Literature Review

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Health literacy assessment instruments: literature review

Instrumentos de avaliação do letramento em saúde: revisão de literatura

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ABSTRACT

Introduction: Assessing health literacy may favor clinical practice. **Purpose:** To review the scientific literature about instruments and methods to assess health literacy. **Research strategy:** Bibliographic searches were performed in the electronic databases of PubMed, Web of Science and BVS – LILACS. DeCS (Health Science Descriptors) and MeSH (Medical Subject Headings) descriptors were used, combined by Boolean operators. **Selection criteria:** Articles published between 2009 and 2014 in Portuguese, English or Spanish, that used general health literacy assessment instruments or instruments that allow this type of analysis. Articles that did not approach health literacy in the title or abstract were excluded, as well as articles that did not cite health literacy assessment instruments and outcomes, repeated articles, reviews, case studies and series of cases. Two reviewers analyzed and selected the articles. **Results:** A variety of health literacy assessment instruments was identified. The most frequently used instruments were the Test of Functional Health Literacy in Adults and the Rapid Estimate of Adult Literacy. The design of most studies was cross-sectional observational, with greater scientific output in the United States and Europe. Categorization of health literacy into levels and presentation of the respective frequency distributions prevailed. Speech, Language and Hearing Sciences studies that include health literacy assessment are scarce. **Conclusion:** Researchers have utilized a variety of instruments and methods to assess health literacy, with predominance of clinical screening tests focusing on functional health literacy, administered in the setting of outpatient clinics and hospitals.

Keywords: Health literacy; Health evaluation; Methodology; Review; Speech, language and hearing sciences

RESUMO

Introdução: Avaliar o letramento em saúde pode favorecer a prática clínica. **Objetivo:** Revisar a literatura científica sobre os instrumentos e métodos para avaliação do letramento em saúde. **Estratégia de pesquisa:** Foram realizadas pesquisas bibliográficas nas plataformas de busca PubMed, Web of Science e BVS – LILACS. Foram utilizados descritores DeCS (Descritores em Ciências da Saúde) e MeSH (*Medical Subject Headings*), combinados entre si por operadores booleanos. **Critérios de seleção:** Artigos publicados entre 2009 e 2014, em português, inglês ou espanhol, que utilizaram instrumentos de avaliação do letramento em saúde geral, ou que possibilitaram este tipo de análise. Foram excluídos os artigos que não abordaram o letramento em saúde no título ou resumo, não citaram instrumentos e resultados da avaliação do letramento em saúde, artigos repetidos, revisões, casos e série de casos. A análise e a seleção dos artigos foram realizadas por dois revisores. **Resultados:** Foram identificados diversos instrumentos de avaliação do letramento em saúde, sendo o *Test of Functional Health Literacy in Adults* e o *Rapid Estimate of Adult Literacy* os mais adotados. A maioria dos estudos utilizou delineamento observacional transversal e a maior produção científica deu-se nos Estados Unidos e na Europa. Prevaleceu a categorização do letramento em saúde em níveis e a exposição das respectivas distribuições de frequências. São escassos estudos fonoaudiológicos que abrangem a avaliação do letramento em saúde. **Conclusão:** Os pesquisadores têm utilizado variados instrumentos e métodos de avaliação do letramento em saúde, com predominância dos testes de triagem clínica com enfoque no letramento em saúde funcional, utilizados no contexto de ambulatórios e hospitais.

Palavras-chave: Alfabetização em saúde; Avaliação em saúde; Metodologia; Revisão; Fonoaudiologia

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Authors' contribution: *SRLM* planned and conducted the bibliographic research, selected articles to be reviewed, wrote and formatted the article. *SMAL* planned the bibliographic research, selected articles to be reviewed, supervised and revised the article.

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INTRODUCTION

Health literacy is defined as people's knowledge, motivation and competence towards having access to, understanding, evaluating and applying health information to judge and make decisions, in their daily lives, regarding healthcare, disease prevention and health promotion, in order to maintain or improve their quality of life[1].

In view of the relevance of health literacy, scientific literature has developed - and is still researching - resources to measure it[2]. The tests that have been validated so far allow to classify the degree of health literacy of individuals and populations and, thus, determine the most appropriate intervention in cases in which the assessed skills prove to be limited. This process is fundamental to foster the obtention of more favorable clinical outcomes and to reduce health inequities[3].

Health literacy is, above all, a theme that congregates competences related to communication and application of health information. Therefore, the speech-language pathologist and audiologist must not only incorporate the theme into his/her practice, but also be a strategic element in the discussion about health literacy and in the proposal of instruments to assess it in the healthcare network[4].

Health literacy assessment instruments can be general or specific. The former can be classified into: 1. Clinical screening tests, which assess reading comprehension, word recognition and mathematical literacy, aiming to identify difficulties in understanding and using health information; 2. Approximation measures, which use literacy research to estimate the proportion of people with health literacy difficulties in the studied population; and 3. Direct health literacy measures, that is, measures of people's ability to understand, access, evaluate and use health information and services. These measures are the field which has been undergoing the greatest expansion[1]. As for specific health literacy assessment instruments, they focus on each health condition that one intends to analyze in order to measure patients' capacity to deal with disorders such as asthma, diabetes and hypertension, and also on alterations related to other health specialties[5].

As a result of the utilization of these assessment instruments, individuals can be classified as follows, according to their health literacy level: 1. Basic/functional - basic reading and writing skills that enable the individual to deal with daily health situations; 2. Communicative/interactive - more advanced cognitive and literacy skills which, together with social skills, enable the individual to extract and apply information and meanings from different means of communication, with the purpose of modifying circumstances in health situations; 3. Critical - even more advanced cognitive and literacy skills, which enable the individual to analyze information critically and use it to exercise greater control on life events and health situations[6].

It is important to highlight that, in spite of the availability of different health literacy assessment instruments and although they have provided a valuable contribution to clinical practice, no single test encompasses the entire complexity of the theme. This is justified by the large variety of contexts related to the mastering of the written and oral language that is involved in the theme[3,5].

Another characteristic inherent in the study of health literacy is the fact that it is constituted as interdisciplinary knowledge[7]. In this context, the speech-language pathologist and audiologist needs to master the specific knowledge of his/her field of activity, so that he/she is able to research, assess and plan actions and interventions focusing on health literacy skills. This professional's role is of utmost importance because of the close relation between health literacy and the skills of speaking, listening to and understanding oral/written language. Thus, it has been observed that patients with communication disorders clearly experience even greater challenges regarding health literacy[4,8,9]. In the current conjuncture, in which communication among the healthcare system, workers and users must be enhanced[7], the Speech, Language and Hearing Sciences - which are specially related to communication - can effectively contribute to improve speech, pragmatic language competences, and hearing, reading and writing skills[4,8,9]. Despite the close relation between the speech-language pathologist and audiologist's expertise in rehabilitating and improving communicative skills and health literacy (a capacity that depends on the effective use of oral and written language in the dialogic bonds that emerge between users and health professionals), there are few studies in the field of the Speech, Language and Hearing Sciences about the theme[4,8,9]. Being familiar with the health literacy assessment instruments is the first step speech-language pathologists and audiologists must take to qualify themselves to work in this important field of activity.

OBJECTIVE

This study aimed to review the scientific literature that deals with instruments and methods used to assess health literacy.

RESEARCH STRATEGY

The question that guided the review was: "Which instruments are used to assess health literacy?" To obtain answers to this question, a bibliographic research was carried out in the following electronic databases: PubMed (US National Library of Medicine), Web of Science, and BVS - LILACS (Virtual Health Library - Latin American and Caribbean Literature in Health Sciences). Data were collected in the period from April to August 2014.

MeSH (Medical Subject Headings) descriptors, from the US National Library of Medicine, were used to the PubMed and Web of Science platforms (*health literacy* and *questionnaires* (*title/abstract*)). To research into BVS - LILACS, DeCS (*Descritores*

em Ciências da Saúde - Health Sciences Descriptors) were used, as well as the free term "literacy", combined by the utilization of the Boolean operators AND and OR. Thus, the search equation was: MH: N02.421.143.827.407.228.500$ OR Health Literacy OR *Alfabetización en Salud* OR *Alfabetização em Saúde* OR *Letramento* OR MH: N02.421.143.827.407.680 OR Patient Education as Topic OR *Educación del Paciente como Asunto* OR *Educação de Pacientes como Assunto* OR MH: N02.421.143.827.407.228$ OR Consumer Health Information OR *Información de Salud al Consumidor* OR *Informação de Saúde ao Consumidor* AND MH: N06.850.520.308.750$ OR Questionnaires OR *Cuestionarios* OR *Questionários*.

SELECTION CRITERIA

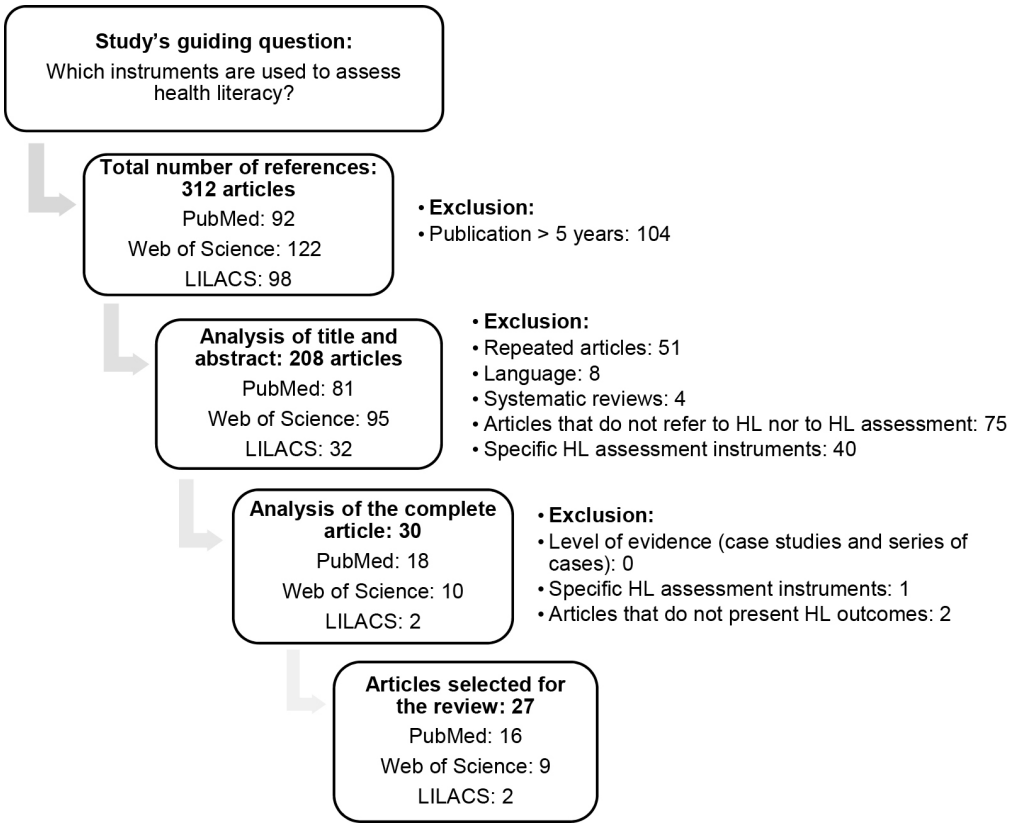
Articles published between 2009 and 2014 in Portuguese, English or Spanish were selected to be reviewed. The selected articles used general health literacy assessment instruments, that is, instruments to assess individuals' functional, communicative or critical health literacy that deal with the health theme in a broad way, without approaches related to specialties. Studies that employed health literacy assessment instruments developed for a specific area (diabetes, for example) were also included, provided that such instruments were adapted in the literature and applied to other health contexts - therefore, they were considered instruments that allowed to analyze general health literacy.

Articles that did not approach health literacy in the title or abstract were excluded, as well as articles that did not mention the instruments and outcomes of health literacy assessment, repeated articles in the electronic databases, reviews, case studies and series of cases. Articles that used health literacy assessment instruments developed exclusively for specific areas (oncology, mental health and others) were also excluded.

The analysis of the articles and the decision-making process concerning inclusion in the review were performed by two reviewers, and 27 articles that met the inclusion criteria were selected (Figure 1).

DATA ANALYSIS

Initially, the studies were analyzed through the reading of their titles and abstracts. Then, the articles that met the selection criteria were fully read. For the analysis of the selected articles, the recommendations set forth by STROBE[10] were used. Strobe (Strengthening the Reporting of Observational studies in Epidemiology) is an international initiative to improve the quality of description in observational studies. The analysis protocol containing the recommendations of the STROBE initiative was structured as a database in the software



Subtitle: HL = Health literacy

Figure 1. Selection of articles

Microsoft Office – Excel®, 2013 and included the following elements: a detailed description of the study's identification data, introduction, methodology, main results (descriptive and analytical), discussion and conclusions.

Subsequently, a descriptive analysis of the frequency distribution of the following variables was performed: health literacy assessment instruments, type of health literacy assessment instruments (general, specific or indirect assessment), studies' design, type of variable into which health literacy was classified (response or explanatory), studies' place of origin, studies' setting (primary care services, outpatient clinics, hospitals, internet), form of presentation of health literacy outcomes (by frequency distribution, continuous measures, classification of health literacy levels), and factors associated with health literacy. All variables were analyzed critically and discussed. The main characteristics of the selected studies and of the most frequent health literacy assessment instruments were organized in charts.

RESULTS

Synthesis of the studies

Chart 1 presents the general health literacy assessment instruments, the indirect health literacy assessment instruments (those which have an intrinsic relation to the theme, as they assess behaviors that promote health or efficacy in physician-patient communication, for example), and the description of the studies' outcomes, as far as health literacy is concerned.

Health literacy assessment instruments

In the 27 analyzed articles, 36 health literacy assessment instruments were identified, with 17 distinct types. TOFHLA (Test of Functional Health Literacy in Adults) and REALM (Rapid Estimate of Adult Literacy in Medicine) were the

Chart 1. Synthesis: studies selected for the analysis of health literacy assessment instruments (n=27)

Authors, year	Country	Design	Casuistics	Instruments*	Results
Sleath et al., 2014[11]	United States of America	Multi-center, cross-sectional, observational.	228 English-speaking adults with glaucoma in self-administration of medications.	REALM	14.5% of patients obtained a score of 0-60 in REALM and 83.3% obtained a score of 61-66. There was no association between HL and adherence to medication.
Izard et al., 2014[12]	United States of America	Cross-sectional observational.	50 patients with prostate cancer (aged ≥ 21 years) and 50 health professionals.	1) REALM-SF 2) Graphical Literacy Scale	Mean score in REALM-SF: 6.8 (maximum: 7, SD: 1.0), equivalent to high HL.
van der Vaart et al., 2014[13]	The Netherlands	Pretest/ posttest.	360 patients with rheumatoid arthritis aged 20-86 years.	1) MFCCHL– Ishikawa (Version in Dutch) 2) 5-item version of PEPPI-5	Mean score in HL: 38.6 (scale from 14 (low HL) to 56 (high HL)) (SD: 7.2). Significant association between portal use and HL: Higher HL = higher frequency of access to the portal.
Tsai et al., 2014[14]	Taiwan	Cross-sectional observational.	347 women living in the regions of great Taipei or Taoyuan (north of Taiwan).	1) THLS-modified version 2) HPLP Chinese	Mean score in HL: 2.60 (maximum: 4, SD: 0.55) = moderate HL. 33.2% of the participants presented inadequate HL and 66.8%, adequate HL. There was an association between HL and health-promoting behaviors.
Wei et al., 2014[15]	Taiwan	Cross-sectional observational.	752 Taiwanese adults (372 from Taipei and 380 from Hualien).	MHLS	Mean score in MHLS: 43.2 (maximum: 50, SD: 6.6). Adequate HL: 68.6%, marginal HL: 25.3%, and inadequate HL: 6.1%.
Smedberg et al., 2014[16]	15 European countries	Multi-center, cross-sectional, observational.	8,344 pregnant women or women with children younger than one year.	SBSQ	HL among non-smokers and smokers: low: 5.0% and 7.4%, medium: 39.7% and 47.4%, high: 55.3% and 45.1% (p-value <0.001). Women with low HL were more likely to continue smoking during pregnancy.
Lupattelli et al., 2014[17]	Countries in Europe, Oceania, and the Americas	Multi-center, cross-sectional, observational.	4,999 pregnant women.	SBSQ	High HL: 54.5%, medium: 40.3% and low: 5.2%. HL was significantly associated with non-adherence to medication, risk perception and beliefs about the medication.

Chart 1. Synthesis: studies selected for the analysis of health literacy assessment instruments (n=27) (cont.)

Authors, year	Country	Design	Casuistics	Instruments*	Results
Nesbitt et al., 2014[18]	United States of America	Cross-sectional observational.	612 patients with cardiac insufficiency, age ≥ 18 years, rural area.	STOFHLA	Mean score in HL: 25.5 (maximum: 36, SD: 8.8). HL had no influence on health-related quality of life.
Hirsh et al., 2014[19]	United States of America	Randomized clinical trial.	300 patients with rheumatoid arthritis, age ≥ 18 years.	STOFHLA	28% of patients with inadequate or marginal HL. Mean score in HL: 77.6 (maximum: 100; SD: 23.5%). Limited HL is a predictor of the presence of significant discrepancies between verbal and written assessments.
Riebl et al., 2013[20]	United States of America	Cross-sectional, observational - pilot study	60 adults aged ≥ 21 years.	NVS	Mean score in HL: 5.2 (ranges from 0-6: 4-6 = adequate HL). Individuals with lower level of schooling presented lower HL scores.
Inoue et al., 2013[21]	Japan	Cross-sectional observational.	269 patients with type 2 diabetes, age ≥ 20 years and < 75 years.	1) MFCCHL– Ishikawa 2) Question with a Likert scale.	Functional HL: 3.36 (SD: 0.58); communicative: 2.65 (SD: 0.68); critical: 2.28 (SD: 0.59). HL and patient-physician communication were associated with the understanding and management of diabetes.
Jovic´-Vranes et al., 2013[22]	Serbia	Cross-sectional observational (instrument validation).	120 patients, age ≥ 18 years.	1) TOFHLA 2)STOFHLA (Serbian versions)	Adequate HL: 59.0% and 82.9%, limited HL: 41.0% and 17.1% (respectively in TOFHLA and STOFHLA). Sex, age, level of schooling, self-perception of health and presence of chronic disease were associated with HL.
Kiser et al., 2012[23]	United States of America	Randomized clinical trial.	99 adult patients with chronic obstructive pulmonary disease.	STOFHLA	Low HL: 36%. Patients with low or high HL benefited from the intervention of self-management of an inhalation technique.
Anger et al., 2012[24]	United States of America	Cross-sectional observational - pilot study	36 women with pelvic floor disorder, aged between 42 and 94 years.	TOFHLA	Mean score in HL: 93 (maximum 100). HL score decreased as age increased. Patients had low recall of the diagnosis and poor understanding of their pelvic floor condition, despite the fact that 97.2% of them presented high HL.
Coughlan et al., 2012[25]	Ireland	Cross-sectional observational - pilot study	199 patients, age ≥ 18 years, attending an anticoagulation clinic.	REALM	Median of the HL score: 64 (maximum: 66). Low HL: 19.1%, adequate HL: 80.9%. There was an association between HL and level of schooling.
Apolinário et al., 2012[26]	Brazil	Cross-sectional observational (instrument validation).	226 elderly patients, age ≥ 60 years, both sexes.	SAHLPA (full and short versions: SAHLPA-50 and SAHLPA-18)	Score mean: 37.7 (SD: 9.0). Inadequate HL: 66% (SAHLPA-50). The developed instrument presents good validity and consistence.
Eriksson-Backa et al., 2012[27]	Finland	Cross-sectional observational.	281 elderly patients aged 65-79 years, both sexes.	Questionnaire adapted from eHEALS	Greater vulnerability to the obtention/ use of health information: low level of schooling and self-perception of health, disinterest and low proactivity in the search for health information.
Convery et al., 2011[28]	Australia	Cross-sectional observational.	80 adults with hearing loss aged 45-90 years, both sexes.	STOFHLA	Mean score in HL: 34 (adequate HL), (maximum: 36; SD: 4.61). Higher HL levels were associated with increased likelihood of completing the task in an independent and successful way.
van der Vaart et al., 2011[29]	The Netherlands	Cross-sectional observational.	227 patients of a rheumatology clinic aged <70 years.	MFCCHL– Ishikawa (Version in Dutch)	Mean score in the functional HL: 3.4 (SD: 0.55), communicative: 2.8 (SD: 0.64) and critical: 2.0 (SD: 0.67).

Chart 1. Synthesis: studies selected for the analysis of health literacy assessment instruments (n=27) (cont.)

Authors, year	Country	Design	Casuistics	Instruments*	Results
Myaskovsky et al., 2011[30]	United States of America	Multi-center, cross-sectional, observational.	275 subjects with spinal cord injury, wheelchair users for at least one year, age ≥16 years.	1) REALM – Revised. 2) 9-item Healthcare System Distrust Scale.	Mean score in HL: 7.37 (maximum: 8, SD: 1.55). Afro-Americans obtained a lower HL compared to whites.
Hahn et al., 2011[31]	United States of America	Cross-sectional observational (instrument validation).	608 English speakers, primary care patients, age ≥21 years.	Health LiTT	The proportions of correct answers in the Health LiTT ranged from 30% to 95%. The test provides reliable and valid scores. Lower scores were associated with lower income and level of schooling, absence of previous use of computers and self-report of poor reading skills.
Rawson et al., 2010[32]	United States of America	Cross-sectional observational (instrument validation).	155 patients referred to outpatient cardiology.	1) REALM 2) METER	Mean score: METER: 36.1 (SD: 5.0; maximum: 40); REALM: 62.2 (SD: 6.5; maximum: 66). METER measures HL in a fast and practical way.
Fink et al., 2010[33]	United States of America	Multi-center randomized clinical trial.	502 patients with indication for elective surgeries.	REALM	HL mean score: 62.3 in the group with the repeat back technique and 62.5 in the group without the technique.
Fink et al., 2010[34]	United States of America	Multi-center randomized clinical trial.	502 patients with indication for elective surgeries.	REALM	Patients with limited HL: 16% with score <60 and 2% with score <40 in REALM. HL was not significantly associated with understanding.
Sox et al., 2010[35]	United States of America	Cross-sectional observational.	15 parents/ guardians of students undergoing diagnostic analysis for ADHD	TOFHLA	HL score ranged from 79 to 100. The inclusion of user support items in the developed application was based on HL or on experience of technology.
Ishikawa et al., 2009[36]	Japan	Cross-sectional observational.	134 patients with type 2 diabetes being regularly monitored at an outpatient clinic.	1) MFCCHL– Ishikawa 2) PPPM - adapted 3) IPCDP - adapted	Functional HL: 3.4, communicative: 2.5 and critical: 2.0 (maximum = 4). HL is related to patient-physician communication and to patient's perception of the process.
Carthery-Goulart et al., 2009[37]	Brazil	Cross-sectional observational (instrument validation).	312 healthy patients, age ≥ 18 years, both sexes.	STOFHLA (in Portuguese)	32.4% of patients with inadequate or borderline performance in the instrument. Among elderly patients, 51.6%. Association between S-TOFHLA results and level of schooling. The instrument is adequate to the Brazilian population.

Subtitle: Instruments* = Health literacy assessment instruments; REALM = Rapid Estimate of Adult Literacy in Medicine; HL = Health literacy; REALM-SF = Rapid Estimate of Adult Literacy in Medicine - short form; SD = standard deviation; MFCCHL– Ishikawa = Measure of functional, communicative and critical health literacy – Ishikawa; PEPPI-5 = Perceived Efficacy in Patient-Physician Interactions questionnaire; THLS = Taiwan Health Literacy Scale; HPLP Chinese = Chinese version of the Health-Promoting Lifestyle Profile; MHLS = Mandarin Health Literacy Scale; SBSQ = Set of Brief Screening Questions; S-TOFHLA = Short Test of Functional Health Literacy in Adults; NVS = Newest Vital Sign; TOFHLA = Test of Functional Health Literacy in Adults; SAHLSA = Short Assessment of Health Literacy for Spanish speaking Adults; SAHLPA = Short Assessment of Health Literacy for Portuguese-Speaking Adults; eHEALS = eHealth Literacy Scale; Health LiTT = Health Literacy Assessment Using Talking Touchscreen Technology; METER = Medical Term Recognition Test; ADHD = Attention Deficit Hyperactivity Disorder; PPPM = patient's perceived participation measure; IPCDP = Interpersonal Processes of Care in Diverse Populations Questionnaire

instruments that were most frequently used. TOFHLA was chosen in 8 articles (29.6%)[18,19,22-24,28,35,37], and 1 of these studies used both versions of this test (the full and the short versions) [22]. The short version - S-TOFHLA - was the most frequent one (6 articles) (22.2%)[18,19,22,23,28,37]. TOFHLA and its versions were used in the United States, Serbia, Australia and Brazil.

REALM, employed in the United States, Ireland and Brazil, was chosen in 8 articles (29.6%)[11,12,25,26,30,32-34]. Five of these articles used the full version (18.6%)[11,25,32-34], 1 of them used the short version (3.7%)[12], and 1 used the reviewed version (3.7%)[30]. Of these 8 studies, 1 (3.7%) used SAHLPA (Short Assessment of Health Literacy for Portuguese-speaking Adults)[26], a version

validated in Portuguese of SAHLSA (Short Assessment of Health Literacy for Spanish-speaking Adults), adapted from REALM. MFCCHL – Ishikawa (Measure of functional, communicative and critical health literacy) was used in 4 articles (14.8%)[13,21,29,36] in Japan and the Netherlands, and SBSQ (Set of Brief Screening Questions), in 2 articles (7.4%)[16,17]: a study that performed assessments in 15 European countries[16] and a study that involved countries in Europe, Oceania, North and South America[17]. Each one of the other 13 health literacy assessment instruments that were identified in the study was used by 1 article (3.7%).

Among the 13 health literacy assessment instruments that were chosen in only one article (n=13), 7 (53.8%) referred to general health literacy assessment instruments[12,14,15,20,27,31,32]: NVS (Newest Vital Sign)[20], MHLS (Mandarin Health Literacy Scale)[15] and Health LiTT[31] (Health Literacy Assessment Using Talking Touchscreen Technology) (n=3, 23.1%), which test the understanding of textual and numerical information (functional health literacy); METER (Medical Term Recognition Test)[32] and THLS (Taiwan Health Literacy Scale)[14] - modified version (n=2, 15.3%), which test term recognition in the area of health, also restricted to functional health literacy; Graphical Literacy Scale[12] (n=1, 7.7%), which tests the understanding of common graphic representations of numerical health information - therefore, also related to functional health literacy; the questionnaire inspired by eHEALS (eHealth Literacy Scale)[27] (n=1, 7.7%), which assesses informational health literacy, that is, functional health literacy, by means of statements that are judged by patients (whether they agree with the assertions or not - answers in a five-point Likert scale). The other 6 instruments (46.2%)[13,14,21,30,36] were considered as indirect health literacy assessments and approached the following themes: patient's feeling of trust in the interaction with the physician (1 instrument related to communicative health literacy)[13]; health-promoting behaviors in adults[14]; patient's perception of their own participation in health assistance[36]; patient's perception of the physician's explanation[36]; patient's perception of the clarity of medical explanations[21]; and individual's distrust of the healthcare system[30] (5 instruments related to functional, communicative and critical health literacy).

In 14 articles (51.9%)[11,13,17-21,23,24,28,30,33,34,36], general and specific health literacy assessment instruments were used in an associated form, and the approached specialties were: Rheumatology[13,19] Endocrinology[21,36], Surgery[33,34] (each area approached in 2 articles, 7.4%), Ophthalmology[11], Pharmacy[17], Cardiology[18], Nutrition and Physical Education[20], Pneumology[23], Urology and Urogynecology[24], Speech-Language Pathology and Audiology[28], Orthopedics and Physiotherapy[30] (each area approached in 1 article, 3.7%).

The main characteristics of the health literacy assessment instruments most frequently used in the selected articles are presented on Chart 2.

Methodological and contextual characteristics of the selected studies

Concerning design, the majority of the studies was observational and cross-sectional (n= 22; 81.5%)[11,12,14-18,20-22,24-32,35-37], and some received additional specifications: 3 were pilot studies (11.1%)[20,24,25], 4 were multi-center studies (14.8%)[11,16,17,30], and 5 focused on validation of assessment instruments (18.5%)[22,26,31,32,37]. Randomized clinical trials - studies that present higher levels of scientific evidence - totaled only 4 occurrences (14.8%)[19,23,33,34], and 2 of them were multi-center studies (7.4%)[33,34]. Only 1 study presented a pretest/posttest design (3.7%)[13].

Among the instrument validation studies, 3 (60.0%) translated and adapted health literacy assessment tests to local languages in Serbia and Brazil: TOFHLA and STOFHLA to Serbian[22]; STOFHLA to Portuguese[37]; SAHLSA (test in Spanish adapted from REALM) to Portuguese, originating SAHLPA-50 and SAHLPA-18[26]. The other 2 studies (40.0%) proposed to develop new health literacy assessment instruments, both in the United States: Health LiTT[31] and METER (which includes many words from REALM)[32].

Health literacy was considered an explanatory variable in the majority of the articles (n=16, 59.3%)[11-13,16,18-20,23-25,28-30,33-35]. The articles that considered health literacy the response variable (n=11, 40.7%)[14,15,17,21,22,26,27,31,32,36,37] include the 5 instrument validation studies (18.5%)[22,26,31,32,37], 4 population-based studies (14.8%) - 2 in Taiwan[14,15], 1 in Finland [27] and 1 intercontinental study[17], - and 2 studies with diabetic patients (7.4%), carried out in Japan[21,36].

As for place of origin, studies carried out in North America predominated (n=13; 48.1%)[11,12,18-20,23,24,30-35], all of them in the United States. Six European studies were identified (22.2%): 2 from the Netherlands (7.4%)[13,29], 1 from Ireland (3.7%)[25], 1 from Finland (3.7%)[27], 1 from Serbia (3.7%)[22], and 1 jointly developed by 15 European countries (3.7%)[16]. Four studies were conducted in Asia (14.8%): 2 in Japan (7.4%)[21,36] and 2 in Taiwan (7.4%)[14,15]. Two studies were carried out in Latin America, both in Brazil (7.4%)[26,37], and 1 study was conducted in Oceania (Australia) (3.7%)[28]. One intercontinental study involved the participation of countries in Europe, Oceania, North America and South America (3.7%)[17].

The majority of the studies was carried out at clinics or reference centers located at outpatient clinics or hospitals (n=17; 63.0%)[11-13,19,23-26,28-30,32-37]. Seven studies referred to the primary care context (25.9%)[14,15,20,21,22,27,31] and 1 involved assessments both in a primary care environment and in a hospital (3.7%)[18]. Two studies (the multinational ones) collected data via the Internet (7.4%)[16,17].

Forms of presentation and analysis of health literacy outcomes

Concerning outcome presentation, the majority of the

Chart 2. Synthesis of the characteristics of the health literacy assessment instruments

Instrument	Characteristics	Versions / Languages
Test of Functional Health Literacy in Adults (TOFHLA)[22,24,38,39,40]	**Assessment object:** Functional health literacy. **Assessment method:** Self-administered, with previous oral instructions. For reading comprehension items, sentences with absent words are presented. Subjects select one out of four answer options to fill in the gaps. Texts are extracted from real materials from the health context, such as medical forms and instructions for health examinations. For mathematical literacy items, materials related to medical prescriptions are presented and the patient is required to answer the questions orally. **Assessment items:** TOFHLA: 50 reading comprehension items and 17 numerical skills items. STOFHLA: 36 reading comprehension items and four numerical skills items. **Administration time:** 22 minutes for TOFHLA and 12 for STOFHLA. **Classification of outcomes:** For TOFHLA, the score ranges from 0 to 100 (0 to 50 for reading comprehension, the same for mathematical literacy). The results establish levels of functional health literacy. Inadequate (0-59 points), marginal (60-74 points) and adequate (75-100 points). For STOFHLA, the score also ranges from 0 to 100: 0 to 28 in the mathematical literacy items (each item is worth 7 points) and 0 to 72 in the reading comprehension items (each item is worth 2 points). Levels of functional health literacy: Inadequate (0-53 points), marginal (54-66 points) and adequate (67-100 points).	**1.TOFHLA:** Original version in English. **2. TOFHLA-Spanish:** Version in Spanish. **3. STOFHLA (Short TOFHLA):** Short version. **4. STOFHLA- Spanish:** Short version in Spanish. **5. TOFHLA and STOFHLA in Serbian**[22]. **6. STOFHLA in Portuguese**[37].
Rapid Estimate of Adult Literacy in Medicine (REALM)[26,41,42]	**Assessment object:** Functional health literacy. **Assessment method:** The patient reads out loud a list of 66 medical terms organized in increasing order of difficulty. Each word pronounced correctly is worth 1 point. **Assessment items:** 66 terms in the area of health. **Administration time:** 2 to 3 minutes. **Classification of outcomes:** The score ranges from 0 to 66 and identifies health literacy as inadequate (0-44 correct answers), limited (45-60 correct answers) and adequate (61-66). REALM attributes 1 out of 4 estimated literacy degrees: 1) 3rd series and below (score from 0 to 18), 2) 4th to 6th series (19 to 44 points), 3) 7th to 8th series (45 to 60 points) and 4) 9th series and over (61 to 66 points).	**1. REALM short form**[43]**.** **2. REALM – Revised:** Version with 8 items[41]. **3.SAHLSA -50 and 18:** Versions adapted to Spanish, including comprehension assessment[26]. **4. SAHLPA 50 and 18:** Version of SAHLSA adapted to Portuguese.
Measure of functional, communicative and critical health literacy (MFCCHL– Ishikawa)[7]	**Assessment object:** Functional, communicative and critical health literacy, developed for patients with type 2 diabetes. The objective is to assess the ability to extract, understand and use health-related information. **Assessment method:** Self-administered questionnaire of health literacy scales. If the patient requests, he can be helped by an assistant. **Assessment items:** 3 sub-scales with 14 answer items: 5 items for functional HL, 5 for communicative HL, and 4 for critical HL. **Administration time:** Not specified. **Classification of outcomes:** Each item is assessed according to a 4-point Likert scale, ranging from 1 (never) to 4 (frequently). The score of the items of each scale is added and divided by the number of items in that scale. Therefore, the score in each sub-scale ranges from 1 to 4. The scores are inverted for the functional HL sub-scale so that higher scores indicate higher health literacy.	**1. (MFCCHL– Ishikawa):** Version in Dutch.
Set of Brief Screening Questions (SBSQ)[44]	**Assessment object:** Health literacy (without specification of HL level). The test enables to identify patients with inadequate HL. **Assessment method:** Interview. **Assessment items:** Three screening questions with answers according to a 5-point Likert scale. **Administration time:** There is no maximum time stipulated for filling in the questionnaire. **Classification of outcomes:** HL classified as inadequate, marginal or adequate. The test's authors report that the optimal cutpoint depends on the test's accuracy and prevalence of inadequate HL, as well as on tests' costs and classification of false positives. Other studies[12,13] in which answers in a 4-point Likert scale were used established a score ranging from 0 to 12 and classified HL as low (0 to 5 points), medium (6 to 9 points) and high (10 to 12 points).	**1. SBSQ** with 3 questions and answers in a **4-point Likert scale.** Classification of HL in low, medium and high[16,17]. **- Remark:** Studies have administered the test in up to 18 countries and translated it to their respective languages[17].

Subtitle: SAHLSA = Short Assessment of Health Literacy for Spanish-Speaking Adults; SAHLPA = Short Assessment of Health Literacy for Portuguese-Speaking Adults; HL = Health literacy

studies categorized health literacy and presented frequency distribution (n=13, 48.1%) [11,14-16,17,19,22-26,34,37].

Many researchers decided to analyze the outcomes through the mean of the scores, without making categorizations (n=11, 40.7%)[12,13,18,20,21,28-32,36]. Other approaches to outcome presentation occurred in 3 studies (11.1%), in which the researchers provided the minimum and maximum score[35] and an analysis of the proportion of correct answers[31] and of the score obtained in each item, presenting neither the mean nor the frequency per category[27].

In the articles in which health literacy outcomes were categorized, the classifications were presented in various forms: inadequate, marginal or adequate health literacy[15,19,22,24,37] (n=5, 18.5%); inadequate, limited or adequate[11,25,34] (n=3, 11.1%); low, medium or high[16,17] (n=2, 7.4%); rudimentary, basic or advanced[26] (n=1, 3.7%); inadequate or adequate[14] (n=1, 3.7%); and low or adequate[23] (n=1, 3.7%). It is important to highlight that there were studies in which the authors modified the analysis scheme of the original test, as they assessed the outcome as a mean in a continuous scale, while the original test was structured in categories[17]. Other authors altered the score scale from 1 to 4 - calculated by the mean - to 14 to 56 - calculated by the sum of the score[13].

In view of the presented classifications, the prevalence of adequate health literacy in the articles ranged from 44.0% among elderly individuals aged 60 years or older, assessed by SAHLPA-50 in Brazil[26], to 92.7% among women aged 42 to 94 years, assessed by TOFHLA in the United States[24]. For this analysis, health literacy was conceived in a dichotomous way: adequate, when described by researchers as adequate, high or advanced, and inadequate, when described in the studies as inadequate, limited, marginal, low, medium, rudimentary or basic.

Associations with statistical significance were identified between health literacy outcomes and different aspects assessed in the 27 studies: level of schooling[20,22,25,27,31,37]; age[22,24]; self-perception of health[22,27]; race[30]; income[31]; previous use of computers[31]; self-report of reading skills[31]; health-promoting behaviors[14]; patient-physician communication and patient's perception of the communication process[36]; sex and presence of chronic disease[22]; smoking during pregnancy[16]; non-adherence to medication, risk perception and beliefs about medication among pregnant women[17]; access to a portal to visualize an electronic medical record[13]; discrepancies in verbal and written assessments in the area of rheumatoid arthritis[19]; understanding and management of diabetes[21]; self-management of an inhalation technique[23]; proactive search for health information[27]; and completion of the task of assembling a hearing aid device[28]. We observed that health literacy was mostly associated with level of schooling (6 articles - 22.2%), age and self-perception of health (2 articles - 7.4%).

DISCUSSION

Due to the variability of objectives and methods in the articles and to the fact that the variable was frequently of the explanatory type[11,12,13,16,18,19,20,23,24,25,28,29,30,33,34,35], health literacy and its assessment are viewed as greatly relevant in different countries and contexts.

The health literacy assessment instruments that presented the highest occurrence in this review were TOFHLA and REALM. Such findings corroborate the findings of other studies[8,26,32]. In fact, the majority of studies on validation of health literacy assessment instruments was composed of translations and adaptations of TOFHLA and REALM[22,26,37]. This was also observed in Brazil[26,37]. The choice of these tests can be justified by the fact that they are screenings, that is, they are quick, available in an ever-increasing number of languages and can be adapted to different clinical settings. Among their limitations, the two instruments assess only the functional level of health literacy. It is likely that this is the reason why TOFHLA[18,19,24,28,33] and REALM[11,30,33,34] were, sometimes, associated with other health literacy assessment instruments (in five (18.5%) and four (14.8%) of the articles, respectively).

Although the objects of analysis of the present review were general health literacy assessment instruments, it is necessary to highlight that different specialties are currently engaged in using and developing health literacy assessment instruments related to specific themes. This was revealed by the number of articles that were excluded because they approached only the specific type of health literacy (n=40). Among the selected articles, it was possible to observe a frequent association between general and specific health literacy assessment instruments[11,13,17-19,21,23,24,28,30,33,34,36]. This strategy strengthens the fact that, today, there are no sufficiently comprehensive health literacy assessment instruments to analyze the theme[3,5]. This justifies the decision made by some researchers of using more than one health literacy assessment instrument[11,13,17-19,21,23,24,28,30,33,34,36].

It is important to explain that the methodological option of the present study to focus on general health literacy assessment instruments was necessary due to the volume and variety of studies and instruments to assess the subject. Furthermore, the choice aimed to contribute to a global approach to health literacy that could be applied more adequately to the context of primary care. We believe this study can help to clarify the current panorama of health literacy research. Another contribution was the detailed description of the instruments that occurred most frequently in the assessment of general health literacy. Last but not least, the analysis of the associations among general, specific and indirect instruments is an interpretation that, according to our review, had not been available in the scientific literature up to the present moment.

In the Brazilian context, studies about health literacy assessment have focused on the functional level and have been

conducted in a clinical environment, by means of screening instruments originated in other countries and languages, and validated to Portuguese. There are gaps in the assessment of communicative and critical health literacy. The present review about health literacy assessment instruments, as well as the development and analysis of new instruments that can be applied to the Brazilian reality, are necessary steps to identify individuals and populations that have health literacy difficulties. In addition, they favor clinical practice and health education.

It is important to mention here that only one Audiology study included health literacy assessment and found a positive association between health literacy and individuals' performance of adjusting and inserting an individual sound amplification device. We emphasize the speech-language pathologist and audiologist's function of using and organizing different resources, like texts with a clear and simple language, figures and oral instructions, in order to enable a specific health literacy in hearing health, aiming at adherence and success in the use of individual sound amplification devices[28]. Thus, the speech-language pathologist and audiologist must work together with the other health professionals, helping to identify patients who have health literacy difficulties. However, it is important to bear in mind that, by means of their exclusive competences regarding speech, hearing, oral and written language, the speech-language pathologist and audiologist has unique and differentiated functions to assess and intervene in the development of an effective communication between users and health professionals and, thus, enhance health literacy[4].

CONCLUSION

There is a great variety of instruments and methods to assess health literacy. Among general health literacy assessment instruments, the clinical screening tests TOFHLA and REALM predominated, used in outpatient clinics and hospitals, and focusing on functional health literacy. The majority of the studies presented a cross-sectional observational design, with the highest scientific output in the United States and European countries.

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