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RETROSPECTIVE ANALYSIS OF THE PREVALENCE AND IMPACT OF APHASIA IN ACUTE STROKE PATIENTS ADMITTED TO STROKE UNIT, AL QASSIMI HOSPITAL

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Abstract :
Background: Aphasia is a common and disabling complication of stroke that affects communication, social participation, and rehabilitation outcomes. Despite its significance, there is limited retrospective research on aphasia prevalence and impact in stroke unit settings, particularly in the United Arab Emirates. **Objective:** To determine the prevalence of aphasia among acute stroke patients admitted to the Stroke Unit at Al Qassimi Hospital and assess its association with demographic and clinical factors, stroke severity, lesion characteristics, and hospital outcomes. **Methods:** This retrospective observational study reviewed medical records of acute stroke patients admitted between July 2023 and July 2024. Demographic data, stroke characteristics, lesion location, presence of aphasia, NIHSS scores, hospital length of stay (LOS), and outcomes were analyzed. Statistical analyses included descriptive statistics, chi-square tests, t-tests, ANOVA, and regression models. **Results:** Among 429 stroke patients, 14.9% presented with aphasia. Aphasia was significantly associated with ischemic infarction (17%) and left-hemisphere lesions, especially in the basal ganglia, parietal lobe, and MCA territories. Patients with aphasia had higher NIHSS scores (mean = 12.8) compared to non-aphasic patients (mean = 3.8; $p < 0.001$). Aphasia prevalence increased with stroke severity, affecting nearly 90% of severe stroke cases. Aphasic patients also had longer hospital stays (mean = 12.4 days vs. 4.8 days, $p < 0.001$) and were overrepresented among in-hospital deaths. **Conclusion:** Aphasia occurred in 14.9% of stroke patients and was significantly associated with greater stroke severity, left-hemisphere lesions, and prolonged hospitalization. Early identification and integrated rehabilitation are critical for improving outcomes in this high-risk group.

Keywords: aphasia, stroke, NIHSS, prevalence, United Arab Emirates, stroke unit, rehabilitation

I. INTRODUCTION

Stroke is a leading cause of disability and mortality worldwide. Specialized stroke units, managed by multidisciplinary teams, improve outcomes and reduce complications (National Stroke Foundation, 2010). Aphasia, a language disorder resulting from stroke-related brain injury, is one of the most disabling sequelae, affecting up to one-third of patients in some populations. It significantly impairs communication, quality of life, and rehabilitation success.

Aphasia is associated with poorer outcomes, including increased mortality, longer hospital stays, and greater rehabilitation needs (Wu et al., 2020). However, although a few hospital-based studies from Egypt and neighboring Middle Eastern countries have reported aphasia prevalence ranging from 20% to 62% among stroke patients (Khedr et al., 2020; Ghoreyshi et al., 2021), comprehensive data on its prevalence and impact within stroke unit settings across the region remain limited.

This study aims to investigate the prevalence, predictors, and clinical consequences of aphasia in acute stroke patients admitted to the Stroke Unit at Al Qassimi Hospital, UAE.

II. METHOD

Study Design and Setting

This retrospective observational study was conducted in the Stroke Unit of Al Qassimi Hospital, a tertiary care center in Sharjah, UAE. The hospital provides comprehensive stroke management, including neuroimaging, thrombolysis, and rehabilitation services. Medical records of all patients admitted with acute stroke between July 2023 and July 2024 were reviewed.

Study Population and Sampling

Inclusion criteria:

- Age ≥18 years.
- Diagnosis of acute stroke confirmed by imaging.

- Admission to the Stroke Unit.
- Aphasia diagnosis documented in clinical records.

Exclusion criteria:

- Previous history of stroke.
- Other neurological or psychiatric disorders affecting language (e.g., dementia).
- Reduced level of consciousness on admission.
- Patients with transient ischemic attacks, which are resolved within 24 hours without causing permanent brain injury, may be excluded
- Non-supported primary languages.

A total of 429 patients met the inclusion criteria.

Diagnosis of Aphasia and Other Studied Variables

Aphasia was identified by clinical diagnosis recorded in patient charts and confirmed by stroke neurologists. Additional variables collected included:

- Demographics: age, gender, nationality, education level, risk factors (smoking, hypertension, diabetes, atrial fibrillation).
- Stroke characteristics: stroke type (ischemic infarction, hemorrhagic, TIA), lesion laterality and location.
- Severity: National Institutes of Health Stroke Scale (NIHSS) scores on admission.
- Outcomes: hospital LOS, discharge status (improved, transferred, deceased).

III. Statistical Analysis

Data were analyzed using SPSS v26. Descriptive statistics summarized demographics and stroke features. Prevalence of aphasia was expressed as percentages. Associations between aphasia and categorical variables were assessed using chi-square tests. Continuous variables were compared using t-tests and ANOVA. Logistic regression identified predictors of aphasia. Correlation analyses assessed relationships between aphasia, NIHSS, and LOS. A p-value <0.05 was considered statistically significant.

IV. Results

4.1 Patient Characteristics

A total of 429 acute stroke patients were analyzed. The mean age was 54.7 ± 12.3 years, and 58% were male. Hypertension (62.2%) and diabetes mellitus (55.6%) were the most common comorbidities. No significant differences in age, gender, or risk factors were observed between aphasic and non-aphasic patients (all $p > 0.05$).

Table 4.1: Baseline characteristics of stroke patients with and without aphasia (N=429).

Variable	Total (N=429)	Aphasia (n=64, 14.9%)	No Aphasia (n=365, 85.1%)	p-value
Age, mean ± SD	54.7 ± 12.3	56.1 ± 11.9	54.4 ± 12.4	0.32
Male sex, n (%)	249 (58.0)	36 (56.3)	213 (58.4)	0.75
Hypertension, n (%)	267 (62.2)	42 (65.6)	225 (61.6)	0.29
Diabetes, n (%)	238 (55.6)	38 (59.4)	200 (54.8)	0.37
Smoking, n (%)	105 (24.5)	16 (25.0)	89 (24.4)	0.88
Atrial fibrillation, n (%)	19 (4.4)	2 (3.1)	17 (4.7)	0.55

4.2 Stroke Type, Lesion Location, and Laterality

The majority of patients presented with acute ischemic stroke (n = 379; 88.3%), while acute hemorrhagic stroke was identified in 28 patients (6.5%), and transient ischemic attack (TIA) in 22 patients (5.1%). Fig1 Neuroimaging findings (CT/MRI) revealed that infarction was the most common radiological pattern, observed in 336 cases (78.3%). Hemorrhagic lesions were identified in 62 patients (14.5%), whereas 27 scans (6.3%) appeared normal or unremarkable. Other findings, such as structural abnormalities or chronic changes unrelated to the acute event, were noted in 4 cases (0.9%). Fig2

Aphasia was more prevalent among patients with acute ischemic stroke (17%), compared to acute hemorrhagic stroke (3.2%) and TIA, where language deficits were uncommon. Lesions localized to the left cerebral hemisphere, particularly involving the middle cerebral artery (MCA) territory, basal ganglia, and parietal, frontal, or temporal lobes, were most frequently associated with aphasia.

These findings indicate that ischemic stroke constituted the predominant subtype in this cohort, with infarction as the principal neuroimaging feature. Moreover, the association between left-hemisphere lesions and aphasia reinforces the well-established lateralization of language functions and underscores the importance of early neuroimaging for identifying patients at risk and guiding targeted rehabilitation strategies.

Figure 1: Stroke Type

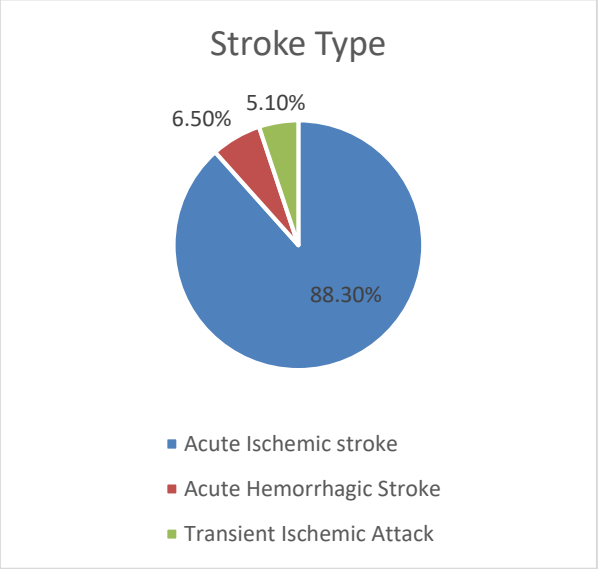
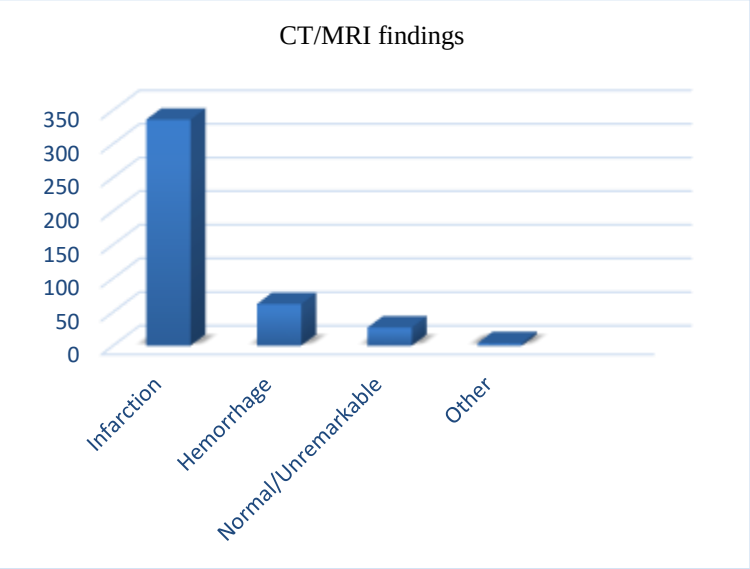


Figure 2: CT/MRI findings



4.3 Prevalence and Stroke Severity

Aphasia was present in 64 patients (14.9%). Mild aphasia was the most common (8.4%), with severe (4.9%) and mute cases (1.4%) being less frequent. Expressive aphasia was observed in 1.9%, global aphasia in 1.4%, and receptive aphasia in 0.9%.

Table 4.3: Aphasia by stroke and severity

Aphasia Variable	N	%
Aphasia Present	64	0.149
Mild	36	0.084
Severe	21	0.049
Mute	6	0.014
Not charted on the system	1	0.002

4.4 Stroke Severity (NIHSS)

Patients with aphasia had significantly higher NIHSS scores at admission (12.79 ± 5.69) compared to patients without aphasia (3.81 ± 3.72), indicating more severe neurological impairment (Mann-Whitney $U = 2119.5$, $p < 0.001$). The point-biserial correlation demonstrated a moderate-to-strong positive association between NIHSS and aphasia ($r = 0.619$, $p < 0.001$). *(Table 4.4)*

A strong correlation was observed between stroke severity (NIHSS) and aphasia: 88% of patients with NIHSS ≥16 exhibited aphasia, and mean NIHSS scores were significantly higher in aphasic patients (12.79 vs. 3.81, $p < 0.001$). These findings confirm that aphasia is a marker of more extensive neurological injury, consistent with previous literature (Boehme et al., 2016; Adina et al., 2021). Clinically, this reinforces the utility of NIHSS in early detection of language impairment.

Table 4.4.1: Aphasia Presence AND NIHSS

Aphasia Presence	N	NIHSS Mean ± SD	Median	Range
No	365	3.81 ± 3.72	3	0–18
Yes	64	12.79 ± 5.69	13	3–29

4.5 Impact on Hospitalization and Functional Outcomes

The duration of hospital stay among the study cohort (n = 429) ranged from 0 to 146 days, with a mean of 5.93 days (SD = 10.92). The data were not normally distributed, reflecting substantial variability in hospitalization length across patients.

When analyzed by aphasia status, patients with aphasia (n = 64) had a mean length of stay (LoS) of 12.4 days (median = 6.0), compared with a mean of 4.8 days (median = 3.0) among those without aphasia (n = 365). The maximum duration of hospitalization reached 146 days in aphasic patients compared with 87 days among non-aphasic individuals.

A Mann–Whitney U test demonstrated a statistically significant difference in hospital stay between the two groups ($U = 5550.0$, $Z = -6.801$, $p < 0.001$), confirming that the presence of aphasia was associated with a prolonged hospitalization following stroke. These finding align with prior reports linking aphasia to increased inpatient complications, longer LOS, and poorer short-term functional outcomes (Boehme et al., 2016; Adina et al., 2021).

These results highlight the importance of early aphasia identification and integrated multidisciplinary rehabilitation, which may help reduce hospitalization duration and improve overall recovery outcomes.

V. Discussion

This study demonstrates that aphasia is a clinically important complication of acute stroke in our cohort, with a prevalence of 14.9%. This rate is comparable to hospital-based studies in Egypt and Southeast Asia but lower than European cohorts (Khedr et al., 2020; Grönberg et al., 2022). The younger age distribution of our patients likely contributes to the lower incidence, since older age is an established risk factor for aphasia (Bowen et al., 2021).

The strong association between aphasia and stroke severity is a major finding. Patients with aphasia exhibited significantly higher NIHSS scores, and almost nine out of ten patients with severe stroke (NIHSS $\geqslant$16) developed aphasia. These results mirror prior reports that language impairment reflects greater neurological burden and larger cortical-subcortical involvement (Boehme et al., 2016). Clinically, this highlights the importance of integrating aphasia assessment within NIHSS evaluation to enhance prognostic accuracy and guide early rehabilitation.

Lesion mapping reinforced the critical role of the left MCA territory, basal ganglia, and parietal lobe in post-stroke aphasia, consistent with classic neuroanatomical models (Bohra et al., 2015; Khedr et al., 2020). The occasional occurrence of aphasia in right or bilateral strokes underscores the variability of hemispheric language dominance and the importance of subcortical and associative networks. Future research should employ advanced imaging such as diffusion tensor tractography to delineate language-related white matter pathways.

Contrary to expectations, vascular risk factors and demographics did not significantly predict aphasia in our cohort. This may reflect sample homogeneity, or that lesion site and severity exert greater influence than systemic comorbidities. Such findings are in line with some reports from Brazil and China (Lima et al., 2020; Wu et al., 2020).

Importantly, aphasia was linked to worse hospital outcomes. Length of stay was significantly longer in aphasic patients, and mortality disproportionately higher, corroborating studies showing aphasia as a predictor of dependency, healthcare burden, and poor survival (Adina et al., 2021; Frederick et al., 2022). These results stress the need for early speech–language therapy integration in acute stroke management.

VI. Conclusion

This study demonstrates that aphasia is a common complication in acute stroke patients, with a prevalence of 14.9%, and is closely associated with stroke severity and left-hemisphere lesions. Patients with aphasia experienced longer hospital stays and greater functional impairment, underscoring its clinical significance for recovery planning and healthcare resource allocation.

Strengths of this study include the comprehensive analysis of a well-defined cohort, systematic evaluation of clinical and demographic variables, and integration of neuroimaging and NIHSS data to assess the association between aphasia and stroke severity.

However, the study has several limitations: it is retrospective, single-center, and has a relatively small sample size; aphasia subtypes were not precisely classified due to the unavailability of speech therapists; detailed lesion mapping was limited; and long-term functional outcomes, such as discharge MRS scores and post-discharge recovery, were not consistently available.
Based on these findings, the following recommendations are proposed:

1. Early systematic screening for aphasia in acute stroke patients, particularly in those with moderate-to-severe strokes or left-hemisphere lesions.
2. Integration of multidisciplinary rehabilitation, including speech-language therapy and neuropsychology, to optimize recovery and reduce hospital stay.
3. Prospective multicenter studies with standardized outcome measures and detailed lesion mapping to better understand aphasia recovery trajectories.
4. Routine documentation of functional outcomes such as discharge mRS scores to guide post-stroke care planning.

Overall, early recognition and targeted management of aphasia are critical for improving functional outcomes, reducing healthcare burden, and guiding resource allocation in stroke care.

Abbreviations

NIHSS: National Institutes of Health Stroke Scale, LOS: Length of Stay, TIA: Transient Ischemic Attack, MCA: Middle Cerebral Artery

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Not applicable.

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Not applicable

ETHICS APPROVAL

The study protocol was approved by the Research Ethics Committee of the Ministry of Health and Prevention before data collection commenced. In addition, approval for publication of the study results was granted by the Data & Statistics Department Research Section within the Emirates Health Services. This study adhered to all ethical principles, ensuring the confidentiality and privacy of patient information throughout the entire research process.

DATA AVAILABILITY STATEMENT

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

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