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Original Article

Factors associated with health literacy of post-stroke patients undergoing outpatient follow-up

Fatores associados ao letramento em saúde de pacientes pós-acidente vascular encefálico em acompanhamento ambulatorial

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ABSTRACT

Objective: to assess the prevalence of factors associated with health literacy in patients suffering from stroke with outpatient follow-up. **Methods:** a cross-sectional study, carried out with 44 patients. A sociodemographic and clinical characterization form was used, in addition to the Mini Mental State Examination and the Test of Functional Health Literacy in Adults - Short version (S-TOFHLA). For the analysis, Chi-square test and Spearman's correlation coefficient were applied. **Results:** individuals aged 46 to 59 years (p=0.044), with high school or higher education (p=0.036) and who did not use warfarin (p=0.028) presented adequate literacy. A significant correlation was identified between age and S-TOFHLA reading comprehension (r= -0.537; p<0.001) and age and S-TOFHLA overall results (r= -0.497; p<0.001). A correlation was found between cognitive assessment and reading comprehension (r=0.528; p<0.001) and S-TOFHLA total score (r=0.517; p<0.001). **Conclusion:** health literacy was related to the age group of 46 to 59 years, higher education, better cognitive performance and not using warfarin. **Contributions to practice**: knowing stroke patients' health literacy can support significant changes in nursing practice, especially in the context of outpatient care and rehabilitation. **Descriptors:** Stroke; Health Literacy; Ambulatory Care; Health Promotion; Nursing.

RESUMO

Objetivo: avaliar a prevalência de fatores associados ao letramento em saúde em pacientes acometidos por acidente vascular encefálico com acompanhamento ambulatorial. **Métodos:** estudo transversal, realizado com 44 pacientes. Foi utilizado um formulário de caracterização sociodemográfica e clínica, além do Mini Exame do Estado Mental e do *Test of Functional Health Literacy in Adults - Short version* (S-TOFHLA). Para a análise, foram aplicados o teste Qui-quadrado e o coeficiente de correlação de Spearman. **Resultados:** apresentaram letramento adequado os indivíduos de 46 a 59 anos (p=0,044), com ensino médio ou superior (p=0,036) e que não faziam uso de varfarina (p=0,028). Identificou-se correlação significativa entre idade e compreensão leitora do S-TOFHLA (r= -0,537; p<0,001) e idade e resultados globais do S-TOFHLA (r= -0,497; p<0,001). Verificou-se correlação entre avaliação cognitiva e compreensão leitora (r=0,528; p<0,001) e pontuação total da S-TOFHLA (r=0,517; p<0,001). **Conclusão:** o letramento em saúde relacionou-se à faixa etária de 46 a 59 anos, à maior escolaridade, ao melhor desempenho cognitivo e à não utilização da varfarina. **Contribuições para a prática**: conhecer o letramento em saúde dos pacientes com acidente vascular encefálico pode subsidiar mudanças significativas na prática de enfermagem, especialmente no contexto da atenção ambulatorial e da reabilitação.
Descritores: Acidente Vascular Encefálico; Letramento em Saúde; Assistência Ambulatorial; Promoção da Saúde; Enfermagem.

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Introduction

Stroke is a neurological condition responsible for high mortality and disability. More than 80 million people have been affected by this disease globally, of which around 185 thousand cases represent recurrent events[1]. The condition predominantly affects middle-aged and older adults[2].

The risk of stroke recurrence is related to the control of chronic conditions such as high blood pressure and diabetes mellitus, and the presence of risk factors such as cardiac arrhythmias, smoking, alcoholism, inadequate lifestyle habits and low adherence to drug treatment[3]. These factors, in turn, are directly influenced by patients' ability to understand, process and apply the guidance provided by healthcare professionals[4].

In this context, health self-management after stroke requires that patients develop skills to understand their health condition, make informed decisions, communicate effectively, and actively participate in care. Such skills are related to the level of health literacy.

Health literacy is defined as the set of skills that enable an individual to seek, interpret, critically judge and apply health-related knowledge, with the aim of adopting behaviors that positively influence their own health condition or that of others[5]. Although the expression originates from the English term health literacy, different translations are used in Brazil, such as *alfabetização*, *literacia* and *letramento em saúde*, the latter being the most common in national scientific literature[6].

Inadequate levels of health literacy are associated with lower adherence to treatment and increased risk of stroke recurrence[7]. Given the complexity of post-stroke care, which includes activities such as reading prescriptions and leaflets, calculating medication doses, understanding multidisciplinary guidelines and communication in healthcare services[8], it becomes essential to understand the role of health literacy in the care experience of these patients, aiming to promote autonomy and improve clinical outcomes.

This study aimed to assess the prevalence of factors associated with health literacy in patients suffering from stroke with outpatient follow-up.

Methods

Study design and period

This is a cross-sectional study developed according to the EQUATOR network guidelines, using the STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) checklist. Data collection was carried out between November 2023 and April 2024, with patients affected by stroke in an outpatient unit specialized in neurological conditions, linked to a highly complex hospital service of the public health network in the city of Fortaleza, Ceará, Brazil. The outpatient unit offers care in several areas including stroke, epilepsy, demyelinating diseases, movement disorders and neuromuscular diseases. Stroke patient care occurs weekly, in the afternoon shift, under the responsibility of a care team composed of professionals from different health categories.

Population and sample; inclusion and exclusion criteria

The study population consisted of 180 patients diagnosed with stroke undergoing outpatient follow-up during data collection. Sampling was by convenience, consecutively, according to the following inclusion criteria: confirmed diagnosis of stroke; being literate; being 18 years of age or older; and cognitive preservation verified through the Mini Mental State Examination (MMSE), with a score equal to or greater than 24 points[9]. Exclusion criteria were limitations in communication or visual impairment that made it impossible to properly apply the data collection instruments.

It was decided not to apply statistical sample calculation, but to include all eligible participants present during the collection period, in line with a similar protocol[7]. However, the final sample consisted of 44

patients, due to logistical issues such as non-attendance at the outpatient clinic, refusal to participate and failure to meet the inclusion criteria.

Study protocol

For data collection, a form with sociodemographic and clinical information was used, namely sex, age, education, income, marital status, origin, self-reported chronic diseases, types of medications in use and lifestyle habits. To assess cognitive function, the MMSE was used and to measure health literacy, and to measure health literacy, the Test of Functional Health Literacy in Adults – Short version (S-TOFHLA) was applied in the Portuguese version.

The MMSE is the most widely used cognitive screening instrument internationally, consisting of seven domains that investigate cognitive functions, such as orientation to time, orientation to place, registration of three words, attention and calculation, recall of three words, language, and visual construction. The score ranges from 0 to 30 points, with results below 24 indicating possible cognitive impairment[9].

The S-TOFHLA is an instrument used to measure individuals' ability to interpret information and instructions related to the context of healthcare. It consists of two parts, such as reading comprehension (36 items, with a score of 2 points for each correct answer, totaling up to 72 points) and numerical comprehension (4 items, with a score of 7 points for each correct answer, totaling up to 28 points), resulting in a maximum score of 100 points. Performance is stratified into three categories of health literacy: inadequate (0 to 53 points); borderline (54 to 66 points); and adequate (67 to 100 points)[10].

Participants were invited to take part in the study while they were waiting for care at the outpatient clinic and were informed about the study objectives. Subsequently, a form containing questions on sociodemographic and clinical characteristics was applied, as well as the MMSE, using the structured interview technique, which lasted an average of 15 minutes. Subsequently, each patient received the printed S-TOFHLA to read and choose the most appropriate alternative in items related to reading comprehension and write the correct answer in the numeracy questions. The time to answer this test was 15 minutes.

Data analysis and treatment

Data were processed using SPSS 20.0, license number 101011131007. Results were organized into tables with absolute and percentage frequencies. The Chi-square test was applied to analyze the association between the S-TOFHLA classification (adequate and inadequate/borderline) and sociodemographic and clinical variables. The linear correlation between total S-TOFHLA, reading comprehension and numeracy with age and MMSE was performed using Spearman's r coefficient. Analyses with $p<0.05$ were considered statistically significant.

Ethical aspects

The guidelines established in Resolution 466/12, which regulates research involving human beings, were followed. The study was approved by the *Hospital Geral de Fortaleza* Research Ethics Committee and obtained Opinion 6,738,693/2024 and Certificate of Presentation of Ethical Consideration 70121323.3.3001.5040.

Results

It was evident that 65% were men; 47.5% were in the age group of 46-59 years; 52.5% had completed high school; 62.5% had no partner; 70% earned a minimum wage; and 75% were from the city of Fortaleza-Ceará. The overall S-TOFHLA mean was 74.3 ± 23.3 (ranging from 0 to 100 points), classified as adequate health literacy. Among patients, 65.9% presented adequate literacy and 34.1% inadequate/borderline. The means of reading comprehension and numerical dimension were 55.6 ± 18.6 and 20.2 ± 11.1, respectively.

It was observed that adequate literacy was statistically associated with the age group of 46 to 59 years (p=0.044) and having completed high school or higher education (p=0.036). No significant association was identified between adequate and inadequate/borderline literacy and sex, marital status, income, and origin (Table 1).

Table 1 – Association between sociodemographic characteristics and health literacy classification of post-stroke patients. Fortaleza, CE, Brazil, 2025

Variables	Total	Adequate	Inadequate/ borderline	p-value*
	n (%)	n (%)	n (%)	
Sex				0.930
Male	26(59.1)	17(65.4)	9(34.6)	
Female	18(40.9)	12(66.7)	6(35.3)	
Age range (years)				0.044†
21 – 45	12(27.3)	9(75.0)	3 (25.0)	
46 – 59	19(43.2)	15(78.9)	4(21.1)	
60 – 88	13(29.5)	5(38.5)	8(61.5)	
Education				0.036†
Elementary school	16(36.4)	8(50.0)	8(50.0)	
High school	21(47.7)	14(66.7)	7(33.3)	
Higher education	7(15.9)	7(100.0)	0(0.0)	
Income (minimum wage)				0.062
1	28(63.4)	18(64.3)	10(35.7)	
2 to 4	14(36.6)	9(64.3)	5(35.7)	
Marital status				0.328
No partner	25(56.8)	18(72.0)	7(28.0)	
With partner	19(43.2)	11(57.9)	8(33.3)	
Origin				0.877
Fortaleza	30(68.2)	20(66.7)	10(33.3)	
Inland	14(31.8)	9(64.3)	5(35.4)	

*Pearson's Chi-square test; †Significant for p<0.05

A moderate and statistically significant negative correlation was identified between age and reading comprehension (r= -0.537; p<0.001), which indicates that as age increases, patients' performance in understanding health-related texts decreases. The same trend was observed in the correlation between the overall S-TOFHLA results and age (r= -0.497; p<0.001), indicating that older individuals had lower health literacy. On the other hand, the correlation between age and numeracy was negative, weak and without statistical significance (r= -0.247; p=0.109), suggesting that age did not significantly influence individuals' ability to interpret and use health-related numerical information.

Concerning cognitive assessment, patients presented a mean MMSE score of 26.8±2.0. The correlation between MMSE and reading comprehension (r=0.528; p<0.001) and total S-TOFHLA score (r=0.517; p<0.001) indicated that better levels of cognitive function are associated with greater health literacy. The correlation between MMSE and numeracy was weak (r=0.267) and not statistically significant (p=0.790), showing that this dimension may not depend directly on overall cognition (Table 2).

Table 2 – Correlation between dimensions and total score of S-TOFHLA with age and Mini Mental State Examination of post-stroke patients. Fortaleza, CE, Brazil, 2025

Variables	Dimensions					
	Reading comprehension		Numeracy		Total	
	r*	p-value†	r	p-value	r	p-value
Age	-0.537	<0.001	-0.247	0.109	-0.497	<0.001
MMSE	0.528	<0.001	0.267	0.790	0.517	<0.001

*R is the Spearman coefficient; †Spearman coefficient; S-TOFHLA - Test of Functional Health Literacy in Adults - Short version; MMSE - Mini Mental State Examination

Regarding self-reported diseases, medication use and lifestyle habits, hypertension was the most frequent condition (97.7%). Most patients did not consume alcohol (79.6%), did not smoke (95.5%) and reported practicing physical activity (65.9%). A statistically significant association was found between warfarin use and health literacy (p=0.028). Patients using this anticoagulant presented a higher frequency of inadequate/borderline classification (57.1%) compared to those who did not use it (23.3%). No statistically significant association was identified between health literacy and other chronic diseases and lifestyle habits. However, it was found that the occurrence of not smoking, not using alcohol and practicing physical activity was higher in patients with adequate literacy (Table 3).

Table 3 – Association between self-reported chronic diseases, warfarin use and lifestyle habits with the health literacy classification of post-stroke patients. Fortaleza, CE, Brazil, 2025

Variables	Total	Adequate	Inadequate/ borderline	p-value*
	n (%)	n (%)	n (%)	
High blood pressure				0.226
Yes	43(97.7)	28(65.1)	15(34.9)	
No	1(2.3)	1(100.0)	0(0.0)	
Diabetes mellitus				0.467
Yes	30(68.1)	18(60.0)	12(40.0)	
No	14(31.9)	11(78.6)	3(21.4)	
Physical activity				0.455
Yes	29(65.9)	18(62.1)	11(37.9)	
No	15(34.1)	11(73.3)	4(28.7)	
Warfarin use				0.028†
Yes	14(31.8)	6(42.9)	8(57.1)	
No	30(68.2)	23(76.7)	7(23.3)	
Cardiac arrhythmia				0.420
Yes	10(22.7)	6(60.0)	4(40.0)	
No	34(77.3)	8(23.5)	26(66.7)	
Alcoholism				0.400
Yes	9(20.4)	7(77.8)	2(22.2)	
No	34(79.6)	22(62.9)	13(37.1)	
Smoking				0.298
Yes	2(4.5)	2(100.0)	0(0.0)	
No	42(95.5)	27(64.3)	15(35.7)	

*Pearson's Chi-square test; †Significant for p<0.05

Discussion

Understanding the health literacy of people affected by stroke is a priority, given the impact of this condition on public health[1] and the need for ongoing healthcare focused on prevention, recovery, and rehabilitation. Assessing health literacy allows health education interventions to be planned in a manner consistent with patients' ability to seek, interpret, and apply information related to their health condition[11]. Health literacy goes beyond reading labels and information leaflets. It is a resource that allows individuals to acquire health-related information, helping to promote autonomy and self-care[12].

A higher prevalence of adequate literacy was identified among participants, a result that differs from the findings of several national studies with other populations, such as hypertensive individuals[13-14], diabetic individuals[12], adults[10], and older adults[15], in which inadequate health literacy predominated. This result may have been influenced by the time taken to administer the S-TOFHLA in this study (15 minutes), which was longer than the time used in other studies[10,16] that used seven to 10 minutes. Another aspect that may have influenced this was the high level of education[16], with more than half of the patients having completed high school, differing from the studies cited, whose participants had mostly completed elementary school.

The relationship between education and health literacy is widely described, especially when assessed by instruments such as the S-TOFHLA that require reading and numeracy skills[17]. It is important to emphasize that it is extremely important to develop studies to gain a detailed understanding of health literacy in stroke patients from other dimensions and that include individuals with low levels of education or functional illiteracy as well as those with mild cognitive deficits. Given the high prevalence of stroke in people with low levels of education[18] and the possibility of post-stroke cognitive impairment[7], this may help to strengthen neuroprotective behaviors to prevent disease recurrence[9].

Adequate literacy was identified in 62 to 68.7% of post-stroke patients, a percentage close to that found in this study. This data may reflect the exposure of patients to information during hospitalization and outpatient follow-up, which favored the construction of knowledge about their own health condition[7,19]. However, it is essential that healthcare services pay attention to both patients with lower levels of education and those with higher levels of education, as both may have difficulties in health literacy, requiring personalized educational approaches[20].

A significant association was observed between adequate health literacy, age range of 46 to 59 years and secondary or higher education, corroborating

previous findings[10,20]. Lower health literacy in older individuals may be attributed to age-related cognitive changes, such as decreased working memory and processing speed, which impact the understanding of health information[21-22]. It is recommended that educational interventions aimed at this population consider these changes and use more frequent, accessible and interactive strategies[7].

An association was found between cognitive function and health literacy, which revealed significant correlations between the MMSE and reading comprehension and the total S-TOFHLA score, indicating that better cognitive levels are associated with greater health literacy. These results confirm data from previous studies that demonstrated a correlation between cognitive performance and health literacy[4,23]. Between MMSE and numeracy, correlation was weak and not significant, suggesting that this ability may depend on factors other than overall cognition, such as previous experience with mathematical calculations or specific logical reasoning skills[24].

Although there was no statistically significant association between health literacy and lifestyle habits, it was observed that patients with better habits, such as not smoking, not consuming alcohol and practicing physical activity, presented higher levels of health literacy. These behaviors may be related to greater acceptance of health information by individuals with higher education and greater ability to interpret information[7]. These results are relevant in preventing stroke recurrence, which is estimated at 26% after five years of the first event[25] and in the need for adherence to multiple secondary prevention strategies, including adequate use of medications, cessation of smoking and alcoholism and physical activity[26].

Among the self-reported chronic diseases, high blood pressure was the most cited by patients. Considering that high blood pressure is a major risk factor for stroke[27], the strategic role of health literacy in self-care and effective blood pressure control is highlighted. In this context, nursing care focused on health education, monitoring therapeutic adherence and identifying cognitive or comprehension difficulties are essential[13].

A significant association was found between inadequate/borderline literacy and warfarin use. This medication, although widely used due to its low cost[28], requires strict monitoring due to pharmacokinetic variability, interactions with food and other drugs, and the need to monitor the International Normalized Ratio. Individuals with inadequate health literacy have a higher risk of nonadherence, hemorrhagic or thromboembolic complications[29]. This highlights the relevance of specific educational interventions for patients on anticoagulation, which are adjusted to their understanding capacity and sociocultural context. In patients with ischemic stroke, the main indication for warfarin is atrial fibrillation, a cardiac arrhythmia responsible for 30% of cases of ischemic stroke, especially in older adults[30].

Therefore, health literacy needs to be considered as a determining factor in stroke patients' health condition, directly influencing clinical outcomes[12]. Educational strategies, especially conducted by the nursing team, must be adapted to the level of health literacy, incorporating visual resources, simple language, verbal reinforcement and caregiver involvement[14]. A multidisciplinary and patient-centered approach is essential to ensure the effectiveness of care actions and prevention of recurrence[7].

Study limitations

A study limitation was the measurement of health literacy only in the functional dimension. It is recognized that health literacy is a dynamic and multifactorial construct, which involves interactive, critical and organizational aspects. Therefore, it is suggested that subsequent studies consider other dimensions of health literacy for a detailed understanding of the literacy level of post-stroke patients.

Contributions to practice

The results of this study showed that health literacy was related to educational level, age and cognitive level, highlighting the need for continuous, accessible and multimodal educational strategies aimed at stroke patients and their caregivers. Such strategies should include both individuals with low educational levels and those with higher educational levels, since limitations in health literacy can occur in both groups.

It is believed that understanding stroke patients' health literacy can support significant changes in nursing practice, especially in the context of outpatient care and rehabilitation. Incorporating health literacy assessment into the routines of services aimed at this target audience can contribute to the development of more effective educational actions focused on patients' needs, strengthening nursing actions in health promotion, longitudinal monitoring, and qualified care.

Conclusion

Health literacy was related to the age group of 46 to 59 years, higher education level, better cognitive performance and non-use of warfarin. The results indicate that health literacy can influence the outpatient follow-up of post-stroke patients, since higher levels of health literacy were related to better self-care practices and control of risk factors.

Authors' contributions

Data conception and design or analysis and interpretation; Manuscript writing or relevant critical review of intellectual content: Maniva SJCF, Benedito CG, Chagas ALB, Santiago JCS, Almeida PC, Campos RKGG. Final approval of the version to be published and agreement to be responsible for all aspects related to the accuracy or integrity of any part of the manuscript being appropriately investigated and resolved: Maniva SJCF.

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