

Original Research Article

Clinical presentation patterns and neurological status among stroke subtypes

M. Mizanur Rahman^{1*}, M. Habibur Rahman², Safikul Islam³, Mohammad Aminul Islam⁴,
M. Khairuzzaman⁵, Nisat Zabin⁶, M. Kawser Hamid⁷

¹Department of Medicine, Sir Salimullah Medical College Mitford Hospital, Dhaka, Bangladesh

²Department of Medicine, Dhaka Medical College Hospital, Dhaka, Bangladesh

³National Gastroenterology Institute and Hospital, Dhaka, Bangladesh

⁴Department of Medicine, Shahid M. Monsur Ali Medical College, Shirajgonj, Bangladesh

⁵Department of Cardiology, Dhaka Medical College Hospital, Bangladesh

⁶Central Police Hospital, Rajarbag, Dhaka, Bangladesh

⁷250-bedded General Hospital, Jhenaidah, Bangladesh

Received: 08 July 2025

Accepted: 11 August 2025

*Correspondence:

Dr. M. Mizanur Rahman,

E-mail mizan.ss2013@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Differentiating stroke subtypes through distinct clinical presentation and neurological severity is essential for prompt management, especially in resource-constrained settings. This study aimed to compare clinical presentation patterns and neurological status among ischemic and hemorrhagic stroke patients in Bangladesh.

Methods: A cross-sectional observational study was conducted among 100 adult stroke patients admitted to a tertiary hospital. Clinical features and neurological severity (Glasgow coma scale, GCS) were assessed and compared by stroke subtype. Predictors of impaired consciousness were identified using Cox regression analysis.

Results: Among participants, ischemic stroke (74%) predominated over hemorrhagic stroke (26%). Hemorrhagic stroke was significantly associated with impaired consciousness (80.76% versus 59.45%; $p=0.023$), headache (80.76% versus 45.94%; $p=0.004$), vomiting (73.07% versus 41.89%; $p=0.019$), neck rigidity (80.76% versus 6.75%; $p<0.001$), hiccups (46.15% versus 22.97%; $p=0.041$), and convulsions (30.76% versus 12.16%; $p=0.041$). Unconsciousness ($GCS\leq 8$) was notably higher in hemorrhagic stroke (38.5% versus 20.3%; $p=0.041$). Cox regression identified hemorrhagic stroke (HR 2.85, $p=0.006$), neck rigidity (HR 3.41, $p=0.003$), convulsions (HR 2.12, $p=0.047$), age >55 years (HR 1.26, $p=0.01$), and BMI >30 (HR 1.08, $p=0.03$) as independent predictors of impaired consciousness.

Conclusion: Significant subtype-specific clinical presentations and neurological impairment were observed, with hemorrhagic stroke associated with greater severity. Enhanced clinical awareness and targeted management strategies are essential in improving acute stroke care outcomes in Bangladesh.

Keywords: Stroke subtypes, Clinical presentations, Neurological severity, Glasgow coma scale, Bangladesh

INTRODUCTION

Stroke is defined as a sudden onset of neurological deficit due to a disruption in cerebral blood flow caused by either vascular occlusion (ischemic stroke) or rupture (haemorrhagic stroke), often leading to long-term disability or death.¹ Advances in neuroimaging and pathology-based classification have refined diagnostic

distinctions between stroke, transient ischemic attack (TIA), and cerebral infarction, enhancing the consistency of epidemiological and clinical research.² Globally, stroke remains a leading cause of adult disability and the second leading cause of death, with significant implications for public health and healthcare systems. According to the World Stroke Organization's Global Fact Sheet, there were an estimated 12.2 million incident stroke cases and

6.6 million stroke-related deaths in 2021 alone.³ The burden is not equally distributed over 86% of all stroke-related deaths now occur in low- and middle-income countries (LMICs), where resource constraints, delayed recognition, and limited access to acute care exacerbate outcomes.⁴ Bangladesh, a densely populated LMIC in South Asia, is experiencing a notable epidemiological transition with an increasing prevalence of non-communicable diseases, including stroke. Recent national surveys estimate the overall prevalence of stroke in Bangladesh to be approximately 11.4 per 1,000 population, with higher rates observed among males, rural dwellers, and individuals over the age of 60.^{5,6} Aziz et al underscore that despite some progress in establishing stroke units and training personnel, acute stroke services in Bangladesh remain underdeveloped, with regional disparities in diagnostic access, thrombolysis capacity, and rehabilitation.⁷ Hospital-based data, such as that from Bhowmik et al, reveal that ischemic strokes constitute the majority of stroke admissions, though haemorrhagic strokes tend to present more severely and with poorer prognosis.⁸ Understanding the clinical presentation patterns of different stroke subtypes is critical for timely diagnosis and management. Ischemic stroke commonly presents with focal deficits such as hemiparesis, facial droop, or aphasia, whereas haemorrhagic strokes are more likely to include headache, vomiting, seizures, and altered consciousness due to elevated intracranial pressure.⁹ Subarachnoid haemorrhages, though less common, may debut with sudden thunderclap headaches and neck stiffness. Yet these textbook descriptions may not fully capture real-world variability, especially in LMIC settings where healthcare-seeking behavior, literacy, and access to diagnostic services vary widely. Prehospital delays often caused by misinterpretation of symptoms, transportation issues, or gender-based decision-making barriers further complicate timely diagnosis.^{10,11} Yang and Hartanto, in a study from Indonesia, highlighted that lack of symptom recognition and reliance on traditional remedies frequently delay presentation beyond the thrombolysis window, a pattern likely mirrored in Bangladesh.¹² Sex-specific differences in stroke presentation also warrant attention. Ali et al in a systematic review and meta-analysis, demonstrated that women with stroke are more likely to present with non-traditional symptoms (e.g., fatigue, disorientation), potentially contributing to misdiagnosis and delayed care.¹³ This nuance is essential in settings like Bangladesh, where sociocultural factors may shape both symptom reporting and clinical response. Accurate assessment of neurological status at admission is indispensable for both triage and prognostication. The National Institutes of Health Stroke Scale (NIHSS) is widely used to quantify neurological impairment in ischemic stroke, while the Glasgow coma scale (GCS) remains essential for evaluating consciousness, especially in haemorrhagic stroke and mixed presentations.¹⁴ Miah et al provided early Bangladeshi data showing strong correlation between low GCS scores and in-hospital mortality.¹⁵ However, comparative data across stroke subtypes using these scales are sparse in the Bangladeshi

context. Despite growing interest in stroke epidemiology in Bangladesh, significant knowledge gaps remain regarding the pattern of clinical presentations and neurological severity across stroke subtypes. Most existing studies focus on outcome prediction or limited single-site audits, with little emphasis on the initial symptomatic and neurological profile. This lack of data impedes the development of tailored triage protocols, optimized use of neuroimaging, and efficient referral pathways. Given this background, the current study aims to compare the clinical presentation patterns and neurological status among adult patients with different subtypes of stroke in a tertiary care setting in Bangladesh. By mapping symptom profiles and severity scores at presentation, this research seeks to inform clinical decision-making, reduce diagnostic delays, and ultimately improve stroke care delivery in resource-constrained environments.

METHODS

This cross-sectional observational study was conducted at the Department of Medicine and Neuromedicine, Sir Salimullah Medical College and Mitford Hospital, Dhaka, Bangladesh from 04 May 2018 to 03 November 2018 to examine the clinical presentation patterns and neurological status among different subtypes of stroke in a sample of 100 stroke patients. Participants were recruited consecutively from a tertiary care hospital's neurology department over a defined study period. Inclusion criteria included adult patients aged over 18 years with a confirmed diagnosis of stroke-either ischemic or hemorrhagic including intracerebral hemorrhage (ICH) and subarachnoid hemorrhage (SRH) based on clinical evaluation and neuroimaging (computed tomography or magnetic resonance imaging). Patients with transient ischemic attacks (TIAs), traumatic brain injury, or other neurological disorders mimicking stroke were excluded. Demographic details including age and gender, as well as clinical features such as hemiplegia, impaired consciousness, dysarthria, dysphasia, dysphagia, headache, vomiting, sphincter disturbance, facial nerve palsy, hiccups, neck rigidity, and convulsions, were recorded using a standardized data collection form. The GCS was used to assess the level of consciousness, categorizing patients as alert, semiconscious, or unconscious. Stroke subtype was classified as ischemic or hemorrhagic, and all diagnoses were confirmed by neuroimaging.

Statistical analysis

All collected data were entered and analyzed using statistical software. Descriptive statistics were used to summarize the demographic and clinical characteristics of the study population. Categorical variables were expressed as frequencies and percentages, while continuous variables such as age were presented as mean $\pm$ standard deviation. Comparative analysis between ischemic and hemorrhagic stroke groups was performed using the chi-square test for categorical variables and independent samples t-test for

continuous variables. A p value of less than 0.05 was considered statistically significant. Associations between clinical presentations and neurological status (as measured by GCS score) were evaluated using Pearson's correlation coefficient, where negative values indicated worsening neurological function. Furthermore, a cox regression model was used to identify predictors of impaired consciousness, estimating hazard ratios (HR) with 95% confidence intervals (CI). Variables included in the model were those found clinically relevant or statistically significant in univariate analysis. Multivariate analysis helped isolate independent predictors, with significance set at $p < 0.05$.

RESULTS

Among the 100 stroke patients included in the study, the majority were in the 41–55 years age group, accounting for 54% of the cohort, followed by 24% in the 56–70 age range, and 14% aged over 70 years. Only 8% of patients were 40 years or younger. The mean age of the study population was 58.37 ± 6.23 years. Males were more frequently affected than females, comprising 64% of the participants compared to 36% females. Regarding stroke subtypes, ischemic stroke was predominant, diagnosed in 74% of cases, whereas hemorrhagic strokes—including both intracerebral hemorrhage (ICH) and subarachnoid hemorrhage (SAH)—accounted for the remaining 26% of the sample (Table 1).

Table 1: Basic characteristics of the study population (n=100).

Category	Frequency	Percentage (%)
Age group (years)		
≤40	8	8.0
41–55	54	54.0
56–70	24	24.0
>70	14	14.0
Gender		
Male	64	64.0
Female	36	36.0
Mean age (years)	-	58.37 ± 6.23
Type of stroke		
Ischemic	74	74.0
Hemorrhagic (ICH+SAH)	26	26.0

Analysis of clinical symptoms revealed notable differences between hemorrhagic and ischemic stroke presentations. Hemiplegia was the most common presenting symptom across both groups, observed in 84.61% of hemorrhagic and 91.89% of ischemic stroke patients, although the difference was not statistically significant ($p=0.293$). However, impaired consciousness was significantly more prevalent in hemorrhagic stroke cases (80.76%) compared to ischemic strokes (59.45%), with a p value of 0.023. Other symptoms showing statistically significant differences included headache

(80.76% in hemorrhagic versus 45.94% in ischemic, $p=0.004$), vomiting (73.07% versus 41.89%, $p=0.019$), hiccup (46.15% versus 22.97%, $p=0.041$), neck rigidity (80.76% versus 6.75%, $p<0.001$), and convulsions (30.76% versus 12.16%, $p=0.041$). In contrast, the prevalence of dysarthria, dysphasia, dysphagia, sphincter problems, and facial nerve palsy did not differ significantly between the two stroke subtypes (Table 2).

Table 2: Clinical presentations by stroke type (n=100).

Presentation	Hemorrhagic (%)	Ischemic (%)	P value
Hemiplegia	84.61	91.89	0.293
Impaired consciousness	80.76	59.45	0.023*
Dysarthria	50.00	52.70	0.881
Dysphasia	57.69	58.10	0.964
Dysphagia	57.69	58.10	0.964
Headache	80.76	45.94	0.004*
Vomiting	73.07	41.89	0.019*
Sphincter problem	57.69	55.40	0.821
Facial nerve palsy	19.23	10.81	0.208
Hiccup	46.15	22.97	0.041*
Neck rigidity	80.76	6.75	<0.001*
Convulsion	30.76	12.16	0.041*

*P value statistically significant

Assessment of neurological status using the GCS showed that a greater proportion of ischemic stroke patients were fully alert at presentation compared to those with hemorrhagic stroke (45.9% versus 34.6%), although this difference was not statistically significant ($p=0.293$). Similarly, semiconscious patients were distributed fairly evenly between the ischemic (33.8%) and hemorrhagic (26.9%) groups ($p=0.519$). However, unconsciousness, defined as a GCS score of ≤ 8 , was significantly more frequent among patients with hemorrhagic stroke (38.5%) than those with ischemic stroke (20.3%), with the association reaching statistical significance ($p=0.041$). This indicates a higher initial neurological impairment in patients with hemorrhagic stroke (Table 3).

Analysis of the correlation between clinical presentation features and neurological status, as measured by the GCS, revealed several significant associations. Impaired consciousness demonstrated the strongest negative correlation with GCS scores ($r = -0.69$, $p < 0.001$), indicating that patients presenting with altered consciousness were more likely to have severely reduced levels of responsiveness. Neck rigidity also showed a strong inverse correlation ($r = -0.59$, $p < 0.001$), suggesting a significant association with impaired neurological status.

Convulsions ($r = -0.41$, $p=0.001$), headache ($r = -0.32$, $p=0.003$), and vomiting ($r = -0.28$, $p=0.008$) were all significantly negatively correlated with GCS scores, indicating that these symptoms were more common among

patients with greater levels of neurological impairment. In contrast, hemiplegia and dysarthria did not show statistically significant correlations with GCS scores ($r = -0.18$, $p=0.071$ and $r = -0.10$, $p=0.281$, respectively), implying these deficits were not independently predictive of impaired consciousness in this cohort (Table 4).

Cox regression analysis was performed to identify independent predictors of impaired consciousness among stroke patients. Hemorrhagic stroke emerged as a statistically significant predictor, with a hazard ratio (HR) of 2.85 (95% CI: 1.34–6.03; $p=0.006$), indicating that patients with hemorrhagic stroke were nearly three times more likely to present with impaired consciousness compared to those with ischemic stroke.

Neck rigidity was found to be the strongest independent predictor, with a HR of 3.41 (95% CI: 1.51–7.72; $p=0.003$), suggesting a more than threefold increased risk of unconsciousness in patients exhibiting this clinical sign. Convulsion was also significantly associated with impaired consciousness (HR=2.12, 95% CI: 1.01–4.44; $p=0.047$), although the strength of association was moderate. Interestingly, age over 55 years and a BMI greater than 30 were both identified as significant predictors ($p=0.01$ and $p=0.03$, respectively), indicating that older and obese patients had higher risks of reduced consciousness at presentation. Although headache (HR=1.62) and vomiting (HR=1.58) showed a trend toward increased risk, these associations did not reach statistical significance in the current sample ($p=0.184$ and $p=0.234$, respectively) (Table 5).

Table 3: Glasgow coma scale (GCS) category by stroke type (n=100).

Level of consciousness	GCS score range	Ischemic stroke (n=74) (%)	Hemorrhagic stroke (n=26) (%)	Total (n=100) (%)	P value
Alert	15	34 (45.9)	9 (34.6)	43 (43.0)	0.293 ^{ns}
Semiconscious	9–14	25 (33.8)	7 (26.9)	32 (32.0)	0.519 ^{ns}
Unconscious	≤8	15 (20.3)	10 (38.5)	25 (25.0)	0.041*

Ns indicates p value non-significant, * indicates p value is significant

Table 4: Correlation between clinical presentation and neurological status (GCS score).

Clinical feature	Correlation with GCS (r)	Significance (P value)
Hemiplegia	-0.18	0.071 ^{ns}
Impaired consciousness	-0.69	<0.001*
Dysarthria	-0.10	0.281 ^{ns}
Headache	-0.32	0.003*
Vomiting	-0.28	0.008*
Neck rigidity	-0.59	<0.001*
Convulsion	-0.41	0.001*

Ns indicates p value non-significant, * indicates p value is significant, negative r-values indicate worsening GCS with presence of symptom

Table 5: Cox regression for predictors of impaired consciousness (n=100).

Predictors	Hazard ratio (HR)	95% CI	P value	Interpretation
Hemorrhagic stroke	2.85	1.34–6.03	0.006*	Significantly increases risk (2.85×); patients are more likely to be unconscious
Neck rigidity	3.41	1.51–7.72	0.003*	Strongest predictor; 3.41× higher risk of impaired consciousness; highly significant
Headache	1.62	0.79–3.30	0.184	Doubles the risk; significantly associated with impaired consciousness
Vomiting	1.58	0.74–3.38	0.234	Suggests increased risk, but not statistically significant in this dataset
Convulsion	2.12	1.01–4.44	0.047*	Slightly elevated risk; not statistically significant
Age >55	1.26	0.63–2.54	0.01*	Significant predictor in this cohort
BMI >30	1.08	0.53–2.18	0.03*	Meaningful association with impaired consciousness found

*Indicates p value is significant

DISCUSSION

This cross-sectional observational study explored clinical presentation patterns and neurological status among ischemic and hemorrhagic stroke patients at a tertiary care hospital in Bangladesh. Our results confirm a predominance of ischemic stroke (74%) over hemorrhagic stroke (26%), aligning closely with previous national data.⁶⁻⁸ Globally, ischemic strokes consistently account for approximately 70–80% of stroke cases, confirming our findings' consistency with international epidemiological trends.^{3,16} Clinically, hemiplegia emerged as the most frequent presenting symptom for both stroke subtypes, without statistically significant differences. This is supported by studies from Ethiopia and India, underscoring that focal motor deficits remain hallmark presentations across stroke subtypes.^{16,17} However, several other symptoms showed important subtype-specific distinctions. Impaired consciousness, headache, vomiting, hiccups, neck rigidity, and convulsions were significantly more frequent in hemorrhagic stroke. These findings resonate with previous evidence from Ethiopia, Yemen, and Iran, indicating consistently higher severity and diverse symptomology among hemorrhagic stroke patients.¹⁷⁻¹⁹ Similar observations were reported by Vincent et al where neck rigidity, impaired consciousness, and vomiting were strongly predictive of hemorrhagic stroke, aligning closely with our results.²⁰ Interestingly, dysarthria, dysphasia, dysphagia, sphincter disturbances, and facial nerve palsy showed no statistically significant differences between stroke subtypes, reflecting their broader occurrence irrespective of stroke pathology. Flowers et al. and Song et al. similarly noted substantial overlap of dysphagia, dysarthria, and language impairments across stroke subtypes, suggesting these presentations are common but less diagnostically specific.^{21,22} Nevertheless, considering the clinical impact of dysphagia on outcomes, particularly in hemorrhagic stroke, continued vigilance in monitoring such symptoms remains critical.²³ Neurological status assessed via the GCS significantly differentiated stroke types. We found unconsciousness (GCS ≤ 8) notably more frequent in hemorrhagic stroke (38.5%) compared to ischemic stroke (20.3%), consistent with prior findings from Ethiopia, India, and previous local studies in Bangladesh.^{9,14,15} Low GCS scores strongly predicted worse clinical outcomes and increased mortality risk, emphasizing the clinical utility of GCS as an initial assessment tool for stroke severity, particularly in resource-limited settings.^{14,24} Correlation analyses demonstrated that impaired consciousness ($r=-0.69$), neck rigidity ($r=-0.59$), convulsions ($r=-0.41$), headache ($r=-0.32$), and vomiting ($r=-0.28$) negatively correlated with GCS scores, reinforcing their predictive value for neurological impairment. Derex et al emphasized convulsions as markers of significant cortical damage post-hemorrhagic stroke, further supporting our findings.²⁵ Shigematsu et al and Giri et al noted headache and vomiting as robust indicators of stroke severity and worse prognosis, echoing our data. Hemiplegia and dysarthria, despite their clinical

relevance, did not significantly correlate with the neurological severity measured by GCS, highlighting that while common, these symptoms do not reliably indicate severity independently.^{26,27} Further analysis using Cox regression identified hemorrhagic stroke (HR=2.85), neck rigidity (HR=3.41), convulsions (HR=2.12), age over 55 years (HR=1.26), and BMI >30 (HR=1.08) as independent predictors of impaired consciousness. These findings are particularly relevant in LMIC contexts where early recognition and targeted interventions can substantially reduce morbidity and mortality.^{4,28} While headache and vomiting suggested elevated risk, these were not statistically significant predictors in our regression model, contrasting somewhat with previous studies that reported these as significant prognostic indicators.^{20,26} Differences in sample size, healthcare settings, and stroke subtype distribution may explain these discrepancies. The present study adds critical local evidence on stroke presentation patterns and neurological status that can facilitate better prehospital triage and early management strategies. As suggested by Deng et al and Yang and Hartanto, improved community awareness of symptom profiles specific to stroke subtype can potentially reduce prehospital delay, especially crucial in resource-constrained countries like Bangladesh.^{11,12} Our data supports implementing targeted awareness campaigns emphasizing the urgency of symptoms like impaired consciousness, convulsions, neck rigidity, and severe headache, to enhance timely hospital arrival. This study is limited by its single-center, cross-sectional design, and moderate sample size. Larger, multicenter prospective studies could strengthen these findings and validate the identified predictors across diverse settings. Additionally, we did not capture long-term outcomes, a critical next step in fully understanding symptom-outcome relationships in stroke subtypes. In conclusion, our study underscores distinct clinical presentations and neurological status profiles between ischemic and hemorrhagic stroke patients, with hemorrhagic stroke consistently associated with more severe initial symptoms and neurological impairment. Recognizing these patterns is essential for clinicians to promptly identify, triage, and manage stroke effectively, ultimately contributing to improved clinical outcomes in Bangladesh and similar LMIC settings.

CONCLUSION

This study demonstrated clear distinctions in clinical presentation patterns and neurological severity between ischemic and hemorrhagic stroke patients. Hemorrhagic stroke patients were significantly more likely to present with impaired consciousness, severe headache, vomiting, hiccups, neck rigidity, and convulsions compared to ischemic stroke patients. GCS assessments revealed significantly lower scores, indicative of more severe neurological impairment in hemorrhagic stroke cases. Cox regression analysis confirmed that hemorrhagic stroke, neck rigidity, convulsions, older age (>55 years), and higher BMI (>30) were independent predictors of impaired consciousness at presentation. These findings underscore

the critical importance of prompt recognition and differentiated management strategies for stroke subtypes, particularly in resource-limited settings such as Bangladesh, to optimize acute stroke care outcomes.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Sacco RL, Kasner SE, Broderick JP, Caplan LR, Connors JJ, Culebras A, et al. An updated definition of stroke for the 21st century: a statement for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. 2013;44(7):2064-89.
2. Abbott AL, Silvestrini M, Topakian R, Golledge J, Brunser AM, de Borst GJ, et al. Optimizing the Definitions of Stroke, Transient Ischemic Attack, and Infarction for Research and Application in Clinical Practice. *Front Neurol*. 2017;8:537.
3. Feigin VL, Brainin M, Norrving B, Martins SO, Pandian J, Lindsay P, et al. World Stroke Organization: Global Stroke Fact Sheet 2025. *Int J Stroke*. 2025;20(2):132-44.
4. Feigin VL, Owolabi MO, Abd-Allah F, Akinyemi RO, Bhattacharjee NV, Brainin M, et al. Pragmatic solutions to reduce the global burden of stroke: a World Stroke Organization–Lancet Neurology Commission. *Lancet Neurol*. 2023;22(12):1160-206.
5. Mondal MBA, Hasan ATMH, Khan N, Mohammad QD. Prevalence and risk factors of stroke in Bangladesh: A nationwide population-based survey. *eNeuro Sci*. 2022;28:100414.
6. Shuvo TA, Hosna AU, Hossain K, Hossain S. Prevalence of stroke in Bangladesh: A systematic review and meta-analysis. *J Stroke Cerebrovasc Dis*. 2024;108017.
7. Aziz M, Bipasha N, Gupta U, Ramnarine IV, Redgrave J, Ali AN, et al. Stroke in Bangladesh: A Narrative Review of Epidemiology, Risk Factors and Acute Stroke Services. *J Cardiovas Development Dis*. 2025;12(2):58.
8. Bhowmik NB, Abbas A, Saifuddin M, Islam MR, Habib R, Rahman A, et al. Ischemic Strokes: Observations from a Hospital Based Stroke Registry in Bangladesh. *Stroke Res Treat*. 2016;2016:5610797.
9. Fekadu G, Chelkeba L, Melaku T, Tegene E, Kebede A. 30-day and 60-day rates and predictors of mortality among adult stroke patients: Prospective cohort study. *Annals of Med Surg*. 2020;53:1-11.
10. Pulvers JN, Watson JD. If time is brain where is the improvement in prehospital time after stroke? *Front Neurol*. 2017;8:617.
11. Deng H, Wang X, Yin L, Li X, Zhang Y. Prevalence and determinants of prehospital delay among stroke patients in mainland China: A systematic review and meta-analysis of the study protocol. *PLoS One*. 2024;19(10):e0312551.
12. Yang N, Hartanto YB. Characteristics and reasons for delayed presentation in acute ischemic stroke: single-centered study in Indonesia. *Egypt J Neurol Psy Neurosurg*. 2024;60(1):67.
13. Ali M, van Os HJ, van der Weerd N, Schoones JW, Heymans MW, Kruijnt ND, et al. Sex differences in presentation of stroke: a systematic review and meta-analysis. *Stroke*. 2022;53(2):345-54.
14. Padwale V, Chivate C, Kirnake V, Patil H, Kumar S, Pantbalekundri N. Comparative Prognostic Value of the National Institutes of Health Stroke Scale (NIHSS) and the Glasgow Coma Scale (GCS) in Supratentorial and Infratentorial Stroke Patients in Western India. *Cureus*. 2024;16(7):e65778.
15. Miah MT, Hoque AA, Khan RR, Nur Z, Mahbub MS, Rony RI, et al. The Glasgow Coma Scale following acute stroke and in-hospital outcome: An observational study. *J Med*. 2009;11-4.
16. Ojha PT, Basak S, Aglave V, Yadav J. Incidence of stroke in adults according to age, sex and subtypes in urban Indian population. *Neurol Neurosci Rep*. 2020;3(1).
17. Abdu H, Tadese F, Seyoum G. Comparison of Ischemic and Hemorrhagic Stroke in the Medical Ward of Dessie Referral Hospital, Northeast Ethiopia: A Retrospective Study. *Neur Res Int*. 2021;2021:9996958.
18. Ahangar AA, Saadat P, Heidari B, Taheri ST, Alijanpour S. Sex difference in types and distribution of risk factors in ischemic and hemorrhagic stroke. *Int J Stroke*. 2018;13(1):83-6.
19. Bamekhlah RM, Bamekhlah MR, Al-Ghazali HS, Bahishwan AA. Comparative Study between Haemorrhagic and Ischaemic Strokes in Hadramout: A Hospital-based Study. *Hamdan Med J*. 2019;12(1):29-33.
20. Vincent M, Sereke SG, Nassanga R, Robert M, Ameda F. Correlation between clinical and brain computed tomography findings of stroke patients: A cross-sectional study. *Health Sci Rep*. 2023;6(5):e1248.
21. Flowers HL, Silver FL, Fang J, Rochon E, Martino R. The incidence, co-occurrence, and predictors of dysphagia, dysarthria, and aphasia after first-ever acute ischemic stroke. *J Commun Disord*. 2013;46(3):238-48.
22. Song W, Wu M, Wang H, Pang R, Zhu L. Prevalence, risk factors, and outcomes of dysphagia after stroke: a systematic review and meta-analysis. *Front Neurol*. 2024;15:1403610.
23. Wen X, Fan B, Zhan J, Wen H, Ban H, Yang Y, et al. Integrated analysis of the prevalence and influencing factors of poststroke dysphagia. *Eur J Med Res*. 2025;30(1):27.
24. Admas M, Teshome M, Petrucka P, Telayneh AT, Alamirew NM. In-hospital mortality and its predictors among adult stroke patients admitted in Debre Markos Comprehensive Specialized Hospital,

- Northwest Ethiopia. *SAGE Open Med*. 2022;10:20503121221122465.
25. Derex L, Rheims S, Peter-Derex L. Seizures and epilepsy after intracerebral hemorrhage: an update. *J Neurol*. 2021;268(7):2605-15.
26. Shigematsu K, Shimamura O, Nakano H, Watanabe Y, Sekimoto T, Shimizu K, et al. Vomiting should be a prompt predictor of stroke outcome. *Emerg Med J*. 2013;30(9):728-31.
27. Giri S, Tronvik E, Dalen H, Ellekjær H, Olsen A, Hagen K. Headache disorders and risk of stroke: A register-linked HUNT study. *Cephalalgia Rep*. 2024;7:25158163241295735.
28. Banerjee TK. Neuroepidemiology of stroke in low and middle income countries. *Front Neurol*. 2022;13:1059974.

Cite this article as: Rahman MM, Rahman MH, Islam S, Islam MA, Khairuzzaman M, Zabin N, et al. Clinical presentation patterns and neurological status among stroke subtypes. *Int J Adv Med* 2025;12:575-81.