



Low health literacy and quality of life in patients with systemic arterial hypertension

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ABSTRACT

Purpose: Evaluate the level of health literacy and quality of life of patients with hypertension.

Methods: A cross-sectional, observational study was carried out in the Northeast region of Brazil with 105 patients with hypertension through the SAHLPA-18, S-TOFHLA and MINICHAL tests.

Results: For both literacy tests applied, it can be observed that about 60% of the interviewed patients did not present adequate health literacy. It was found that factors such as increasing age, lower economic class and lower education were associated with a lower level of health literacy. In the evaluation of the quality of life by the MINICHAL, 46.7% of the patients reported that hypertension interferes with quality of life. It was also possible to show that the time of diagnosis ($p = 0.04$) and the economic class ($p = 0.008$) influence the quality of life.

Conclusion: Hypertension is a chronic condition that requires continuous treatment and has potential risks of evolving with fatal and non-fatal complications that can affect the patients' quality of life. The data presented reflect the difficulty in understanding and processing health information, which may directly impact on the therapeutic management of hypertension.

1. Introduction

Chronic non-communicable diseases (NCD) can be defined as a set of diseases associated with a diversity of risk factors, prolonged and variable clinical history over time, extensive asymptomatic periods, latency phases, and periods of acuteness or exacerbation that can generate disabilities [1]. Current data show that the mortality rate due to NCD in the world is around 70% [2].

Systemic arterial hypertension (SAH) stands out among the NCD of cardiovascular origin. Cardiovascular diseases are the main cause of death in Brazil, and SAH contributes either directly or indirectly to 50% of these deaths. Hypertension currently affects approximately 32.5% of the adult population and more than 60% of the elderly. Patients with arterial hypertension report changes in their quality of life in several aspects [3,4].

The treatment of SAH involves non-medication and medication. The effectiveness and success of treatment depend on active participation and involvement of the users as an active subject in the self-management of their clinical condition, since hypertension demands continuous daily care and does not depend on a medical prescription only [5]. The patient must know at least some minor aspects of the disease to facilitate adherence to treatment.

The health literacy is a concept that goes beyond merely knowing how to read and write, but rather defined as the knowledge, motivation, and

individual skills to access, understand, evaluate, and apply health information to make judgments and make decisions about health in everyday life. Inadequate health literacy leads patients to develop attitudes and behaviors that offer health risks, such as low adherence to drug treatment, less use of prevention services, late diagnosis of comorbidities, and less understanding of the health-disease process. Assessing the level of health literacy is important to avoid negative clinical outcomes of NCD [6].

It is relevant to understand the relationship between the level of health literacy of patients with SAH and the possible determinants and consequences involved, especially with regard to the management of hypertension, self-care measures and therapeutic adherence. Thus, this study aims to assess the level of health literacy and the quality of life of patients with SAH.

2. Methods

Cross-sectional observational study carried out with 105 patients with SAH. The research was carried out in the Northeast region of Brazil. For the execution of the project, authorization was obtained from the Research Ethics Committee (approval number: 67710317.9.0000.5196) in accordance with that described in resolution 466/2012. All participants were invited to sign the Informed Consent Form, once explained the objectives of the study.

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2.1. Participants

Patients were selected for the research following the inclusion criteria of being 18 years of age or older, literate, and diagnosis of systemic arterial hypertension. The exclusion criteria were the self-reported declaration of the use of drugs that affect cognition, not having a minimum of visual acuity or adequate hearing to perform the tests or the presence of manifestations of neurological or cognitive disorders, evidenced through simple questions of attention, location and temporality performed by the researchers.

2.2. Variables

The outcome was health literacy and quality of life. The independent variables were:

- sex (male; female);
- age group (in years: up to 40, 40–59 or 60 and over);
- SAH time (in years: up to 5, 5–10, 11–20 or over to 20);
- education (elementary school, high school or University education);
- economic classification of the respondent, according to the Brazilian economic classification criterion (Brazil Criterion 2022) of the Brazilian Association of Research Companies [7]. The cuts for each class are as follows: class A (45–100 points), class B1 (38–44 points), class B2 (29–37 points), class C1 (23–28 points), class C2 (17–22 points), and class D-E (1–16 points).

2.3. Data sources

The interview was conducted by a researcher with adequate training, in view of the specifics of each test, and performed in a room reserved for this purpose. Interviews were carried out using different questionnaires to assess the following variables:

- a) clinical and sociodemographic.
- b) health literacy level.

- Short assessment of health literacy for Portuguese-speaking adults (SAHLPA-18) is a validated questionnaire (Cronbach's alpha = 0.93) that can be easily applied by trained professionals and has an application time of about 3 min. 18 cards were made containing distinct highlighted medical terms. The patient was asked to read the highlighted term aloud so that the interviewer could evaluate its pronunciation and then the interviewee should associate the term read with one of the answer options. Literacy was considered adequate when the patient had a number of correct answers greater than 14 [8].
- The Short Test of Functional Health Literacy in Adults (S-TOFHLA) it is validated questionnaire (Cronbach's alpha = 0.95). It is used to assess the numerical ability and reading comprehension about health information. The questionnaire consists of reading comprehension skills items and numerical skill cards. Has an estimated time of completion by a trained professional of 12 min. According to the score obtained in the tests, the level of health literacy of the patient is classified as inadequate if the score ranges from 0 to 53, borderline from 54 to 66, and adequate if the score ranges from 67 to 100 points [9].

- c) quality of life.

The Mini-Questionnaire on Quality of Life in Hypertension (MINICHAL) was applied to specifically evaluate the quality of life of patients with SAH [10]. It is a quickly-applied questionnaire with 17 multiple choice questions that assess the domain of mental status, somatic manifestations, and investigates how the patient assesses that hypertension and its treatment influence quality of life. The answer options were distributed on a Likert-type frequency scale. For the analysis of the results, the lower the total score obtained, the better the quality of life of the patient.

2.4. Statistical analysis

The scores of the health literacy assessment instruments were subjected to the Kruskal-Wallis test followed by a post-test comparison (Dunn). Spearman's correlation coefficient was used to verify the relationship between the test scores with the age, education, and economic class of the interviewees.

The adjusted model was built using generalized linear models with the application of the Gamma distribution, since the outcomes do not have a non-Gaussian distribution and are continuous variables, and a log linkage function. The independent variables were included in the model after the bivariate analysis revealed a significance lower than or equal to 20%. In the final adjusted model, models with significant Omnibus test were accepted and independent variables with significance in Wald's chi-square (χ^2) test were considered for the interpretation of effect. A significance level of 5% was adopted to minimize possible false-positive errors.

3. Results

3.1. Sociodemographic and clinical characteristics

105 hypertensive patients, with a mean age of 53.3 years (26–82 years) and the vast majority of women (81.9%), were evaluated. The studied population presented the following distribution regarding schooling: 40% of the individuals studied up to elementary school; approximately 39% attended high school, and only 21% had higher education. It was found that less than 10% of patients had health insurance. Most respondents were from economic classes C, D, and E. The average time of diagnosis of hypertension reported by the patients was approximately 12 years, with a minimum of 6 months and a maximum of 39 years (Table 1).

3.2. Health literacy level

According to the classification stipulated by the SAHLPA-18, 60% had a level of health literacy considered inadequate. The analysis by the S-TOFHLA revealed that 57.2% of the patients did not have adequate literacy, divided into 16.2% with borderline literacy and 41.0% with inadequate literacy.

Table 1
Sociodemographic and clinical characteristics.

Variables	Frequency - n (%)
Sex	
Female	86 (81.9)
Male	19 (18.1)
Age (years)	
<40	13 (12.4)
40–59	66 (62.9)
≥60	26 (24.7)
SAH time (years)	
<5	20 (19.0)
5–10	20 (19.0)
11–20	41 (39.1)
>20	24 (22.8)
Education	
Elementary school	42 (40.0)
High school	41 (39.0)
University education	22 (21.0)
Health insurance	
Yes	7 (6.7)
No	98 (93.3)
Economic classification	
A	3 (2.9)
B1	7 (6.7)
B2	27 (25.7)
C1	16 (15.2)
C2	27 (25.7)
D - E	25 (23.8)
Total	105 (100.0)

The comparative analysis between the SAHLPA-18 and S-TOFHILA tests, which demonstrated a statistically strong correlation ($p < 0.0001$, 95% CI = 0.55 to 0.77; and $r = 0.68$), suggesting that the patients presented similar literacy levels in both tests, even with these showing different intrinsic characteristics.

An inversely proportional relationship was observed in both literacy level tests when the scores of the questionnaires and the age of the patients were related (SAHLPA-18: $p = 0.01$, 95% CI = -0.42 to -0.05 , $r = -0.25$; S-TOFHILA: $p < 0.0001$, 95% CI = -0.57 to -0.25 , $r = -0.43$; Fig. 1A–B).

It was possible to highlight that patients from the lowest economic classes obtained a lower number of points in the tests (SAHLPA-18: $p < 0.0001$, 95% CI = 0.38 to 0.67, $r = 0.54$; S-TOFHILA: $p < 0.0001$, 95% CI = 0.28 to 0.60, $r = 0.45$; Fig. 2A–B). The scores achieved in the literacy tests were proportional to the level of education of the interviewees, with higher scores being recorded in both questionnaires as the study time increased ($p < 0.0001$; Fig. 2C–D).

3.3. Quality of life

The MINICHAL questionnaire was employed to assess the quality of life of hypertensive patients, to which 46.7% of patients reported that hypertension interferes with their quality of life. Since domain responses are distributed on a frequency scale of the Likert type it was possible to account this percentage of patients who reported that SAH interferes with quality of life in a more detailed way, as follows: 24.8% reported that SAH interferes a little in their quality of life, 10.5% that it interferes considerably, and 11.4% reported that SAH interferes a lot in the quality of life.

There was no statistical difference between male and female patients in any of the domains analyzed. However, there was a strong trend in the domain of somatic manifestations, in which women (6.67, 95% CI = 5.64–7.71) reported a worse quality of life compared to men (4.47, 95% CI = 2.74–6.21; $p = 0.06$; Table 2).

A statistical difference was observed ($p = 0.04$) when comparing the total score obtained in the MINICHAL assessment among patients with 10 or more years of the disease. This result is also evidenced in the health-related analysis of quality of life (HRQL), in which it was possible to observe a significant difference between the time of illness and the interference in health-related quality of life ($p = 0.007$). In the evaluation of the other domains, no significant difference was observed, despite a strong trend in the mental state domain ($p = 0.05$; Table 3).

A negative correlation with the interviewees' quality of life was highlighted, verifying that the lower was the economic class of the interviewees, the higher was the score obtained in the MINICHAL assessment, indicating

a worse index of quality of life ($p = 0.008$, 95% CI = -0.4326 to -0.06326 , $r = -0.26$; Fig. 3).

After analyzing the relationship between the independent variables and the literacy and quality of life outcomes, significant adjusted models were built for the outcome of the S-TOFHILA ($p < 0.001$), SAHLPA ($p < 0.001$) and MINICHAL ($p < 0.001$) scores. Thus, it was evidenced that the schooling of elementary school in relation to university education presents a negative correlation with the S-TOFHILA ($B = -0.39$; $p < 0.001$) and SAHLPA-18 ($B = -0.28$; $p = 0.006$) adjusted for the other factors. This relationship was the strongest among the independent variables. Age maintained a negative correlation with health literacy only in the S-TOFHILA ($B = -0.01$; $p = 0.001$) as well as the number of clinical manifestations of hypertension ($B = -0.0012$; $p = 0.04$) in the S-TOFHILA after adjusting for factors. The socioeconomic level was positively correlated with health literacy ($B = 0.007$; $p = 0.04$) only in the SAHLPA, Table 4.

Regarding quality of life, it is possible to state that in the analyzed sample, the increase in a clinical manifestation of hypertension increases the MINICHAL score by 0.12 units ($B = 0.12$; $p < 0.001$), presented as the factor of greatest effect among those investigated. However, the increase in the score on the socioeconomic scale is related to a decline of 0.016 units in MINICHAL ($B = -0.016$; $p = 0.001$), configuring a negative correlation between the variables. No correlation was identified between health literacy through the S-TOFHILA, time since diagnosis of hypertension and gender with the quality of life outcome in the sample.

4. Discussion

It was possible to show that most patients with hypertension did possess adequate health literacy and a large part of the patients reported that hypertension affects their quality of life.

With the increasing prevalence of NCD, especially those of cardiovascular origin, understanding medical information is essential for patients to effectively receive, process, and apply the instructions given to them, guaranteeing their empowerment and autonomy during the treatment of these chronic conditions. An adequate level of health literacy is essential for the correct self-management of hypertension [11].

The majority of respondents did not possess health insurance and belonged to economic classes C, D, and E. Studies to characterize the profile of users in primary health care services show, in fact, regional differences between patients, with the number of users belonging to economic classes A and B being significantly smaller in the North and Northeast regions of the country [12,13].

The mean age of the patients was approximately 53 years, compatible with the profile observed in other studies with patients with chronic non-

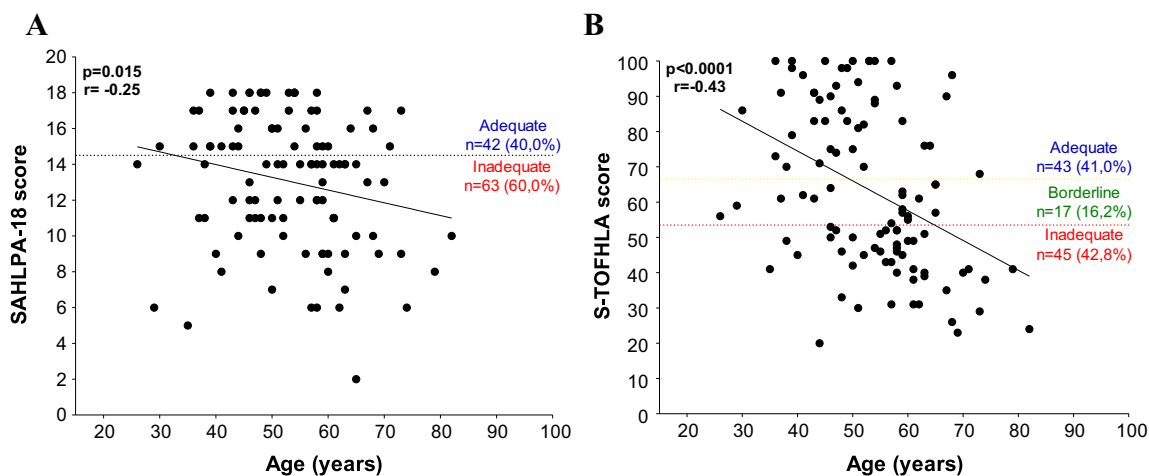


Fig. 1. Health literacy and age of the patients. The “y” axis represents the score obtained in the SAHLPA-18 (A) and S-TOFHILA (B) assessments, while the “x” axis represents the economic classification. Spearman's correlation test was used for statistical analysis. The P -value and the number of patients in each group are indicated in the figure.

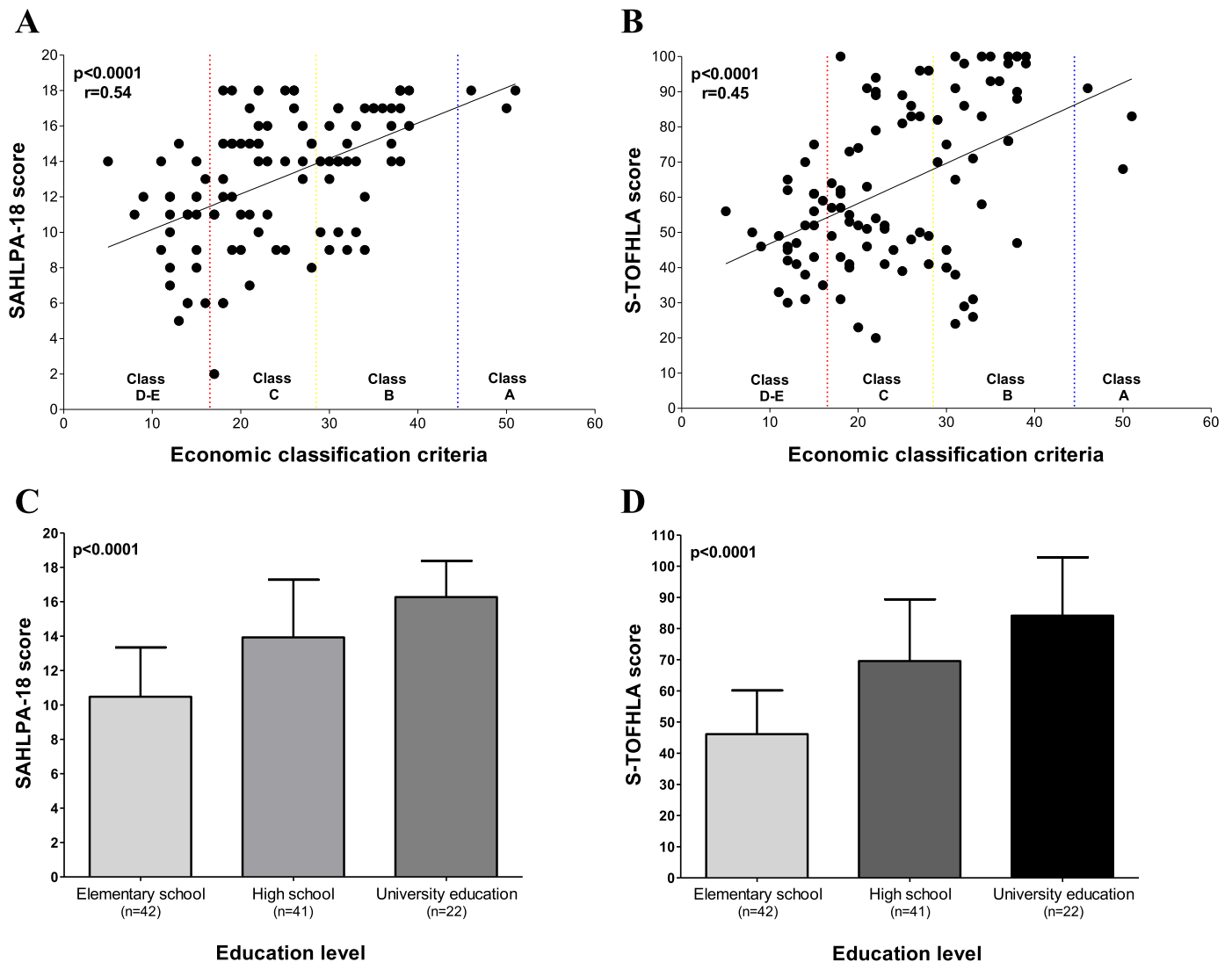


Fig. 2. Health literacy and sociodemographic aspects. The “y” axis represents the score obtained in the SAHLPA-18 (A) and S-TOFHLA (B) assessments, while the “x” axis represents the economic classification; Spearman’s correlation test was used for statistical analysis; The “y” axis represents the score obtained in the SAHLPA-18 (E) and S-TOFHLA (F) assessments, while the “x” axis represents the level of education. The division of the education level was based on the socioeconomic questionnaire answered by the interviewees. The bars represent the mean and standard deviation. Kruskal-Wallis test was used for statistical analysis. The *P*-value and the number of patients in each group are indicated in the figure.

communicable diseases [10]. A greater number of female respondents was observed in the sample. The aspect of this diminished demand by men is associated with several cultural and social factors, in which men still associate health care with the idea of fragility [14].

Table 2
Comparison of quality of life between hypertensive men and women using the MINICHAL assessment.

Domains	Gender	Mean (± SD)	Median	CI 95%	p
MS ^a	Male	6.16 (5.06)	4.00	3.72–8.60	0.25
	Female	7.80 (5.66)	6.00	6.59–9.02	
SM ^b	Male	4.47 (3.60)	4.00	2.74–6.21	0.06
	Female	6.67 (4.83)	6.00	5.64–7.71	
HRQL ^c	Male	0.68 (1.00)	0.00	0.20–1.17	0.90
	Female	0.83 (1.04)	0.00	0.60–1.05	
Total	Male	11.32 (8.61)	10.00	7.17–15.47	0.11
	Female	15.23 (9.79)	13.00	13.13–17.33	

^a MS: Mental State.

^b SM: Somatic manifestations.

^c HRQL: Health-related quality of life.

In this research, the time of diagnosis of hypertension was approximately 12 years. The living time with the disease is a highly important factor for cardiovascular risk stratification, since the longer the time of diagnosis, the higher is the risk of developing fatal and non-fatal complica-

Table 3
Comparison of quality of life and duration of hypertension.

Domains	SAH time	Mean (± SD)	Median	CI 95%	p
MS ^a	10 years or less	6.49 (4.69)	5.00	5.22–7.76	0.05
	More than 10 years	8.62 (6.23)	7.50	6.84–10.40	
SM ^b	10 years or less	5.64 (4.62)	5.00	4.39–6.89	0.14
	More than 10 years	6.98 (4.71)	6.50	5.64–8.32	
HRQL ^c	10 years or less	0.55 (0.81)	0.00	0.33–0.77	0.007
	More than 10 years	1.08 (1.17)	1.00	0.75–1.41	
Total	10 years or less	12.73 (8.88)	11.00	10.33–15.13	0.04
	More than 10 years	16.50 (10.19)	15.00	13.61–19.39	

^a MS: Mental State.

^b SM: Somatic manifestations.

^c HRQL: Health-related quality of life.

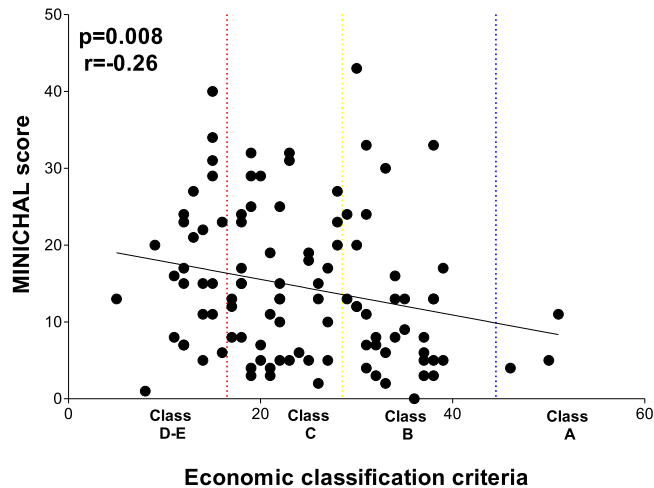


Fig. 3. Correlation between quality of life and the economic classification of patients. The “y” axis represents the score obtained in the MINICHAL assessment, while the “x” axis represents the economic classification. Spearman’s correlation test was used for statistical analysis.

tion [15,16]. The chronic and asymptomatic profile of hypertension is an aspect that hinders treatment adherence and contributes to the occurrence of these complications [17–20].

Inadequate health literacy impairs the understanding of medical information, reading and understanding prescriptions, hinders medication adherence, prevents the acquisition of lifestyle changes, and negatively interferes with patient treatment. In this and other studies also performed with arterial hypertension patients, it was possible to identify an inadequate health literacy level [21,22].

Health literacy measurement instruments seek to assess the effect of several variables that contribute to the development and use of skills in the care context. The major limitation of this task is the lack of an instrument capable of assessing functional and interactive health literacy [23]. In the

present study, two instruments were used, the SAHLPA-18 focuses on word recognition and pronunciation, configured with the assessment of comprehension skills of 18 popular medical terms, while the S-TOFHLA seeks to assess numerical ability and comprehension of the patient reading about health information [9,24]. It is important to highlight that, even with different intrinsic characteristics and low agreement [23], the tests showed a strong positive correlation between them.

Variables such as age, education, and socioeconomic conditions influence the health literacy level of patients. An inverse relationship was found between age and health literacy, with literacy rates being progressively lower in the elderly population in the two analyzed tests, an alarming data since the number of chronic non-communicable diseases in this age group is higher. One aspect that may justify this low literacy rate among the elderly is the fact that this population has difficulties intrinsic to the aging process, such as frequent forgetfulness and cognitive impairment [25,26], or the lower number of study years presented by this population [27].

A strong correlation between the scores obtained in the tests and the economic class was observed. People with higher income have greater opportunities for study and intellectual development [28,29]. Brazil’s illiteracy rate in 2018 corresponded to 6.8% of the population, and this rate has decreased over the years [30]. This percentage corresponds only to the rate of illiterates and not to that of functional illiterates, which includes the illiterate and people with a rudimentary level of literacy. Functional illiterates are people who have not completed the fourth grade (fifth year) of elementary school, and although they know how to read and write, sometimes these people are unable to apply reading skills in the social context in which they are inserted [31,32].

A positive correlation was observed between the health literacy level and the respondents’ education in both evaluated questionnaires. These results corroborate with the data presented in other studies [33,34]. It is worth noting that other studies also show that not always a high education level guarantees that the patient will master the necessary skills to be considered as health literate [35]. This is probably due to the technical and complex terms used in the cultural context of health services and also to the inability of some professionals in transmitting information clearly and accurately [36].

The evaluation of the quality of life related to the health allows estimating the degree of impaired quality of life caused by SAH [37,38]. Quality of

Table 4
Adjusted models for health literacy and quality of life outcomes in hypertensive individuals.

Variables	B	Wald CI95%		Hypothesis test			Omnibus Test	
		Bottom	Upper	x ²	df	Sig.	x ²	p
Outcome: S-TOFHLA								
Interception	4.78	4.43	5.12	751.99	1	<0.001	72.90	<0.001
Elementary school	-0.39	-0.60	-0.18	13.48	1	<0.001		
High school	-0.10	-0.26	0.06	1.56	1	0.212		
University education	0							
Hypertension time	-0.001	-0.008	0.007	0.03	1	0.869		
Age	-0.01	-0.02	-0.004	11.70	1	0.001		
Economic classification	0.01	-0.001	0.01	2.62	1	0.106		
Somatic manifestations (Scale)	-0.01	-0.02	-0.001	4.22	1	0.040		
	0.07	0.05	0.09					
Outcome: SAHLPA-18								
Interception	2.68	2.37	2.99	285.97	1	<0.001	41.19	<0.001
Elementary school	-0.28	-0.49	-0.08	7.66	1	0.006		
High school	-0.08	-0.23	0.08	0.97	1	0.325		
University education	0							
Age	-0.003	-0.009	0.002	1.46	1	0.227		
Economic classification	0.008	0.001	0.02	4.12	1	0.042		
(Scale)	0.07	0.05	0.09					
Outcome: MINICHAL								
Interception	1.85	1.49	2.22	99.47	1	<0.001	126.65	<0.001
Somatic manifestations	0.13	0.11	0.15	181.06	1	<0.001		
Female	-0.05	-0.25	0.14	0.29	1	0.592		
Male	0							
Hypertension time	0.007	-0.004	0.02	1.68	1	0.195		
Economic classification	-0.02	-0.02	-0.006	11.20	1	0.001		
S-TOFHLA	0.003	-0.001	0.007	2.06	1	0.151		
(Scale)	0.15	0.12	0.20					

life is a subjective parameter for the analysis of general well-being, although it has significant importance in the management of this chronic condition [39]. In this study, 46.7% of the patients reported that hypertension interferes with quality of life, although some studies show that the chronic and silent characteristic of hypertension can hinder this perception by patients [40]. Patients with a longer time of hypertension diagnosis reported that presenting this clinical condition interferes with their quality of life. Due to its chronic aspect, hypertension can interfere in different aspects of life, with physical and psychosocial impacts [10,41].

It was possible to evidence a worse quality of life in low-income patients. It is well-described that people from lower economic classes and living in situations of vulnerability may have a worse prognosis and cardiovascular outcomes, which in the long run can impact the quality of life [17].

Women had higher mean scores in the mental and somatic domains, evidencing reports of worse quality of life. Similar results were also evidenced in other publications [17]. It is already reported that women report feelings of dissatisfaction and frustration more often than men, and this has an impact on their quality of life. In addition, higher rates of depression are also described in females [42].

In view of the proposed inferences, it is important to specify some methodological limitations of the study. The sampling process adopted was non-probabilistic and the number of patients who refused to participate in the research or were excluded was not mentioned, limiting the representativeness of the sample included. Although the number of people who had some limitation that made it impossible to participate in this research was not quantified, the main reasons reported by patients were illiteracy, present in a considerable portion of the local population.

It is also important to note that health literacy is associated with other important independent variables that were not listed in the study such as race [43], marital status [44], health insurance and dominant dialect [45]. The quality of life of patients with hypertension is also associated with several other variables not listed in the study, especially achieving controlled blood pressure, absence of target organ complications, and absence of drug [46].

It is important to note that a large part of the patients reported that hypertension affects their quality of life and the most patients with hypertension did possess adequate health literacy. This data reflects the difficulty in understanding and processing health information, which can directly impact the therapeutic management of systemic arterial hypertension.

5. Conclusion

The high rate of hypertensive patients with inadequate health literacy reveals a critical scenario, which makes it difficult to follow the recommendations in their treatment. This data was related to low education, lower socioeconomic level and increasing age, understanding these limitations can contribute to the adequacy of health services. It is necessary to devote special attention to the process of transmitting health information, so that patients receive, process, and effectively apply the instructions given to them.

Given the scarcity of studies on health literacy in Brazil, this research presents a reality unknown to the health system in the semi-arid region of the Northeast, thus making it possible to subsidize new studies and intervention programs in order to guarantee patients autonomy and effectiveness in their decision-making processes.

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Ethics approval

Research Ethics Committee (approval number: 67710317.9.0000.5196);

Consent to participate

All participants were invited to sign the Informed Consent Form;

Availability of data and material

All materials and data are available for consultation;

CRediT authorship contribution statement

Luana Resende Cangussú: Conceptualization, Acquisition of data, Investigation, Writing - original draft preparation; **Eduardo Antonio Sartori Alho:** Acquisition of data, Investigation; **Anekecia Lauro da Silva:** Formal analysis; **Diogo Vilar da Fonsêca:** Formal analysis; **Johnnatas Mikael Lopes:** Data curation, Formal analysis; **Romero Henrique de Almeida Barbosa:** Critical revision of the manuscript for intellectual content, Supervision; **Matheus Rodrigues Lopes:** Conceptualization, Data curation, Formal analysis, Writing - original draft preparation, Supervision;

Declaration of Competing Interest

No potential conflict of interest was reported;

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