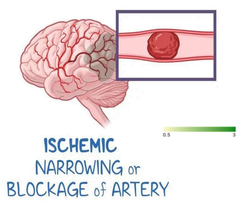
**Ruby Kasana[1], Sneha Mariam Biju[1],** Amit Ranjan Baura[2], Mausumi Barthakur[3], Krishna Undela[1*]

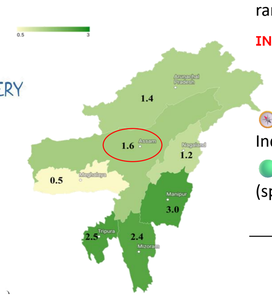
[1]*Department of Pharmacy Practice, National Institute of Pharmaceutical Education and Research (NIPER) Guwahati, Assam, India*
[2]*Department of Neurology and Critical Care, GNRC Institute of Medical Sciences, North Guwahati, Assam, India*
[3]*Department of Neurophysiology, GNRC Institute of Medical Sciences, North Guwahati, Assam, India*
**Corresponding Author's Email ID: krishna@niperguwahati.in*

## BACKGROUND

**Stroke is a severe acute cerebral vascular disease**




***Epidemiology of Stroke***

| Region | Prevalence Estimate (per 100,000 or %) |
|---|---|
| Global | ~1,099 per 100,000 (age-standardized) |
| | ~93.8 million prevalent cases globally |
| Asia (general range) | **~116–483** per 100,000 (incidence estimates) |
| **IN India (national)** | ~105–152 per 100,000 (incidence) |
| | 88.3 per 100,000 (age-standardized incidence in 2021) |
| Northeast India | **~1.53%** prevalence (≈1,530 per 100,000) |
| Assam (specifically) | **~2,229 DALYs** per 100,000 |
| | ~41% 28-day case fatality (hospital data) |

***RATIONALE***

Why It Matters

- **Leading cause of death and long-term disability.**
- **Early recognition of region-specific risk factors is critical to reduce burden.**

Regional Gap

- **Northeast India → Unique genetics, habits, high salt use→ Yet under-represented in national stroke data.**

***OBJECTIVES***

To assess the **demographic and clinical characteristics and risk factors** of stroke patients
To determine the **components associated with functioning** in stroke patients using the **WHO-ICF framework**

## METHODOLOGY

**Study Site:**
GNRC Institute of Medical Science, Sila Grant, North Guwahati, Assam

**Study Duration**
9 Months
(September 2023 to May 2024)

Patients who diagnosed with the stroke in Neurology Intensive Care Unit

***Inclusion Criteria***
- Patients who admitted to the Neuro ICU
- Patients diagnosed of stroke
- Regardless any gender & age group

***Exclusion Criteria***
- Patients with severe systemic diseases, transient ischemic attacks
- Patient/caretaker not willing to give consent

Prospective observational study

**Sources of data**
- Medical records & referral notes
- Laboratory reports
- Patients/caregivers' interview

Demographic information and clinical profile of patient are recorded in data collection form

Clinical examination
Neuroimaging findings

1. Assessment of demographic, clinical characteristics and risk factors
2. Evaluate the components associated with functioning in stroke patients using the WHO-ICF framework

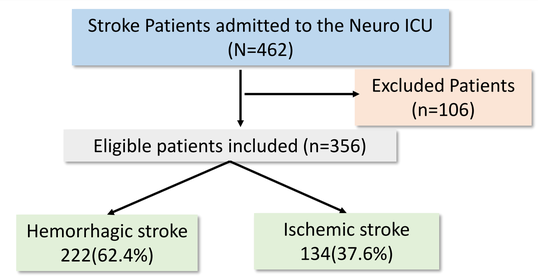
Collection of details related to functional status of patient using pre-validated scales

Based on WHO-ICF framework

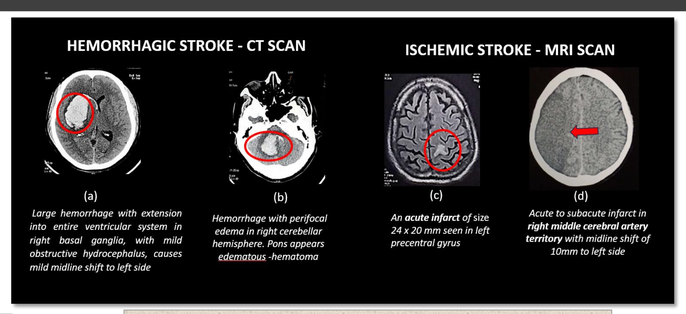
| Impairment | Activity | Participation | Quality of Life |
|---|---|---|---|
| NIHSS | Barthel Index | mRS | SSQoL |

Statistical Analysis and Data interpretation

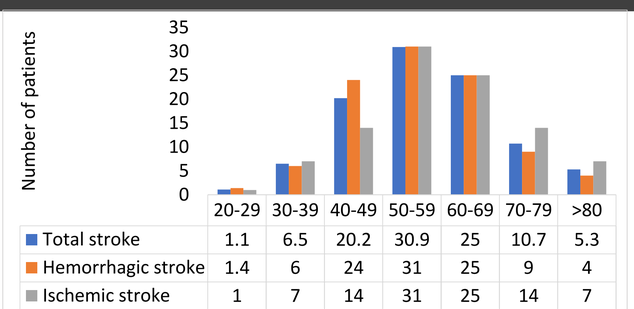
## RESULTS AND DISCUSSION




***Flowchart of recruitment for eligible stroke patients***

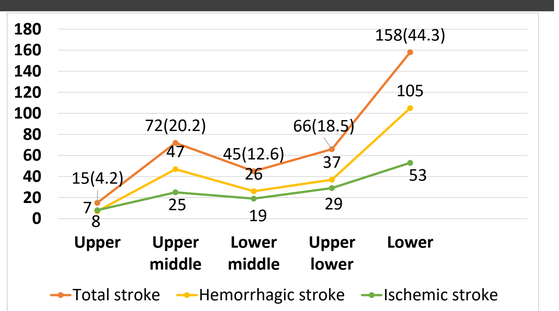



***Neuroimaging Findings of Stroke Patients***




| | 20-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 | >80 |
|---|---|---|---|---|---|---|---|
| Total stroke | 1.1 | 6.5 | 20.2 | 30.9 | 25 | 10.7 | 5.3 |
| Hemorrhagic stroke | 1.4 | 6 | 24 | 31 | 25 | 9 | 4 |
| Ischemic stroke | 1 | 7 | 14 | 31 | 25 | 14 | 7 |

***Age Group among Stroke Patients***




***Socio-economic Status of Stroke Patients***

***Table : Univariate regression analysis of risk factors of the stroke***

| Parameters | | Total stroke N(%) | Hemorrhagic Stroke N(%) | Ischemic Stroke N(%) | Odds Ratio (95% CI) | P value |
|---|---|---|---|---|---|---|
| **Advanced Age (In Year)** | ≥55yrs | 202 (56.7) | 117 (52.7) | 85 (63.4) | 0.64 (0.41-0.99) | 0.048* |
| | <55yrs | 154 (43.3) | 105 (47.3) | 49 (36.6) | 1 (Reference) | |
| **Smoking** | Yes | 191 (53.6) | 130 (58.6) | 61 (45.5) | 1.69 (1.09-2.60) | 0.017* |
| | No | 165 (46.4) | 92 (41.4) | 73 (54.5) | 1 (Reference) | |
| **Alcohol Consumption** | Yes | 84 (23.6) | 64 (28.8) | 20 (14.9) | 2.31 (1.32-4.03) | 0.003* |
| | No | 272 (76.4) | 158 (71.2) | 114 (85.1) | 1 (Reference) | |
| **Hypertension** | Yes | 327 (91.8) | 210 (94.6) | 117 (87.3) | 2.54 (1.17-5.50) | 0.015* |
| | No | 29 (8.2) | 12 (5.4) | 17 (12.7) | 1 (Reference) | |
| **Diabetes Mellitus** | Yes | 73 (20.5) | 35 (15.8) | 38 (28.4) | 0.47 (0.28-0.79) | 0.004* |
| | No | 283 (79.5) | 187 (84.2) | 96 (71.6) | 1 (Reference) | |
| **Hypertension and Diabetes Mellitus** | yes | 70 (19.7) | 32 (14.4) | 38 (28.4) | 0.42 (0.25-0.72) | 0.001* |
| | No | 286 (80.3) | 190 (85.6) | 96 (71.6) | 1 (Reference) | |
| **Adherence to Antihypertensives** | Irregular | 234 (71.6) | 165 (78.6) | 69(58.9) | 2.63 (1.57-4.39) | <0.001* |
| | Not on any medication | 9 (2.8) | 5 (2.4) | 4 (3.4) | 1.37 (0.34-5.48) | 0.735 |
| | Regular | 84 (25.6) | 40 (19.0) | 44(37.6) | 1 (Reference) | |

*#significant at p<0.05*

***Table : Multi-variate analysis of regression analysis of risk factors of the stroke***

| Parameters | | Total stroke N(%) | Hemorrhagic stroke N(%) | Ischemic stroke N(%) | COR (95%CI) | p-value | AOR (95%CI) | P value |
|---|---|---|---|---|---|---|---|---|
| **Previous stroke** | No | 292 (82.0) | 194 (87.4) | 98 (73.1) | 1(Reference) | | | |
| | Yes | 64 (18.0) | 28 (12.6) | 36 (26.9) | 0.39 (0.22-0.68) | 0.001 | 0.33 (0.16-0.68) | **0.003#** |
| **Atrial Fibrillation** | No | 346 (97.2) | 221 (99.5) | 125 (93.3) | 1(Reference) | | | |
| | Yes | 10 (2.8) | 1 (0.5) | 9 (6.7) | 0.06 (0.008-0.50) | 0.001 | 0.04 (0.004-0.331) | **0.003#** |
| **Adherence to antihypertensives** | Regular | 84 (25.6) | 40 (19.0) | 44(37.6) | 1 (Reference) | | | |
| | Irregular | 234 (71.6) | 165 (78.6) | 69(58.9) | **2.63** (1.57-4.39) | <0.001 | **6.15** (2.33-16.25) | **<0.001#** |

*COR, Crude Odds Ratio; AOR, Adjusted Odds Ratio; #significant at p<0.05*

***Stroke impairment classification using NIHSS***

| National Institutes of Health Stroke Scale (NIHSS) Score | Total N(%) | Hemorrhagic stroke N(%) | Ischemic stroke N(%) | Odds ratio | 95% CI | P value |
|---|---|---|---|---|---|---|
| Mild (1-4) | 59(16.6) | 27 (12.2) | 32 (23.9) | Reference | | |
| Moderate (5-15) | 148(41.6) | 75 (33.8) | 73 (54.5) | 1.21 | 0.66-2.23 | 0.523 |
| Moderate-severe (16-20) | 27(7.6) | 18 (8.1) | 9 (6.7) | 2.37 | 0.91-6.12 | 0.072 |
| **Severe (21-42)** | 122(34.2) | 102 (45.9) | 20 (14.9) | 6.04 | 2.99-12.19 | **<0.001#** |

*#significant at p<0.05*

***Treatment pattern in stroke patients***

| Number of days administered | Hemorrhagic stroke | | Ischemic stroke | |
|---|---|---|---|---|
| | Mannitol | Furosemide | Mannitol | Furosemide |
| **1-3 days** | 98 (46.0) | 89 (41.8) | 11 (8.2) | 13 (9.7) |
| **4-7 days** | 60 (28.2) | 61 (28.6) | 13 (9.7) | 6 (4.5) |
| **>7 days** | 31 (14.6) | 31 (14.6) | 4 (3.0) | 4 (3.0) |

***Components associated with functioning in stroke patients using the WHO-ICF framework (Comparison of functional outcomes)***

| Scales Median (IQR | Hemorrhagic Stroke N=68 (66%) | Ischemic Stroke N=33(34%) | P-Value |
|---|---|---|---|
| Barthel Index, | 33 (0-90) | 45 (0-100) | 0.194 |
| Modified Rankin Scale (mRS) | 4 (0-6) | 3 (1-6) | 0.254 |
| Stroke Specific Quality of Life Scale (SS-QOL) | 106 (245) | 141 (49-245) | 0.048# |

*#significant at p<0.05*

## CONCLUSIONS

- Stroke cases are increasing in this region of India, with hemorrhagic stroke being more prominent.
- Hypertension and smoking are identified as the major contributing risk factors.
- A strong association exists between non-adherence to antihypertensive medications and hemorrhagic stroke
- Patients. with a history of stroke and atrial fibrillation are more susceptible to ischemic stroke.

## REFERENCES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***Contact me***

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