Original Article

https://doi.org/10.1590/2317-6431-2025-3036en

Audiology Communication Research
ISSN 2317-6431

Speech therapy profile of patients after ischemic stroke: prevalence of aphasia and level of oral intake

Perfil fonoaudiológico de pacientes pós-acidente vascular cerebral isquêmico: prevalência de afasia e nível de ingestão oral

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ABSTRACT

Purpose: To characterize the profile of the population of a Stroke Unit regarding the prevalence of aphasia and level of oral intake after the first ischemic stroke. **Methods:** Quantitative, cross-sectional and retrospective study, collecting data from patients' electronic medical records, carried out in a Stroke Unit in a state hospital in Florianópolis, Santa Catarina State. **Results:** The total population was 317 patients, of which 225 were included. The sample consisted predominantly of men and elderly individuals. Aphasia was present in 23.1% of patients at admission, with a reduction to 19.5% at discharge. Regarding the level of oral intake at admission and discharge from the Stroke Unit, it was observed that there was a significant reduction in the number of patients with Functional Oral Intake Scale (FOIS) 1 and a significant increase in FOIS 5. **Conclusion:** A significant improvement in the severity of aphasia and in oral intake during hospitalization was observed, especially in patients undergoing speech-language pathology intervention.

Keywords: Ischemic stroke; Stroke; Aphasia; Dysphagia; Speech therapy

RESUMO

Objetivo: Caracterizar o perfil da população de uma Unidade de Acidente Vascular Cerebral quanto à prevalência de afasia e nível de ingestão oral após primeiro acidente vascular cerebral isquêmico. **Métodos:** Estudo quantitativo, transversal e retrospectivo, com coleta de dados em prontuário eletrônico dos pacientes, realizado em uma Unidade de Acidente Vascular Cerebral em Florianópolis, Santa Catarina. **Resultados:** A população total da amostra foi de 317 pacientes; destes, 225 foram incluídos. A amostra foi composta predominantemente por homens e idosos. A afasia esteve presente em 23,1% dos pacientes na admissão, com redução para 19,5% na alta. Já com relação ao nível de ingestão oral na admissão e alta, observou-se redução significativa do número de pacientes no nível 1 da *Functional Oral Intake Scale* e aumento expressivo no nível 5. **Conclusão:** Foi observada melhora significativa na gravidade da afasia e na capacidade de ingestão oral durante a internação, especialmente em pacientes submetidos à intervenção fonoaudiológica.

Palavras-chave: Acidente vascular cerebral isquêmico; Acidente vascular cerebral; Afasia; Disfagia; Fonoaudiologia

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Conflict of interests: No.
Authors' contribution: ALM was responsible for data collection and tabulation of results, analysis, and discussion; DB was responsible for the study design and construction of the results and analysis; RRL was responsible for the analysis and construction of the discussion, together with ALM.
Data Availability Statement
Research data is available in the body of the article.
Funding: None.
Corresponding author: Ana Letícia Mais. E-mail: analeticiafga@gmail.com
Received: March 06, 2025; **Accepted:** June 17, 2025
Editor-in-Chief: Renata Mota Mamede Carvallo.
Associate Editor: Ana Paula Machado Goyano Mac-Kay.

INTRODUCTION

Stroke is one of the leading causes of disability in the elderly population[1] and is associated with sequelae such as aphasia and dysphagia[2]. The language impairment that occurs after a stroke is called aphasia, which is characterized as a disorder that affects not only the content but also the form and use of spoken and written language, impacting both comprehension and expression[3]. Studies indicate that the prevalence of aphasia after stroke ranges from 15.2% to 42%, reaching 22.6% in Brazil, with advanced age and greater severity highlighted as predictive factors[4]. Dysphagia, in turn, is associated with difficulty swallowing food and is characterized by signs such as reduced or absent chewing control, prolonged oral transit time, among others[3]. It affects about 44% of individuals after stroke[2], with a combined prevalence estimated at 60% according to a systematic review study[5].

In Brazil, the prevalence of stroke increases significantly among people over the age of 60, reflecting a growing elderly population, which is expected to rise from 15.6% in 2023 to 37.8% in 2070, according to the Brazilian Institute of Geography and Statistics (IBGE)[6]. Considering that aphasia is present in approximately 23%[7] of individuals affected by stroke, increased life expectancy and the resulting rise in stroke incidence may lead to a proportional increase in the number of patients with aphasia. These conditions impact essential skills such as language and swallowing, compromising quality of life and social interaction[8].

Although there are data on the prevalence of aphasia after stroke in Brazilian contexts, there are still gaps in understanding the specific conditions that influence the presence and severity of aphasia, especially with regard to first ischemic stroke and its relationship with oral intake. This aspect underscores the need to explore how these variables interact across different populations and clinical settings.

This study aimed to characterize the profile of a Stroke Unit population regarding the prevalence of aphasia and the level of oral intake after the first ischemic stroke (IS), contributing to the development of more effective screening and intervention protocols.

METHODS

The research project was approved by the institution's Research Ethics Committee (REC) on 05/22/2024, opinion number 6.829.246. As the study involved only data from medical records, the Informed Consent Form (ICF) was waived.

This is a quantitative, cross-sectional, and retrospective study, with data collected from the Electronic Patient Record (EPR), conducted in a Stroke Unit (SU) at a neurology and neurosurgery reference center. The Unit, located in Florianópolis, Santa Catarina, has a team of 18 specialized neurologists who treat about 1,200 cases per year.

Data collection began after REC approval, and the study included patients admitted to the SU after a first IS diagnosis between 01/01/2023 and 12/31/2023, totaling 225 individuals.

Inclusion criteria considered eligible patients over 18 years old, of both genders, fluent in Brazilian Portuguese (BP), with a first diagnosis of stroke. Excluded from the study were foreign patients not fluent in BP, individuals with a prior diagnosis of other neurological diseases, hemorrhagic stroke, IS with hemorrhagic transformation and/or inconclusive IS diagnosis, patients requiring orotracheal intubation (OTI) and/or tracheostomy after SU admission, individuals with total visual impairment, and incomplete records in the National Institutes of Health Stroke Scale (NIHSS) item.

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For data collection, the following were considered: medical record number, age, gender, education level, patient comorbidities (hypertension, diabetes, and dyslipidemia), length of hospital stay, overall NIHSS and the best language item, assessed by the responsible physician at admission, after thrombectomy and/or thrombolysis, and at discharge from the SU. Stroke severity classification[9,10] is based on: a) NIHSS scores, with levels defined as NIHSS 0–4 = mild stroke; NIHSS 5–10 = moderate stroke; NIHSS 11–20 = severe stroke; NIHSS >20 = very severe stroke; b) Bamford clinical classification; c) whether mechanical thrombectomy and/or thrombolytic therapy were performed; d) score on the Functional Oral Intake Scale (FOIS) at admission and discharge, according to the prescribed diet, with the admission value considered within the first 24 hours of hospitalization. FOIS was rated independently by three blinded evaluators, considering only the medical prescription.

The NIHSS is a clinical scale used to assess deficits and measure the severity of a stroke, covering neurological aspects such as level of consciousness, speech, eye movement, and strength of the upper and lower limbs, among others. The scale includes 15 items and scores range from 0 to 42, with severity directly related to higher scores[11].

The Bamford clinical scale evaluates stroke patients based on initial symptoms and helps assess prognosis at early signs. It classifies strokes into four types: Lacunar Syndromes (LACS), Total Anterior Circulation Syndromes (TACS), Partial Anterior Circulation Syndromes (PACS), and Posterior Circulation Syndromes (POCS)[12].

Among the scales used for oral intake assessment, the FOIS measures the intake level based on consistency, volume, and the need for assisted feeding; scores range from 1 – nothing by mouth – to 7 – full oral intake with no restrictions.

Data collected in the Hospital Health Management System were recorded using Google® Forms and tabulated in Google® Sheets. To assess language evolution between admission and discharge, the McNemar test was used for the NIHSS language score category, appropriate for comparing paired proportions in repeated measures. Normality of quantitative variables was tested with the Shapiro-Wilk test. All analyses were performed using IBM SPSS Statistics software, version 23, with a significance level of 5% ($p<0.05$).

RESULTS

The total study population consisted of 317 individuals diagnosed with first-time stroke, of whom 49 (12.6%) had a hemorrhagic stroke (HS), resulting in a sample of 268 patients with ischemic stroke. After applying the exclusion criteria, including the absence of complete NIHSS data, the final sample consisted of 225 patients. There was a predominance of male participants (60.1%), while 39.9% were female. The average age was 66 years and 6 months.

Regarding education level, the most prevalent was incomplete elementary education (37.3%), followed by completed high school (19.3%), completed elementary education (13.2%), and completed higher education (9.2%). Additionally, 7.5% were classified as literate and 4.8% as illiterate, while 4.4% had no data on education recorded in their medical records.

Regarding the most prevalent comorbidities in the sample, systemic arterial hypertension (SAH), diabetes mellitus (DM), and dyslipidemia (DLP) were present in 61%, 27.2%, and 8.8% of the cases, respectively. Other stroke risk factors were also identified, such as patients over 60 years of age (74.1%), smoking (38.3%), and alcohol consumption (18.9%).

Of the patients in the sample, 163 were not eligible for thrombectomy or thrombolysis. Meanwhile, 28 patients underwent only thrombolysis, 20 only thrombectomy, and 14 underwent both procedures, totaling 62 patients who received interventions.

Table 1 shows the classification of stroke severity at the time of admission and discharge from the Stroke Unit (SU).

Regarding the presence of aphasia at admission and discharge from the Unit, 23.1% (52) of patients exhibited language impairment at admission. Upon discharge, this percentage decreased to 19.5% (44) of patients. The remaining cases were classified according to the degree of aphasia, as shown in Table 2. The evolution of language from admission to discharge from the SU, based on the McNemar test for each NIHSS language score category, is presented in Table 2.

The results showed statistically significant improvement in patients with greater severity, specifically in the NIHSS category 3 ($p = 0.0039$), suggesting that a significant portion of these individuals experienced clinical improvement during hospitalization.

On the other hand, among patients with moderate deficits (NIHSS 2) and mild deficits (NIHSS 1), no statistically significant difference was observed between admission and discharge ($p = 0.79$ and $p = 0.0625$, respectively). Although the milder cases (NIHSS 1) showed a trend toward improvement, this variation did not reach statistical significance, indicating that clinical progression in this group may have been more subtle or influenced by other factors not considered in the analysis.

For the analysis of the relationship between lesion location and NIHSS language severity, only patients with complete data for NIHSS language and Bamford classification were included, totaling 182 patients.

Table 3 shows the Bamford classifications: LACS, PACS, and POCS had NIHSS language score 0 (zero) as the most common, meaning no language impairment. For Bamford TACS, however, the percentage of patients without impairment was equal to those with the highest score in this item, both at 40%.

Regarding the level of oral intake, according to the Functional Oral Intake Scale (FOIS) at admission and discharge from the SU, a significant reduction was observed in the number of patients with "nothing by mouth" status at discharge, shifting toward "some type of oral intake" (Table 4).

When considering speech-language therapy during the patient's stay in the SU, the overall sample showed that medical requests for evaluation were made for 101 patients (44.9%). However, therapeutic intervention was reported in the medical records of 160 individuals (71.11%) during their hospitalization.

Table 1. Stroke severity classification at admission and discharge from the Stroke Unit

Stroke severity - NIHSS*	SU Admission	SU Discharge
Mild (0-4)	112 (49.77%)	128 (56.88%)
Moderate (5-10)	52 (23.11%)	43 (19.11%)
Severe (11-20)	47 (20.88%)	35 (15.55%)
Very severe (>20)	9 (4%)	10 (4.44%)
Not available	5 (2.22%)	9 (4%)

*National Institute of Health Stroke Scale

Subtitle: SU = Stroke Unit; NIHSS = National Institutes of Health Stroke Scale; % = Percentage

Table 2. Aphasia severity at admission and discharge from the Stroke Unit

NIHSS Language	SU Admission	SU Discharge	p-value*
0	167 (74.22%)	172 (76.44%)	-
1	18 (8%)	13 (5.77%)	0.062
2	14 (6.22%)	20 (8.88%)	0.79
3	20 (8.88%)	11 (4.88%)	0.0039
não consta	6 (2.66%)	9 (4%)	-
Total	225 (100%)		

*Teste McNemar

Subtitle: SU = Stroke Unit; NIHSS = National Institutes of Health Stroke Scale; % = Percentage

DISCUSSION

The findings of this study are consistent with research that analyzed 350 patients and identified a mean age of 66 years and 9 months, with 48.9% being male[7]. Similarly, in the present study, a predominance of patients over 60 years of age (74.1%) and a higher frequency of male patients (60.1%) was observed, reinforcing the epidemiological profile of ischemic stroke in adult and elderly populations. The most prevalent comorbidities among the population studied in the Northern Plateau region of Santa Catarina were systemic arterial hypertension (SAH), diabetes mellitus (DM), and dyslipidemia (DLP)[13]. This finding is consistent with results from a neurology ward in a university hospital in Piauí, where SAH and DM were also the most frequent comorbidities[14]. Additionally, lifestyle habits such as smoking and alcohol consumption were identified in significant portions of the sample—factors widely recognized in the literature as aggravating risks for cardiovascular disease and stroke[15].

In this study, the prevalence of aphasia in patients hospitalized due to IS was 23.1% at admission, dropping to 19.5% at discharge, suggesting partial recovery during hospitalization. This finding aligns with previous epidemiological studies, such as one conducted in Santa Catarina, which investigated patients after their first ischemic stroke and reported a prevalence of 22.6%[7]. Similarly, another study found that 38% of patients

Table 3. Bamford classification associated with item 9 score of the National Institutes of Health Stroke Scale

			0	1	2	3	Total
Bamford	LACS	No. (%) Bamford	51 (92.70%)	4 (7.30%)	0 (0%)	0 (0%)	55 (100%)
	PACS	No. (%) Bamford	57 (64.80%)	11 (12.50%)	11 (12.50%)	9 (10.20%)	88 (100%)
	POCS	No. (%) Bamford	13 (92.90%)	1 (7.10%)	0 (0%)	0 (0%)	14 (100%)
	TACS	No. (%) Bamford	10 (40%)	1 (4%)	4 (16%)	10 (40%)	25 (100%)
Total	Nº (%) Bamford		131 (72%)	17 (9.30%)	15 (8.20%)	19 (10.40%)	182 (100%)

Subtitle: LACS = Lacunar Syndromes; PACS = Partial Anterior Circulation Syndromes; POCS = Posterior Circulation Syndromes; TACS = Total Anterior Circulation Syndromes; % = Percentage

Table 4. Oral intake levels of patients with and without evaluation at admission and discharge from the Stroke Unit

With speech-language assessment			Without speech-language assessment		
FOIS	No. of patients at admission	No. of patients at discharge	FOIS	No. of patients at admission	No. of patients at discharge
1	67	26	1	17	6
2	0	2	2	0	0
3	0	4	3	0	0
4	0	1	4	0	0
5	48	89	5	8	18
6	7	9	6	5	1
7	37	29	7	34	39
	total: 160			total: 64	

Subtitle: FOIS = *Functional Oral Intake Scale*; No. = Number

presented with aphasia at admission, which decreased to 18% at discharge[16]. These data suggest that language recovery may be associated with both natural neuroplasticity processes and clinical support provided during hospitalization, such as reperfusion therapies. However, it is known that recovery may be directly influenced by the location and extent of the brain lesion[17], especially in areas associated with anterior circulation, which are more strongly linked to the occurrence and severity of aphasia.

The severity of stroke is a determining factor in neurological recovery, directly influencing the severity of aphasia and therapeutic outcomes. A literature review indicated that factors such as aphasia type, time since stroke, and severity of brain injury significantly impact both language recovery and overall functionality[17]. In the present study, patients with greater language impairment (NIHSS 3) showed statistically significant improvement during hospitalization ($p = 0.0039$), whereas no significant differences were found among those with moderate or mild deficits ($p = 0.79$ and $p = 0.0625$, respectively). Some studies indicate that most recovery occurs within the first six weeks, suggesting that early interventions may enhance rehabilitation by encouraging language practice and social reintegration[16,18].

The Trial of ORG 10172 in Acute Stroke Treatment (TOAST) and Bamford classifications, although distinct, are complementary in the evaluation of ischemic stroke. TOAST classifies stroke according to its etiology (atherothrombotic, cardioembolic, lacunar, and others), assisting in secondary prevention[19]. Bamford, on the other hand, classifies strokes based on clinical syndromes and anatomical location (TACS, PACS, LACS, and POCS), allowing for better prognostic and therapeutic stratification[12].

The etiology of stroke directly impacts clinical deficits, as demonstrated in a 2020 study that identified a higher prevalence of aphasia in patients with atherothrombotic stroke. In multivariate analysis, this stroke subtype proved to be a significant predictive factor for aphasia, possibly due to the extent of lesions in the anterior circulation[7]. These findings were confirmed in the present analysis, in which 225 patients were assessed for neurological deficit severity. Results showed that patients with Total Anterior Circulation Syndrome (TACS) presented with more severe language deficits based on NIHSS language scores. This finding is consistent with guidelines from the Stroke Care Routine Manual, which associates TACS with a clinical presentation of hemiplegia, hemianopsia, and higher cortical deficits, including aphasia[20]. Furthermore, lesion location directly influences neurological recovery and aphasia rehabilitation, making it an important prognostic predictor and reinforcing the relationship described herein[21].

Regarding patient feeding route, the assessment considered the initial FOIS score, prior to thrombolytic therapy and/or thrombectomy in eligible cases. Thus, the high number of patients in FOIS level 1 at admission (62 individuals) may be directly related to the therapeutic approach adopted. It is important to note that many patients arrive at the hospital already presenting with dysphagia, as shown in a study evaluating elderly patients in outpatient care, which found a 41.1%[22] risk of dysphagia, indicating the need for an alternative feeding route beyond fasting. In stroke cases, the general recommendation is to keep patients without oral intake to reduce the risk of complications such as aspiration[23]. This practice is essential, considering that treatments such as thrombolysis must be administered rapidly after symptom onset, often before a complete assessment of the patient's feeding function. Therefore, the association between FOIS scores and the need for fasting prior to therapeutic interventions highlights the importance of careful assessment in the management of stroke patients, especially those presenting with dysphagia at admission[23].

It is important to note that individuals not submitted to thrombolysis are at greater risk of dysphagia in the acute phase of stroke[24], as well as greater condition severity. However, in this study, it was not possible to accurately determine the presence and/or degree of dysphagia among patients, as there was no dedicated speech-language therapist in the unit during the study period, as recommended by Ordinance No. 665 of April 12, 2012, which establishes the need for one speech therapist per ten inpatient beds in the Stroke Unit (SU)[25].

Among the patients evaluated by the speech-language pathology team (n = 101), 63.12% (59 individuals) were assessed through active search, without a formal consultation request from the medical staff. It is known that speech-language intervention in the immediate post-stroke period reduces the risk of bronchial aspiration, directly impacting the reduction of hospital stay length[26]. Furthermore, patients who did not receive cerebral reperfusion therapy had a higher risk of oropharyngeal dysphagia (n = 163), reinforcing the importance of speech-language pathologists within the multidisciplinary team to ensure safe feeding and promote early hospital discharge. Supporting these findings, a study with hospitalized patients showed that 36% of them improved their oral intake during hospitalization, as assessed by the FOIS scale. Moreover, that same study found that a greater number of in-hospital speech therapy sessions was associated with better functional recovery (OR = 1.09; p = 0.020), highlighting the positive impact of speech therapy in post-stroke rehabilitation[27].

Among the limitations of this study is the fact that it was conducted in a single hospital, which may restrict the generalization of the findings. Although the protocols used (NIHSS, FOIS, and Bamford classification) are suitable for screening and follow-up in emergency hospital settings, it is acknowledged that they do not provide sufficient support for an in-depth analysis of the relationship between language and swallowing. The NIHSS assesses only general aspects of language, while the FOIS is limited to functional classification of oral intake, without addressing the pathophysiological mechanisms of dysphagia. Thus, it was not possible to thoroughly discuss a potential interrelationship between linguistic and swallowing deficits, which constitutes a relevant limitation of this study. It is suggested that future research include more specific protocols and instrumental assessments to more precisely investigate this interface.

Despite these limitations, the study presents relevant contributions to the understanding of aphasia recovery in patients with ischemic stroke, highlighting the influence of lesion location, speech-language intervention, and oral intake on the clinical evolution. The data presented also emphasize the need for hospital services to comply with established guidelines, ensuring the availability of specialized professionals in the Stroke Unit. In this context, the study aimed to characterize the population hospitalized in the Unit, analyzing the prevalence of aphasia and the level of oral intake after the first ischemic stroke, contributing to the improvement of screening, clinical management, and rehabilitation protocols for these patients.

CONCLUSION

A significant improvement was observed in the severity of aphasia and in the capacity for oral intake during hospitalization, especially in patients who underwent speech-language therapy. These findings reinforce the importance of systematic assessment and interdisciplinary follow-up in the Stroke Unit (SU) to optimize rehabilitation.

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