

Distúrbios da linguagem em pacientes após AVC: uma revisão sistemática

*Language disorders in patients after stroke:
a systematic review*

*Trastornos del lenguaje en pacientes posteriores a ACV:
una revisión sistemática*

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Resumo

Objetivo. Verificar alterações de linguagem em pacientes adultos e idosos com diagnóstico de Acidente Vascular Cerebral (AVC). **Método.** Os artigos foram pesquisados nas bases de dados SciELO, LILACS, PubMed, Scopus, BIREME e *Web of Science*, sem restrição de local, período ou idioma de publicação, foram selecionados com combinações baseadas em *Medical Subject Headings* (MeSH). **Resultados.** Dois estudos com pontuação ≥ 6 pontos no protocolo qualitativo proposto por Pithon *et al.* foram incluídos na pesquisa. Pacientes com afasia e disartria combinadas, comparados com pacientes sem alterações de linguagem apresentaram inicialmente habilidades funcionais inferiores, embora com potencial significativo de recuperação funcional nas atividades de vida diária. **Conclusão.** As dificuldades de comunicação decorrentes dos distúrbios de linguagem pós-AVC são responsáveis por afetar os pacientes, principalmente no que se refere ao compromisso social, humor, atividades da vida diária e qualidade de vida.

Unitermos. Acidente Vascular Cerebral; Disartria; Afasia; Fonoaudiologia

Abstract

Objective. This paper aimed to present scientific evidence based on a systematic literature review (PRISMA) answering the research question: "What are the communication disorders in adult and older post-stroke patients?". **Method.** The articles were searched in the SciELO, LILACS, PubMed, Scopus, BIREME, and Web of Science databases, with no restriction of place, time, or the language of publication. The studies were selected with combinations based on the Medical Subject Headings (MeSH) and complemented with a search for gray literature in Google Scholar. **Results.** Two studies with scores ≥ 6 points in the qualitative protocol proposed by Pithon *et al.* (2015) were included in the research. Altogether, 51 articles were identified with a potential to be included, of which two met the inclusion criteria and answered the research question. The findings indicate that patients with combined aphasia and dysarthria, compared with patients with no language changes, initially had lower functional abilities – though with a significant potential for functional recovery in the activities of daily living. Also, no direct relationship was verified between the severity of the ischemic stroke and aphasia. However, the people with post-stroke aphasia, when compared with those without aphasia, revealed a greater severity score in the National Institute of Health Stroke Scale (NIHSS). **Conclusão.** The communication difficulties resulting from post-stroke language

disorders are responsible for affecting the patients, especially regarding their social engagement, mood, activities of daily living, and quality of life.

Keywords. Stroke; Dysarthria; Aphasia; Speech, Language and Hearing Sciences

Resumen

Objetivo. Este artículo tuvo como objetivo presentar evidencia científica basada en una revisión sistemática de la literatura (PRISMA) respondiendo a la pregunta de investigación: "¿Cuáles son los trastornos de la comunicación en pacientes adultos y ancianos post-ACV?".

Método. Los artículos fueron buscados en las bases de datos SciELO, LILACS, PubMed, Scopus, BIREME y *Web of Science*, sin restricción de lugar, tiempo o idioma de publicación. Los estudios se seleccionaron con combinaciones basadas en *Medical Subject Headings* (MeSH) y se complementaron con una búsqueda de literatura gris en Google Scholar. **Resultados.** Dos estudios con puntuaciones ≥ 6 puntos en el protocolo cualitativo propuesto por Pithon et al. (2015) fueron incluidos en la investigación. En total, se identificaron 51 artículos con potencial para ser incluidos, de los cuales dos cumplieron con los criterios de inclusión y respondieron la pregunta de investigación. Los hallazgos indican que los pacientes con afasia y disartria combinadas, en comparación con los pacientes sin cambios en el lenguaje, inicialmente tenían habilidades funcionales más bajas, aunque con un potencial significativo de recuperación funcional en las actividades de la vida diaria. Además, no se verificó una relación directa entre la gravedad del ictus isquémico y la afasia. Sin embargo, las personas con afasia posterior a un accidente cerebrovascular, en comparación con aquellas sin afasia, revelaron una puntuación de gravedad mayor en la Escala de accidentes cerebrovasculares del Instituto Nacional de Salud (NIHSS). **Conclusion.** Las dificultades de comunicación derivadas de los trastornos del lenguaje posteriores al ictus son responsables de afectar a los pacientes, especialmente en lo que respecta a su compromiso social, estado de ánimo, actividades de la vida diaria y calidad de vida.

Palabras clave. Accidente Cerebrovascular; Disartria; Afasia; Fonoaudiología

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INTRODUCTION

Stroke is a neurological deficit resulting from the interrupted blood flow in the brain, responsible for a decrease in the neuronal supply and consequently the death of nerve cells^{1,2}. According to the World Health Organization (WHO)³, stroke is one of the greatest cardiovascular complications worldwide, pointed out as the main cause of functional incapacity⁴, with high mortality rates and social and economic cost⁵. It is characterized by the fast development of clinical signs and focal disorders with

symptoms persisting for over 24 hours, causing cognitive and sensory-motor changes⁶.

It is among the cerebrovascular diseases with an incidence of 13.7 million cases a year and estimated to occur in 1 to 4 people over 25 years old⁷. In Brazil, 101.1 thousand deaths due to stroke were registered in 2017, while in 2018 the *Sistema Único de Saúde* (SUS, Brazilian public health care system) registered 197 thousand cases resulting from this disease⁸. The disease can manifest in two ways, characterizing the ischemic stroke, which results from obstructed blood vessels through atherosclerotic or embolic processes, and the hemorrhagic, responsible for the rupture of vessels with blood outflow onto the central nervous system structures. The ischemic one is predominant and pointed out as responsible for approximately 70% of the total cases⁹.

The literature approaches the communication disorders caused by the acquired language changes, highlighting them as one of the main functional disablers in adult life¹⁰. Thus, of the post-stroke impairments, the predominant language disorders include one that can affect the comprehension and/or expression of oral and written language, which is called aphasia¹¹. Such a neurophysiological disorder involves brain mechanisms and can manifest along with behavioral, intellectual, and emotional changes¹².

Moreover, other implications with speech sequelae may take place following a stroke, which is the case of speech apraxia and dysarthria, responsible for phonation,

articulation, resonance, and/or prosody deficits¹³. Apraxia impairs the planning and programming of the orofacial structures' motor skills, hindering the correct voluntary speech production¹⁴. Dysarthria is a motor disorder caused by changes in the muscle control of the speech mechanisms (breathing, phonation, articulation, resonance)¹⁵. Hence, considering the importance of language in the human communication process, the skills affected by a stroke, as well as the imposed functional difficulties, pose an important challenge to these patients' rehabilitation, requiring it to be included in the planning of public health policies¹⁶.

Given the above, the main guiding objective of this research was to verify the scientific evidence of language impairments in adult and older patients diagnosed with a stroke, aiming to answer the following research question: What are the communication disorders in adult and older post-stroke patients?

METHOD

Protocol and Registry

This systematic review was conducted following the recommendations of PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses)¹⁷.

The scientific articles were searched by two independent researchers in the MEDLINE (PubMed), LILACS, SciELO, Scopus, Web of Science, and BIREME databases, with no restriction of language, time, or place of publication. The research was structured and organized in the PICOS

framework, an acronym that stands for target **P**opulation, **I**ntervention, **C**omparison, and **O**utcomes. The population of interest or health problem (P) corresponds to the patients; intervention (I), language; comparison (C), post-stroke; outcome (O), not applicable; (S), cross-sectional study, observational study, case reports, case-control studies, controlled clinical trials, cohort studies.

Research Strategy

The descriptors were selected from the Health Sciences Descriptors (DeCS) and Medical Subject Headings (MeSH), as they are widely used by the scientific community to index articles in PubMed. After the search for descriptors, they were adjusted for the other databases. At first, the following descriptors and Boolean operators were proposed for the search: (stroke) and (language assessment) and (aphasia) and (dysarthria). The search was carried out in September 2020. As a complement, a search for gray literature was conducted in Google Scholar.

Eligibility Criteria

The selected studies could have either of the following designs: descriptive, cross-sectional, observational, case-control, cohort, controlled clinical trials, case-study reports, and qualitative studies. The studies were included with no restriction of language, time, or place of publication. The studies scored 12 on the modified scale by Pithon *et al.*¹⁸ for their quality evaluation.

Risk of Bias

The quality of the methods was independently assessed by the reviewers (BVYR and LFG), following the PRISMA recommendations¹⁸. The evaluation gave priority to clearly described information. At this point, the review was blind, masking the name of the authors and journals to avoid any potential bias or conflict of interest.

Exclusion Criteria

Studies published as letters to the editor, guidelines, literature reviews, systematic reviews, meta-analyses, and abstracts were excluded, as well as unclear studies or unavailable ones in full text.

Data Analysis

The data for the study eligibility process were extracted with a sheet developed in Excel[®] for systematic review by two researchers. The extracted data were inserted in it by one of the researchers and then checked by another one. They were initially selected based on the title; then, the abstracts were analyzed, and only the potentially eligible ones were selected. Based on the abstracts, articles were selected to be read in full, and those that met all the preestablished criteria were included. In cases when the researchers disagreed, a third researcher (KMP) decided the eligibility of the article in question.

Collected Data

Following the screening, the text of the selected articles was reviewed and extracted by two authors (BVYR and LFG), following a standard and under the supervision of KMP and PH, identifying the year of publication, place of the research, language of publication, type of study, sample, method, result, and conclusion of the study.

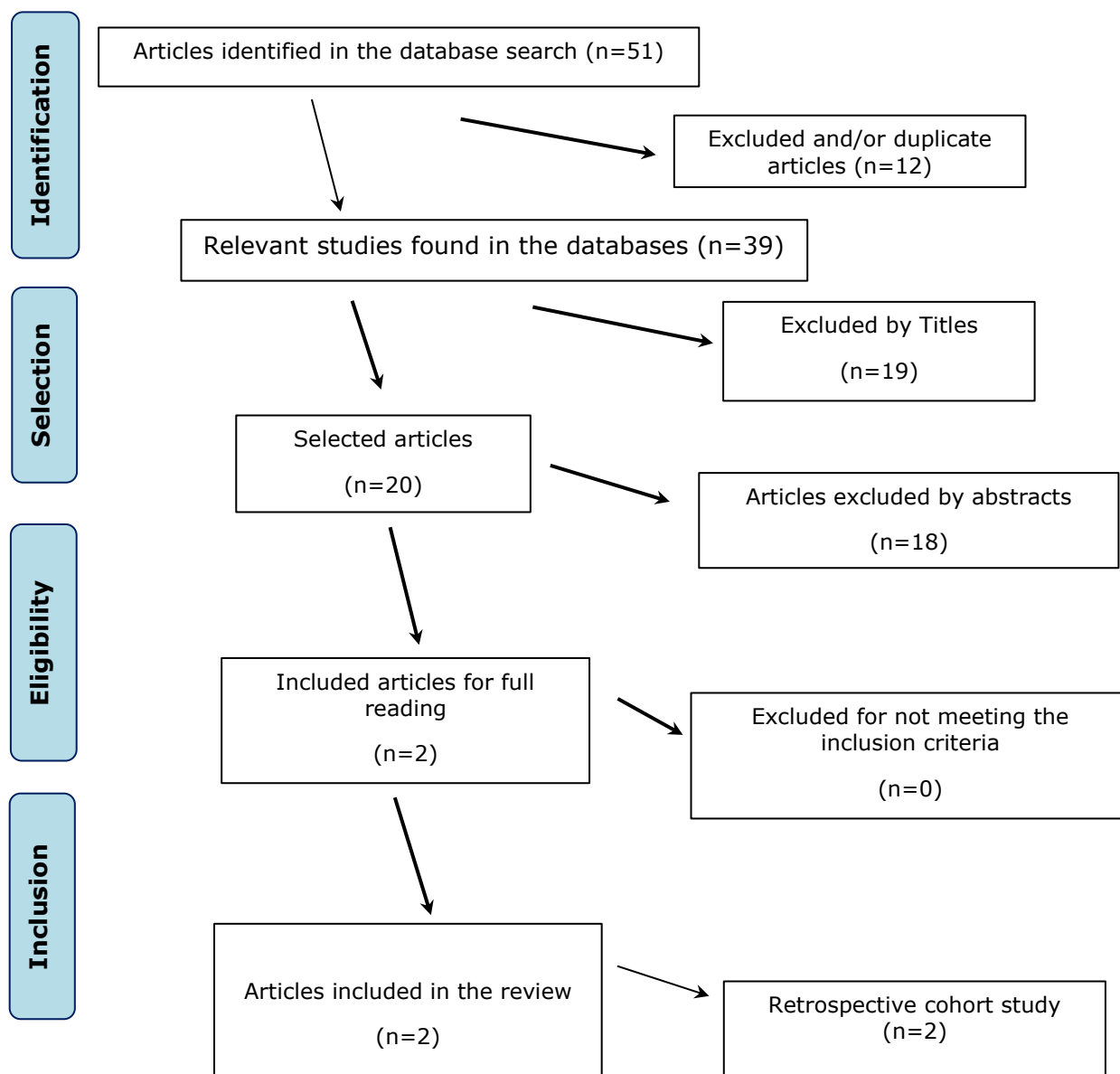
RESULTS

Initially, 51 articles were selected, narrowed to 39 after excluding the repeated ones. Then, the titles and abstracts were analyzed, and 37 papers were excluded for not being within the scope proposed for this research.

Hence, two articles were included for final analysis^{19,20}; both were retrospective cohort studies (Figure 1). It can be justified to include two articles in the research considering that to answer the guiding question the following combination was made by the authors (cerebral vascular accident) and (vocal disorders) and (voice), thus, other works that were not could be recovered by following the systematic review protocol.

The description of the results of the eligible articles in this study can be seen in detail in Table 1. The methods used, as well as the results and conclusion of the pieces of research, are shown in the said table.

Figure 1. Flowchart of the article search and analysis process.



The findings on language disorders in adult and older patients affected by stroke were mainly based on the National Institutes of Health Stroke Scale (NIHSS)^{19,20}, a tool used to objectively quantify the damage resulting from the stroke with a score on each specific ability – the highest results point to some level of disability. Among other tests used in the included studies, the ones that stand out are the

Korean version of the Modified Barthel Index Score (K-MBI), to assess the skills in the activities of daily living (ADL); the Functional Ambulation Categories, to assess functional walk; and the Mini-Mental State Examination (MMSE), to assess cognition. Also, online questionnaires and individual self-reporting interviews were used.

Table 1. Summary of the included articles.

Author Year Place of publication	Objective	Sample size	Method	Results	Conclusion
Lima 2020 ¹⁹ Brazil	To investigate the prevalence, predictors, and prognostic factors of first-time ischemic stroke patients in a reference neurological diseases public hospital in the South of Brazil.	350 patients, mean age 66.76±13.22 years	Data obtained from JOINVASC. Aphasia was diagnosed with the NIHSS. Analysis of first-time stroke patients with and without aphasia. Tests used: Mann-Whitney and chi-square.	79 patients had aphasia (22.6%) with no difference between the sexes. In comparison with patients without aphasia, the aphasic ones had greater deficits in the ADL, longer length of stay, and greater severity in the NIHSS.	The study showed an important presence of aphasia alone in patients with ischemic etiology and without preceding events. There was no relationship between the severity of the stroke and the occurrence of aphasia.
Kim 2016 ²⁰ Korea	To present the clinical characteristics and the impact of combined dysarthria and aphasia on the functional recovery of post-stroke patients.	130 patients	Aphasia and Dysarthria were diagnosed with the Korean version of the NIHSS. Sample analysis divided into 4 groups (with aphasia; with dysarthria; with both; without changes). Tests used: Mann-Whitney and chi-square. Functional assessment tests: Modified Barthel Index (KMBI); Functional Ambulation Category (FAC); Mini-Mental State Examination (MMSE-K); Motricity Index (MI);	9.2% of the patients had dysarthria; 6.9%, aphasia; 48.5% had no language changes; and 35.4% had combined aphasia and dysarthria (AD group). The AD group had higher levels in the primary NIHSS tests, low scores in the other assessments (MMSE-K, EQ-5D-3L index, K-MBI, MI). Significant improvements in K-MBI for the AD group after adjustment for initial severity and patient's age in comparison with other groups.	The post-stroke patients with combined aphasia and dysarthria had a more severe stroke, worse cognitive function, worse quality of life, needed more support to perform the ADL and decreased their motor power. At the same time, they showed a wider potential range of functional improvements, especially in the ADL.

NIHSS = National Institute of Health Stroke Scale; ADL = Activities of daily living.

The study of Lima 2020¹⁹ included 350 first-time ischemic stroke patients in a reference neurology public hospital in the South of Brazil, based on the stroke data bank of Joinville – JOINVASC. In this study, a significant presence of aphasia was noted in older patients with ischemic etiology, with no preceding events and higher stroke severity score.

Concerning the impact of the stroke on language, the authors reported that the post-stroke aphasic patients, compared with the ones without aphasia, had a greater deficit to perform ADL, and greater severity in the NIHSS score, which is a predictor for the occurrence of aphasia¹⁹. Likewise, the study of Kim 2016²⁰, with a sample of 130 patients, assessed the impact of combined aphasia and dysarthria on functional recovery. The patients were classified into groups regarding language function: nine patients with aphasia (A), 12 with dysarthria (D), 46 with both aphasia and dysarthria (AD), and 63 without changes (N). Thus, the AD group, though with a higher NIHSS score that reflected on the severity, had a greater functional stroke recovery potential according to the K-MBI – Barthel scale, used to measure performance in stroke. Hence, the findings point out that the combined presence of aphasia and dysarthria in post-stroke patients is related to a worse neurological and functional condition²⁰.

Regarding hospital recovery, the aphasic patients had a longer length of stay when compared with those without post-stroke aphasia¹⁹. Also, in another study, the results found in patients with combined aphasia and dysarthria

suggest a worse functional recovery, as there was a higher proportion of hospital discharge to other institutions in relation to being sent home²⁰.

The prevalence of post-stroke linguistic impairments considering sex was not approached in either of the studies in the present analysis. However, the ischemic stroke was predominant in relation to the hemorrhagic one.^{19,20} Furthermore, the severity of the ischemic stroke was deemed as an independent predictor for the occurrence of post-stroke aphasia – although no direct relationship between the severity of the ischemic stroke and the occurrence of aphasia was verified¹⁹.

DISCUSSION

Based on the analysis of the compiled studies, it is verified that aphasia and dysarthria are considered the main language disorders acquired by post-stroke patients^{19,20}, occurring alone or in combination. Likewise, previous studies confirmed the incidence of post-stroke dysarthria^{21,22}, aphasia^{23,24}, and the co-occurrence of these disorders^{25,26}.

Also, the severity of the stroke was not a predictor for the occurrence of aphasia, as well as it was independently related to the occurrence of aphasia and hospital death, corroborating previous studies²⁷.

Among the impacts of these post-stroke impairments, it was revealed that acquired aphasia affects the ADL¹⁹, corresponding to the reports by other authors regarding the worsened quality of life of post-stroke patients²⁶. Such a

situation is because aphasic individuals when compared with those with no language changes had losses in social and communication activities²⁵ and possibly suffer from depression²³. According to the National Stroke Organization²⁴, only 10% of the patients with acquired aphasia fully recover, while 25% remain with sequelae, 50% have moderate or severe incapacity and require specific follow-up, and 15% die after the episode. Other studies indicate the longer post-stroke length of stay of patients with aphasia²⁷ – which is possibly related to their greater severity and comorbidities in relation to the group with no language changes^{25,26}.

The patients with combined aphasia and dysarthria, the poor neurological and cognitive condition, declined in the quality of life, need for greater support to perform the ADL, and decreased motor power, whereas they revealed a significant aptitude to recover the functional activities, such as the ADL²⁰.

The changes in communication resulting from post-stroke language disorders pose significant challenges to the individuals. Some face the acceptance of the communication deficit as a significant impact on their lives and feel a loss of identity; others recognize the necessary changes to adjust to the situation²¹⁻²³. Also, the vast majority of this population identifies isolation and exclusion in social situations due to communication changes, causing embarrassment and lack of confidence and belonging^{24,25}. Social participation is essential

to people with language changes, helping to develop feelings of social and environmental belonging²⁴.

Access to health services is multidimensional and is associated with factors that go beyond organizational accessibility²⁸.

CONCLUSION

The language-related post-stroke impairments, such as the mentioned aphasia and dysarthria, are communication difficulties whose impact goes beyond these people's medical disability symptoms, social engagement, mood, ADL, and quality of life. Hence, considering the constant incidence of this disease and its impact on the adult and older population, the rehabilitation services for these disorders have a significant responsibility in the improvement of the patients' well-being.

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