

Revision articles

## Conceptual aspects and factors associated with Functional Health Literacy: a literary review

*Aspectos conceituais e fatores associados ao letramento funcional em saúde: revisão de literatura*

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### ABSTRACT

The purpose of this study is to revise scientific productions concerning the evaluation of health functional literacy which is associated with the quality of life and analyze methodologically the observational studies about this theme. An integrative review has been produced using papers related to the following themes: health functional literacy and quality of life which had a research done in the PubMed, Lilacs and "Biblioteca Virtual de Saúde" databases. After applying the inclusion criteria, 538 articles were obtained, also, after applying the exclusion criteria, 11 articles were selected. Nine out of the eleven articles are international and the remain 2 are national. The review stated the compilation and construction of the publication historical lines, the methodological analysis of observational studies and the elaboration of cloud texts. Most part of the articles have quantitative analysis, adults and elders as target groups and the measurement of the levels of health functional literacy. This study verified the positive interaction between health functional literacy, low education, advanced age, the male gender and low income. The main scenarios were the assistencialist environments. The health functional literacy presented an association with social-demographic variables, such as sex, age and education. Most studies presented in this research had the goal of relating the literacy to pathologies and they were done in clinic environments such as hospitals and health clinics. All eight observational articles included in the review could totally fit the methodological criteria for the elaboration of this type of study.

**Keywords:** Health Literacy; Health Education; Information Literacy; Quality of Life

### RESUMO

O objetivo deste estudo é revisar as produções científicas acerca da avaliação do letramento funcional em saúde em associação com a qualidade de vida; e analisar metodologicamente os estudos observacionais sobre a temática. Trata-se de revisão integrativa de literatura produzida com base em artigos relacionados aos seguintes eixos temáticos: letramento funcional em saúde e qualidade de vida, com busca realizada nas bases de dados PubMed, Lilacs, Biblioteca Virtual em Saúde. Após a aplicação dos critérios de inclusão obteve-se 538 artigos e após a aplicação dos critérios de exclusão foram selecionados 11 artigos sendo nove estudos internacionais e dois nacionais. A revisão constou de compilação e construção de linha histórica das publicações, análise metodológica dos estudos observacionais e elaboração de nuvem de textos. A maior parte dos artigos tem análise quantitativa; público alvo adultos e idosos e medem o nível de letramento funcional em saúde. Os estudos verificaram relação positiva do letramento funcional em saúde com a baixa escolaridade, idade mais avançada, sexo masculino e baixa renda. Os principais cenários foram ambientes assistenciais. O letramento funcional em saúde apresentou associação com variáveis sócio-demográficas como sexo, idade e escolaridade. A maior parte dos estudos encontrados na busca teve como objetivo relacionar o letramento a patologias e foi realizado em ambientes clínicos (ambulatórios e hospitais). Dos oito artigos observacionais incluídos na presente revisão atenderam totalmente aos critérios metodológicos para elaboração desse tipo de estudo.

**Descritores:** Alfabetização em Saúde; Educação em Saúde; Competência em Informação; Qualidade de Vida

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## INTRODUCTION

Functional health literacy is a topic of interest for researchers and health professionals. In addition to the term “functional health literacy”, the literature also uses “health literacy” and “health alphabetization”. Although these terms are often used as synonyms, there are important distinctions that should be considered.

The terms “alphabetization” or “literacy” refer to the results of the process of acquiring the ability to read and write; whereas, “functional literacy” refers to the knowledge and abilities acquired as a result of the ability to read and write which provide an individual the conditions needed to participate in specific activities of a particular field<sup>1</sup>. When this concept is applied to the health area, functional health literacy represents the cognitive ability to understand, interpret and apply written or spoken health information<sup>1</sup>. For the American Medical Association health literacy is a set of skills including the ability to read basic literature and perform numerical tasks required to function in the healthcare environment. The Institute of Medicine in the United States defines functional health literacy as the capacity to obtain, process and understand basic health and health services information necessary to adequately make health decisions. In practice, individuals with adequate functional health literacy tend to have better health conditions<sup>1</sup>.

The World Health Organization defines functional health literacy as the cognitive and social abilities which determine the motivation and capacity of a person to access, comprehend and utilize information as a means of promoting and maintaining health, which does not mean only knowing how to read leaflets and schedule consultations<sup>2</sup>.

Yet, health literacy is defined as “the degree to which people are able to find, understand and share health information in order to maintain and promote health throughout life within different contexts”<sup>3</sup>. Sociodemographic factors seem to affect functional health literacy, with education strongly influencing its level<sup>4</sup>.

It should be noted that there are not extensive studies in Brazil showing the level of functional health literacy of the population<sup>1</sup>. Generally studies on functional health literacy utilize generic reading tests or evaluations based on math and reading skills, but the definition of functional health literacy goes beyond these skills including fields such oral communication, among others. Furthermore, functional health literacy is

dynamic and is found at the intersect between patient abilities and the demands of the specific situation<sup>5</sup>.

In this context, an interrelation between functional health literacy and quality of life is possible in the perspective of self-care<sup>6</sup>.

The term “quality of life” is by nature subjective, multidimensional and defined as the perception that people have of their position in life considering the cultural context and value systems in which they are inserted, along with their objectives, expectations, standards and worries<sup>7</sup>. As such, the perceptions of individuals of their own health, as well as other aspects of their lives, should be considered<sup>8</sup>.

The use of quality of life assessment tools in healthcare is recommended, which would align Brazilian studies with the international agenda for theoretical and methodological advancement of the field, since the methodologies utilized to obtain this measurement are still controversial in the country<sup>9</sup>.

Thus, there are theoretical and methodological questions that have yet to be adequately addressed, justifying the investigation, systematization and discussion of the national and international literature.

Therefore, the objectives of this study were to review the scientific literature on evaluations of functional health literacy in association with quality of life and to methodically analyze observational studies in the area.

## METHODS

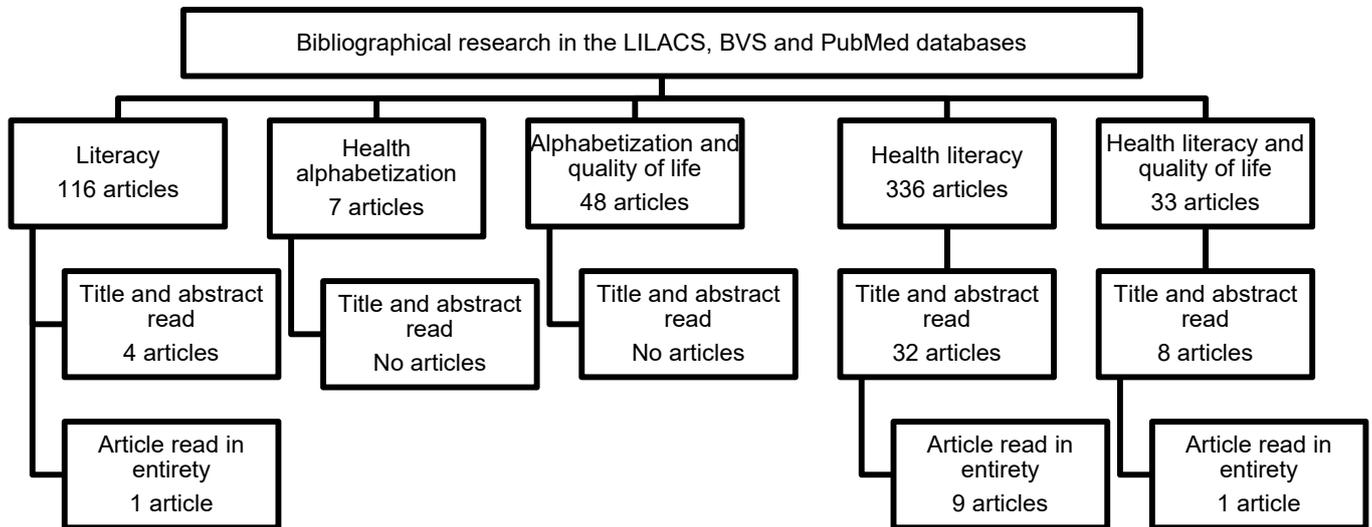
This study consisted of an integrative literature review of articles related to the following themes: functional health literacy and quality of life. The search was conducted in the PubMed, Lilacs and *Biblioteca Virtual em Saúde* (BVS) databases.

The inclusion criteria were: articles in Portuguese, English or Spanish; published within the last 10 years; available in its entirety free of charge; and, with an objective of defining or measuring functional health literacy or evaluating the relationship between functional health literacy and quality of life. The exclusion criteria were: articles addressing the relationship between functional health literacy and pathologies or treatments; case reports; and, expert opinions.

The selection of articles occurred in two stages with the first consisting of selection of the descriptors followed by the database search. To elaborate the search and selection strategy, the following free terms were used, along with their Portuguese and Spanish translations: literacy, health literacy, alphabetization, health alphabetization and quality of life.

The initial search returned 538 articles, of which 93 were from LILACS, 76 from BVS and 369 from PubMed. Of these, 405 articles met the inclusion criteria. After reading titles and abstracts, 360 articles were excluded. Thus, 45 articles were selected for a complete read: 01

from LILACS, 04 from BVS and 40 from PubMed. After reading the articles in entirety, 33 articles with objectives not in alignment with the study objectives were excluded. Finally, 11 articles were selected for inclusion in the study (Figure1).



**Figure 1.** Flowchart demonstrating the search and selection of articles stages of this review.

Data analysis was undergone in three stages. The first stage consisted of compiling and describing articles focusing on the themes: location, design, methodology and primary results of each included study. In this stage, a historical timeline was constructed with chronological distribution of the studies according to their main themes. The second stage included analyzing observational studies and constructing categories according to guidelines established by the STROBE (STrengthening the Reporting of OBservational studies in Epidemiology) initiative<sup>10</sup>. This methodology consists of 22 items related to information which should be included in the title, abstract, introduction, methodology, results and discussions of the study articles. The STROBE Initiative was developed by researchers in the field of epidemiology, statistics, scientific methodology and editors of scientific journals with the objective to guide the description of observational studies. These

guidelines were used for data analysis in the present study.

The third stage of data analysis was the creation of word clouds based on the conclusions of studies included in the review using Wordle Copyright ©2008. It should be noted that word clouds are a form of visualizing linguistic data to show the frequency with which certain words appear in the text. Word size is proportional to the number of times that word appears in the text making the word cloud is a visually hierarchized<sup>11</sup>.

## LITERATURE REVIEW

In the present literature review, eleven studies were selected (Figure 2), of which nine international studies and two national studies were distributed as follows: one study article on “literacy”, nine on “health literacy” and one on “health literacy and quality of life”.

Study, year and location	Design	Methods	Main results
Wallace LS, Rogers ES, Roskos SE, Holiday DB, Weiss BD <sup>12</sup>  2006  United States of America	Cross-sectional	<b>Setting:</b> University primary care clinic. <b>Sample:</b> 305 English speaking patients over 18 years old. <b>Age group:</b> 18-89 years. <b>Sample characteristics:</b> less than a complete high school education (28.8%), high school (39%) and higher education (32.1%); Caucasians (85.2%), African Americans (11.8%) and Hispanics (2.9%); average age (49.5 years). <b>Instruments:</b> Oral interview of 3 min based on the Risk Factor Surveillance Survey Behavioral / Chew screening questions / REALM.	The educational attainment was directly related to the level of functional health literacy. Age and race did not present associations with functional health literacy. The level of functional health literacy was 65.2% adequate, 17.1% average and 17.7% limited.
Wagner C, Knight K, Steptoe A, Wardle J <sup>13</sup>  2007  England	Cross-sectional	<b>Setting:</b> Interviews during home visits in the United Kingdom. <b>Sample:</b> 439 women and 320 men. <b>Age group:</b> 18- 90 years. <b>Sample characteristics:</b> Of the original sample of 759 participants, 40 did not pass the vision exam (an exclusion criteria), leaving the final sample to consist of 719 individuals. <b>Instruments:</b> Modified TOFHLA/ Questionnaire on demographic characteristics, self-rated health, smoking, physical activity and consumption of fruits and vegetables/ questions related to the level of visual acuity and basic reading skills.	Approximately 11% of the adults in the British population participating in this study presented average or inadequate health literacy. Educational attainment and income were directly proportional to literacy. Age presented an inverse relationship with literacy and being male had an association with low health literacy. Limited health literacy is associated with riskier behaviors and lower self-perceived health.
Konfino J; Mejia R, Lani MPM, Perez-Stable EJ <sup>14</sup>  2008  Argentina	Cross-sectional	<b>Setting:</b> Clinical José de San Martín of the University of Buenos Aires (outpatient and inpatient rooms). <b>Sample:</b> 229 patients of the University Hospital. <b>Age group:</b> 19- 93 years. <b>Sample characteristics:</b> men (45.4%), women (54.6%); average age (56 years). <b>Instruments:</b> SAHLSA.	30.1% of the study population presented adequate functional health literacy. Level of functional health literacy per educational attainment level: : ≤ 7 years: 43.5% 8-12 years: 82.6% > 12 years: 3.9% Educational attainment level was related with the level of functional health literacy.
Martin LT, Ruder T, Escarce JJ, Ghosh-Dastidar B, Sherman D, Elliott M et al. <sup>15</sup>  2009  United States of America	Cross-sectional	<b>Setting:</b> National Assessment of Adult Literacy (NAAL). <b>Sample:</b> 17,466 people 18 years or older who met the guidelines for evaluating level of health literacy according to the NAAL. <b>Age group:</b> 18 years or older. <b>Sample characteristics:</b> men (48%), women (52%); 71% Caucasian; 14% with less than a high school education; 27% with an income less than 200% the poverty line of the country. <b>Instruments:</b> 2003 National Assessment of Adult Literacy (NAAL) Household Survey.	The lowest levels of functional health literacy were presented by: older people, African Americans, those with less educational attainment and lower incomes.
Carthery-Goulart MT, Anghinah R, Areza-Fegyveres R, Bahia VS, Brucki SMD, Damin A et al. <sup>16</sup>  2009  Brazil <sup>16</sup>	Cross-sectional	<b>Setting:</b> University hospitals or any other hospitals providing care through SUS. <b>Sample:</b> 312 adult patients of the SUS study sites. <b>Age group:</b> 19- 81 years. <b>Sample characteristics:</b> men (36.6%), women (63.4%); average age (47.3 years); average years of schooling (9.7 years). <b>Instruments:</b> Brazilian version of the S-TOFHLA, interview questionnaire.	The participants were distributed into three groups by age and four groups by educational attainment level. 32% of the participants (general population) had functional health literacy scores in the inadequate or minimal range. There was a positive association between years of schooling and S-TOFHLA score and a negative association between age and S-TOFHLA score.

Study, year and location	Design	Methods	Main results
Passamai MPB, Sampaio HAC, Dias AMI, Cabral LA <sup>1</sup>  2009  Brazil	Narrative review	<b>Setting:</b> national and international scientific production on functional health literacy and health education. <b>Methods:</b> Reflective critical approach to literature compiled according to the following lead questions: What is functional health literacy? To what extent does functional health literacy interfere with communication between patients, health professionals and the health system? What are its impacts on public health?	The study discusses the different concepts of alphabetization, explaining that it is sometimes considered an insufficiently dynamics process limited to teaching how to read and write. On the other hand, others consider literacy an empowerment tool allowing for participation in society. The term "literacy" is the result of a process of teaching and learning the social practices of reading and writing. Functional literacy is the capacity to participate in the activities where alphabetization is necessary. The term "functional health literacy" is still in construction.
Shah LC, West P, Bremmeyr K, Savoy-Moore RT <sup>17</sup>  2010  United States of America	Cross-sectional	<b>Setting:</b> Five primary health centers. <b>Sample:</b> 1014 people (808 adults and 206 adolescents) 13 years or older, patients of the selected primary health centers. <b>Age group:</b> adults (18 -91 years); adolescents (13- 20 years). <b>Sample characteristics:</b> adult men (34.2%), adult women (65.8%); boys (53.4%), girls (46.6%); average age (44.9 years for the adults and 15 for the adolescents); Caucasian (68.8%), African-Americans (28.5%); Hispanics (1.5%), others (1.2%); adults educational attainment (88.8% with a high school education). <b>Instruments:</b> NVS.	Inadequate functional health literacy was demonstrated by 51.9% of the adults and 40.3% of the adolescents. Women presented better levels of functional health literacy when compared to men. Caucasian participants had a greater probability of presenting adequate functional health literacy. Adults who never smoked or stopped smoking more than five years ago and those with greater educational attainment levels had better functional health literacy. Among those individuals with inadequate functional health literacy, 31.1% evaluated their own health as regular. 55.1% of the adults and 57.3% of the adolescents participated in the health education initiative in the school and, among these participants, functional health literacy was better than among those who did not participate in the school-based activity.
Wu AD, Begoray DL, Macdonald M, Wharf JH, Frankish J, Kwan B et al. <sup>18</sup>  2010  Canada	Exploratory	<b>Setting:</b> 03 public schools <b>Sample:</b> 275 high school students in health-related classes where the teacher presented interest in participating in the study. <b>Age group:</b> not informed. <b>Sample characteristics:</b> men (48%), women (52%). <b>Instruments:</b> Instrument developed for this study with 11 health sections and 47 questions related to these; a maximum score of 107 points (the greater the points, the greater the level of functional health literacy). Self-reporting of demographic information through a questionnaire.	The lowest levels of functional health literacy were observed among the individuals with the following characteristics: males; those who immigrated to Canada at an older age; non-English speakers; and, those who were often truant.
Ozdemir H, Alper Z, Uncu Y, Bilgel N <sup>19</sup>  2010  Turkey	Cross-sectional	<b>Setting:</b> Family health primary care clinic. <b>Sample:</b> 456 adult patients who visited the clinic between February 01, 2008 and April 01, 2008. <b>Sample characteristics:</b> men (39.5%), women (60.5%); average age (36.21 years); elementary education (41.2%), middle school (18.4%), high school (28.9) and higher education (11.4%); good economic situation (39.5%), average (57.9%) and bad (2.6%); average age (36.2 years). <b>Instruments:</b> REALM, NVS and a questionnaire for demographic data.	The REALM test noted that 58.7% of the study group presented adequate functional health literacy. The NVS test detected a level of 28.1% of adequacy suggesting that the recognition of medical terms and the ability to pronounce terms was better among the group members than their numerical and reasoning abilities. Women, those with only an elementary education, the economically vulnerable and the elderly presented lower scores on both tests. The difference between the male and female participants could be related to differences in educational attainment since participating women presented less years of schooling.

Study, year and location	Design	Methods	Main results
Song L, Mishel M, Bensen JT, Chen RC, Knafel GJ, Blackard B et al. <sup>32</sup>  2012  United States of America	Cross-sectional	<b>Setting:</b> home visits of health promotion. <b>Sample:</b> 1581 men diagnosed with primary prostate adenocarcinoma. <b>Age group:</b> 40- 79 years. <b>Instruments:</b> Quality of Life (SF12 - Version 2.0), Rapid Estimate of Adult Literacy in Medicine (REALM) and a structured questionnaire for characterization of the sample.	63% of the interviewees presented a high level of health literacy; an average of 03 comorbidities reported; the participants with lower health literacy were more likely to be older, with less than a high school education and have more comorbidities; bivariate analysis showed that the evaluation of quality of life was significantly associated with sociodemographic variables, such as marital status, race, income, educational attainment and factors related to disease; ; the SF12-MCS was significantly associated with REALM; a better score in SF12-MCS was associated with older age, marital status and greater income.
Massey PM, Prelep M, Calimlim BM, Quiter ES, Glik DC <sup>20</sup>  2012  United States of America	Cross-sectional	<b>Setting:</b> Community centers and clinics in diverse regions of California. <b>Sample:</b> 137 adolescents from 13 to 17 years, low income and beneficiaries of public medical insurance. <b>Age group:</b> 13-17 years <b>Sample characteristics:</b> men (48.2%), women (51.8%). <b>Instruments:</b> focus groups and structured interviews.	<b>Movement in the health system:</b> the adolescents complained of the difficulties in scheduling appointments with the chosen physicians and limited dialogue with the pharmacists regarding prescription guidelines. <b>Rights and responsibilities:</b> the adolescents demonstrated knowledge of their role in their own health and their responsibilities to question and understand their care. <b>Preventive care:</b> preventive care did not make sense to the adolescents with the exception of items related to sports and sexually transmitted diseases. <b>Search for information:</b> an active search for information (ex: internet) seemed to interest the adolescents more than a passive search (ex: pamphlets). <b>Doctor-patient relationship:</b> the adolescents considered trust a fundamental component of this relationship.

Figure 2. Synthesis of study data included in the literature review.

The analysis of the article in the “literacy” category<sup>1</sup> clarifies the terms related to the study and their differences showing that there still exists the use of both “functional health literacy” and “alphabetization/literacy in health” in several ways. This finding reflects the reality of health literacy as a new theme in the academic and scientific settings.

Of the nine articles in the “health literacy” category, four are from the United States and one each from Canada, Turkey, the United Kingdom, Argentina and Brazil. Eight studies had a cross-sectional design. Eight studies<sup>12-19</sup> also addressed the level of functional health literacy and its relation with sociodemographic data with quantitative analysis. One study<sup>20</sup> utilized qualitative analysis methods related to the movement of adolescents within the health system and their perceptions of their abilities in functional health literacy. Six studies<sup>12-16,19</sup> targeted adults and the elderly, two<sup>18,20</sup> targeted adolescents and one study<sup>17</sup> evaluated all three of these audiences.

Two articles<sup>13,16</sup> utilized the Test of Functional Health Literacy (TOFHLA), two<sup>12,19</sup> used the Rapid Estimate of Adult Literacy in Medicine (REALM) test and two<sup>17,19</sup> applied the Newest Vital Sign (NVS) test, being that these were the most utilized in the analyzed studies. The TOFHLA and the REALM are tests used for measuring functional health literacy and its relation to care, evolution and the impact of health interventions. The TOFHLA aims to measure reading comprehension (in three health related areas: instructions for preparing for an upper gastrointestinal tract evaluation, patient rights and responsibilities and informed consent agreement form) and numerical skills. A person’s functional health literacy is classified as inadequate (incapable of reading and interpreting health texts) and adequate (capable of reading and interpreting the majority of health texts)<sup>21</sup>.

Another questionnaire proposed to evaluate health literacy is the REALM, a test that evaluates only the recognition of words related to the human body. It associates the number of points with reading skills for each schoolyear. The Newest Vital Sign (NVS) intends

to measure functional health literacy through the use of an ice cream label accompanied by six questions each worth a point. Test scores are classified as follows: 0-1 high chance of limited literacy, 2-3 limited literacy, and 4-6 adequate literacy<sup>21</sup>.

The utilization of different instruments partially limited comparisons between studies. However, it was possible to compile data and analyze the categorizations deriving from the main tests of these studies (Figure 3).

Instrument	Abilities tested	Duration (minutes)	Maximum score	Scores / classification of functional health literacy
TOFHLA	Comprehension and numeration	22	100	0-59 – inadequate 60-74 – minimal 75-100 –adequate
REALM	Word recognition	03	66	0-18 – difficulties with the materials for low literacy 19-24 – needs material for low literacy 45-60 – ability to utilize the majority of patient-focused educational material 61-66 – capable of reading educational patient-focused educational material
NVS	Reading and math	03	03	0-1 – high chance of limited literacy 2-3 – possibility of limited literacy 4-6 – adequate literacy

**Figure 3.** Synthesis of the characteristics of the instruments used in the literature for measuring functional health literacy

The greatest production of studies related to the theme originated from the United States<sup>12,15,17,20</sup>. There is limited research in the area from Latin America with only one study from Brazil<sup>16</sup> and one from Argentina<sup>14</sup>.

Quantitative analysis found associations between limited health literacy and low educational attainment, older age, low income and the male sex<sup>12-18</sup>. A study which found better health literacy among males when compared to females should be highlighted<sup>19</sup>. However, discrepancies between studies in relation to literacy according to gender could be related to social and cultural differences between the study sites.

This study found that research in health literacy predominately utilized adult and elderly participants.

Few studies include adolescents and discuss their abilities and behaviors in relation to their self-care. This finding suggests the need to study this theme in relation to childhood and adolescence, especially considering the importance of these developmental stages in the establishment of and adherence to self-care practices and the health system in adulthood.

Most of the studies are of a quantitative nature and evaluate reading and comprehension of the supplied information, but they do not consider evaluating self-care capabilities which are included in the broad

concept of functional health literacy. It is important to consider that the realities of the health systems differ among the countries; therefore, it is often difficult to compare studies realized in different localities.

In the literature, the majority of the studies referred to specific situations, such as associations between functional health literacy and health knowledge of primigravidae<sup>22</sup>, manifestations of depression<sup>23</sup>, treatment of chronic diseases such as asthma or diabetes<sup>4,24-26</sup>, mental health<sup>27</sup>, child's health<sup>28,29</sup>, nephrological diseases<sup>30</sup> and utilization of health services<sup>31</sup>.

Literature that evaluates the level of functional health literacy without relating it to a pathology or health service is still scarce in general and research of this theme is in its infancy in Brazil. This finding shows that despite the importance of this theme for the evaluation and formulation of public policy, Brazil still needs to advance in scientific production in this area.

The analysis of scientific production on functional health literacy shows that these studies occur predominantly in the healthcare setting with few studies based in other scenarios such as schools. Thus highlighting the need for studies on functional health literacy in an array of settings where the effects of potential

enhancers such as autonomy and self-care in health can be evaluated.

The search for studies relating functional health literacy and quality of life resulted in only one article<sup>32</sup> that evaluated the influence of health literacy on quality of life of people with prostate cancer. Despite focusing on a particular pathology (prostate cancer), this article was included in the review because completely reading the article showed that the study associated level of functional health literacy with quality of life through a generic measurement instrument that did not focus on the disease. This study detected an association between these two variables indicating that elevated functional health literacy could lead to better quality of life. The results showed a statistically significant association between low functional health literacy and low educational attainment, older age and the presence of comorbidities. These findings are supported by other studies<sup>12,13,15,17,18</sup> in this review under the descriptor “health literacy”.

Analysis of the themes “quality of life” and “health literacy” revealed that studies related these themes with a focus on chronic conditions such as asthma<sup>33,34</sup> and heart disease<sup>35</sup> and with specific areas such as oral health<sup>22,36</sup>.

A paucity of literature which evaluates the relationship between functional health literacy and quality of life in the general population without the presence of specific pathologies was observed. Similarly no articles were found relating studies of these associations in the adolescent population.

These findings demonstrate the need to advance research in this area, especially on associations between functional health literacy and quality of life for the advancement of health promotion and not only for rehabilitation after diseases have already developed.

Of the descriptive observational studies in Figure 1, in relation to the title and abstract, 11.1% completely met, 77.7% partially met and 11.1% did not meet the criteria established by the STROBE initiative. Of the introductions, 66.7% completely and 33.3% partially met these criteria, and, when considering the methodologies, 77.8% completely and 22.2% partially met them. Of the results, 88.9% totally met the established criteria compared to 11.1% that only partially met them. Of the discussions, 66.7% completely and 33.3% partially met the established criteria. Only one of the observational articles included in this review met in its entirety the established criteria, thus partial compliance of the analysis protocol of the STROBE initiative dominated (Figure 4).

The analyzed items consisted of information which observational studies need in order to allow for critical reading<sup>10</sup>.

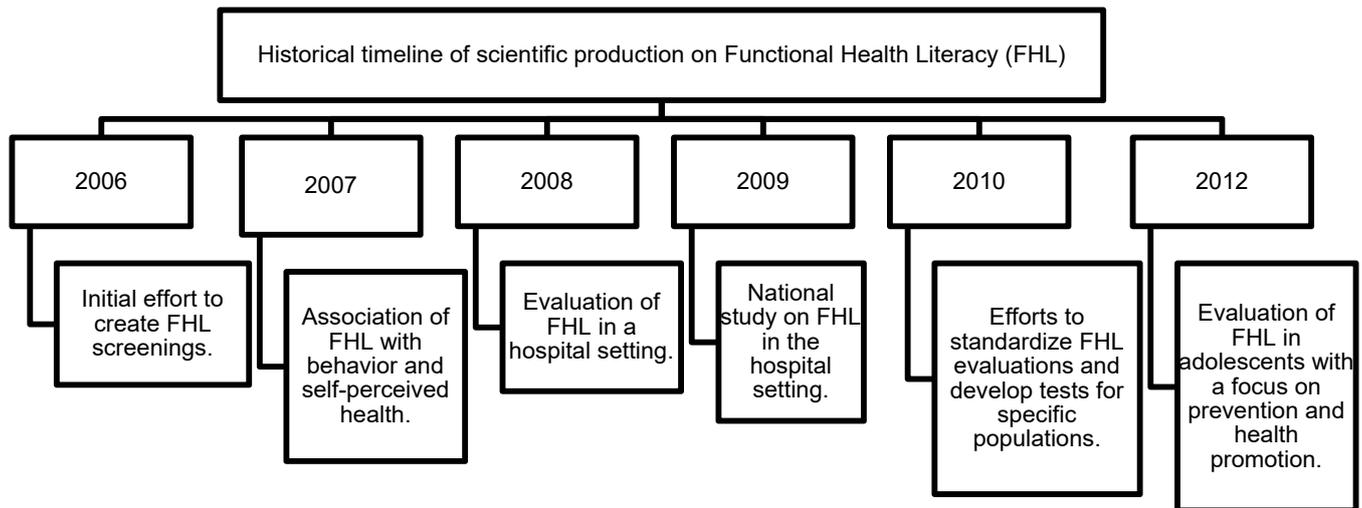
A deficiency in complete and detailed information in observational studies included in this review may compromise the interpretation of results, reproducibility and planning for further studies.

The historical timeline of the articles in the “health literacy” strategy (Figure 5) shows a shift in focus of the articles evaluating functional health literacy from only a measuring functional health literacy to also including its relation with health behaviors and disease prevention.

Article	Title and abstract	Introduction	Methods	Results	Discussion
Wallace LS, Rogers ES, Roskos SE, Holiday DB, Weiss BD <sup>12</sup> – 2006	DM	PM	PM	CM	CM
Wagner C, Knight K, Steptoe A, Wardle J <sup>13</sup> – 2007	PM	CM	CM	CM	CM
Konfino J; Mejia R, Lani MPM, Perez-Stable EJ <sup>14</sup> – 2008	PM	PM	PM	CM	PM
Martin LT, Ruder T, Escarce JJ, Ghosh-Dastidar B, Sherman D, Elliott M et al. <sup>15</sup> – 2009	PM	CM	CM	PM	PM
Carthey-Goulart MT, Anghinah R, Areza-Fegyveres R, Bahia VS, Brucki SMD, Damin A et al. <sup>16</sup> – 2009	PM	CM	CM	CM	PM
Shah LC, West P, Bremmeyr K, Savoy-Moore RT <sup>17</sup> – 2010	CM	CM	CM	CM	CM
Ozdemir H, Alper Z, Uncu Y, Bilgel N <sup>19</sup> – 2010	PM	CM	CM	CM	CM
Song L, Mishel M, Bensen JT, Chen RC, Knafelz GJ, Blackard B et al. <sup>32</sup> – 2012	PM	PM	CM	CM	PM

Legend: CM = completely meets the criteria described in the STROBE initiative; PM= Partially meets the criteria described in the STROBE initiative; DM = does not meet the criteria described in the STROBE initiative.

**Figure 4.** Analysis of observational studies according to the STROBE initiative.



**Figure 5.** Historical timeline of national and international scientific production evaluating functional health literacy without relating it to pathologies.

Another observation revolved around the setting of the studies mostly occurring in the clinical setting. The inclusion of other settings, such as the school, appears in 2012 (the end of the timeline) along with the inclusion of studies on functional health literacy in adolescence.

This analysis shows that although efforts to include non-clinical environments and adolescent populations have begun, these efforts are still in their infancy and need to advance due to this population’s distance from

the health system and their potential to adopt healthy habits.

According to the word cloud (Figure 6) the words with the greatest frequency in the conclusions of the studies are related to the abilities, level and care related to functional health literacy. This reflects the existence of more studies measuring and defining functional health literacy and few studies addressing its improvement.



**Figure 6.** Word cloud

## CONCLUSION

The literature review suggested association between level of functional health literacy and sociodemographic aspects such as income, gender and educational attainment level. The most of the studies aimed to relate functional health literacy with pathologies and were conducted in clinical settings (outpatient and hospital).

It should be noted that only one of the eight observational studies included in this review completely met the criteria described in the STROBE initiative (Strengthening the Reporting of OBServational studies in Epidemiology) for the elaboration of observational studies.

Research on functional health literacy in Brazil is limited, especially those which attempt to related this with quality of life. Since this field is still in its infancy in Brazil, this should be a health research focus.

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