REVIEW ARTICLE

FUNCTIONAL HEALTH LITERACY AMONG CHRONIC CARDIAC PATIENTS: SCOPING REVIEW

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Highlights: (1) Health literacy improves self-care in chronic cardiac patients; (2) Older adults present greater difficulties in understanding their health condition; (3) Educational tools are promising, but studies remain scarce.

PRE-PROOF
(as accepted)
This is a preliminary, unedited version of a manuscript that has been accepted for publication in Revista Contexto & Saúde. As a service to our readers, we are making this initial version of the manuscript available, as accepted. The article will still undergo review, formatting, and approval by the authors before being published in its final form.

http://dx.doi.org/10.21527/2176-7114.2025.50.15201

How to cite:
de Oliveira IMM, Queiroz DB, Macedo LV, Andrade VP, Pessoa VLM de P. Functional health literacy among chronic cardiac patients: a scoping review. Rev. Contexto & Saúde. 2025;25(50):e15201

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FUNCTIONAL HEALTH LITERACY AMONG CHRONIC CARDIAC PATIENTS: SCOPING REVIEW

ABSTRACT

Objective: To map functional health literacy strategies developed with chronic cardiac patients under outpatient follow-up. **Method:** This is a scoping review study, based on the Joanna Briggs Institute Reviewer's Manual, with searches conducted in the following databases and portals: LILACS, Embase, Cochrane, MEDLINE/PubMed, Web of Science, ScienceDirect, Scopus, SciELO, and gray literature (BDTD). The initial sample comprised 2,199 studies, of which 327 were removed as duplicates. At the end of the selection process, 287 articles were analyzed in full, and only 16 answered the research question. **Results:** Findings indicate that health literacy contributed to the adoption of more positive behaviors, such as improved self-care. However, the study also revealed that patients under follow-up still presented difficulties in understanding their health condition—especially older adults. **Conclusion:** The results point to a promising scenario; however, current efforts remain insufficient to affirm definitive changes in knowledge and behaviors.

Keywords: Health literacy; Health education; Cardiovascular diseases; Heart diseases.

Introduction

Cardiovascular diseases (CVD) can affect individuals of any age and are considered one of the main public health problems, ranking first in global mortality and accounting for 17.9 million deaths annually.[1] In order to promote lifestyle changes among cardiac patients, the integrated action of healthcare professionals has gained visibility; health education represents a significant movement toward the appropriation of information and its critical use in addressing signs and symptoms resulting from illness.[2] This highlights the need to seek dynamic learning methods that enable patients to better understand their condition.

From this perspective, functional health literacy (FHL) is defined as achieving a level of knowledge, personal skills, and confidence to act in order to improve personal and community health, thereby changing personal lifestyles and living conditions.[3] In practice, patients with satisfactory levels of health literacy present better health conditions, as they are more capable of understanding the importance of self-care measures.[4]

Identifying, in the scientific literature, how functional health literacy is addressed and which strategies are employed for its development among chronic cardiac patients enables

both patients and healthcare professionals to broaden their perspectives on this topic, improving communication and supporting patients in achieving better understanding of their condition and respective treatment. In light of the above, the objective of this study is to map functional health literacy strategies developed with chronic cardiac patients in outpatient follow-up.

Materials and Methods

This is a scoping review study, which consists of mapping relevant studies within the field of interest and is highly useful for synthesizing research evidence in the current literature, regarding its nature, characteristics, and volume.[5] To conduct this review, the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses – Extension for Scoping Review (PRISMA-ScR) checklist were followed, as recommended by the Joanna Briggs Institute (JBI).[6]

To identify the research question, the "PCC" strategy (Population, Concept, and Context) was applied, where "P" refers to the population (patients with chronic heart diseases), "C" to the concept under investigation (functional health literacy strategies), and the last "C" to the context (outpatient follow-up). Accordingly, this review considered the following guiding research question: What scientific evidence is available regarding the use of functional health literacy strategies with chronic cardiac patients in outpatient follow-up?

For the search, the following electronic data sources were used: Latin American and Caribbean Health Sciences Literature (LILACS), Embase, Cochrane, National Library of Medicine via PubMed (MEDLINE/PubMed), Web of Science, ScienceDirect, Scopus, Scientific Electronic Library Online (SciELO), and gray literature from the Brazilian Digital Library of Theses and Dissertations (BDTD). The searches, bibliographic survey process, and study selection were carried out between March and May 2023.

Accordingly, search strategies were developed for each of the data sources, based on the following controlled descriptors: Medical Subject Headings (MeSH): Health literacy, Health education, Cardiovascular diseases, and Heart diseases; Embase Subject Headings (Emtree): Health literacy, Health education, Cardiovascular disease, and Heart disease; and Health Sciences Descriptors (DeCS): Alfabetização em saúde, Educação em saúde, Doenças Cardiovasculares, and Cardiopatias. Free-text terms were also used, such as functional health

literacy and synonyms for heart diseases, integrated using the Boolean operators AND, OR, and NOT. The search strategies for each source are presented in Chart 1.

Chart 1. Search strategies used in LILACS, Embase, Cochrane, PubMed, Web of Science, ScienceDirect, Scopus, and SciELO, 2024.

Sources	Search strategies
LILACS	(ti:((Alfabetização em Saúde) OR (Letramento Funcional em Saúde))) AND ((Doenças Cardiovasculares) OR (Cardiopatias) OR (Doenças Cardíacas) OR (Doenças do Coração) OR (Transtornos Cardíacos) OR (Transtornos do Coração)) OR ((Educação em Saúde))
Embase	'health literacy':ti AND 'health education' AND ('heart disease' OR 'cardiovascular disease') NOT review:ti
Cochrane	(Health literacy) in Record Title AND (Health education) in All Text AND (Cardiovascular Diseases) OR (Heart Diseases) OR (Cardiac Diseases) OR (Cardiac Disorders) OR (Heart Disorders) in All Text - (Word variations have been searched)
MEDLINE/PubMed	((((Health literacy)[Title]) AND ((Health education))) AND ((Cardiovascular Diseases) OR (Heart Diseases) OR (Cardiac Diseases) OR (Cardiac Disorders) OR (Heart Disorders))) NOT ((Review)[Title])
Web of Science	TI=(Health literacy) AND ALL=(Health education) AND ALL=(Cardiovascular Diseases OR Heart Diseases OR Cardiac Diseases OR Cardiac Disorders OR Heart Disorders)
ScienceDirect	(Health education) AND (Cardiovascular Diseases) OR (Heart Diseases) OR (Cardiac Diseases) OR (Cardiac Disorders) OR (Heart Disorders) AND TITLE (Health literacy) AND NOT (Review)
Scopus	TITLE (*"Health literacy"*) AND ALL (*"Health education"*) AND ALL (*"Cardiovascular Diseases"* OR *"Heart Diseases"* OR *"Cardiac Diseases"* OR *"Cardiac Disorders"* OR *"Heart Disorders"*) AND NOT TITLE (*"Review"*)
SciELO	(ti:((Alfabetização em saúde) OR (Letramento Funcional em Saúde))) AND (ti:((Doenças Cardiovasculares) OR (Cardiopatias) OR (Doenças Cardíacas) OR (Doenças do Coração) OR (Transtornos Cardíacos) OR (Transtornos do Coração))) OR ((Educação em Saúde))
BDTD	(ti:((Alfabetização em Saúde) OR (Letramento Funcional em Saúde))) AND ((Doenças Cardiovasculares) OR (Cardiopatias) OR (Doenças Cardíacas) OR (Doenças do Coração) OR (Transtornos Cardíacos) OR (Transtornos do Coração)) OR ((Educação em Saúde))

For the purpose of this study, the inclusion criteria were defined as follows: studies addressing Functional Health Literacy in patients with chronic heart disease (regardless of the specific type of heart disease or patient age) under outpatient follow-up (encompassing all forms of care within this modality), available in full-text electronic format, and without language or publication year restrictions.

The exclusion criteria were: editorials, letters to the editor, commentaries, opinion articles, review studies, abstracts published in conference proceedings, and studies that did not answer the research question.

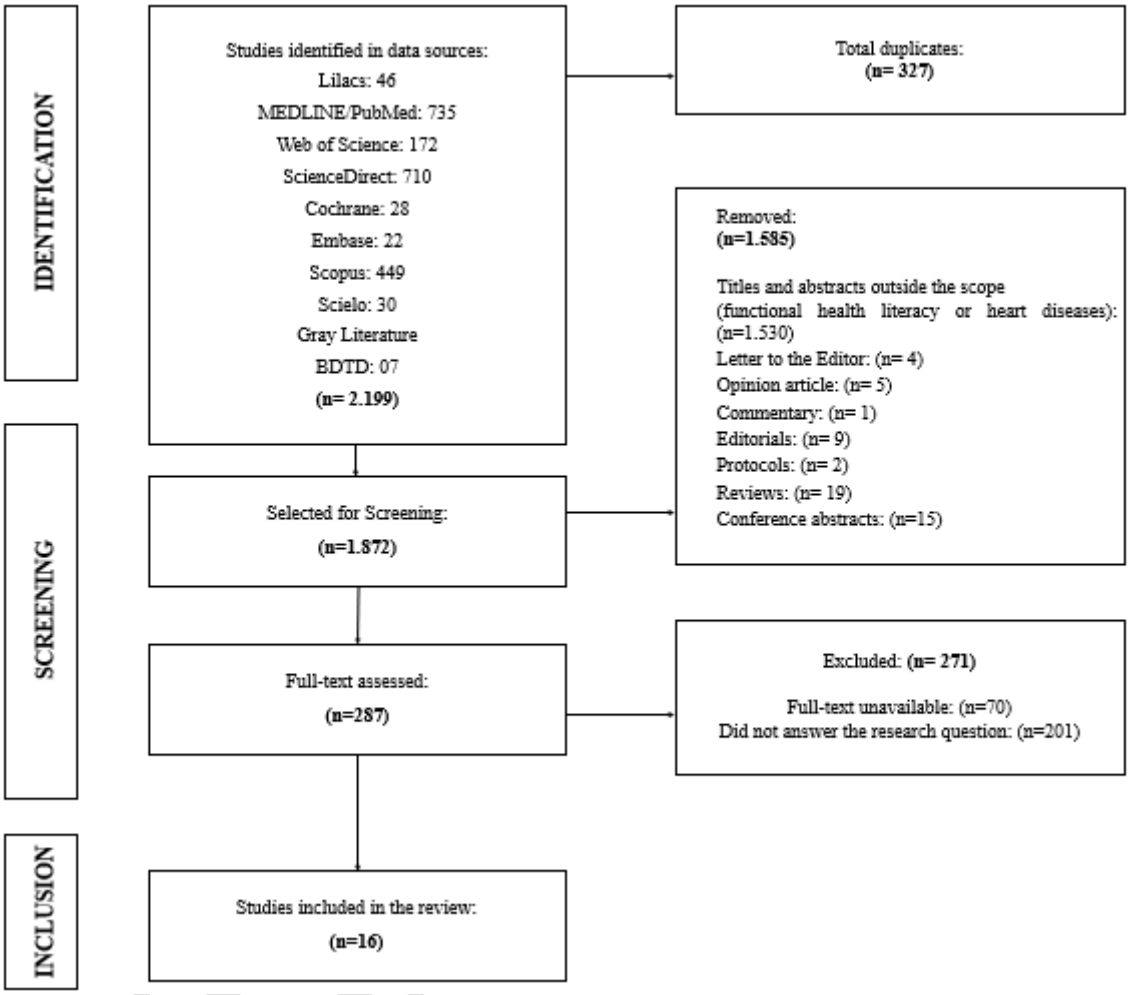
Article selection was performed in a double-blind manner, independently, by two reviewers. Reference management and duplicate removal were carried out using EndnoteWeb (online version), ensuring greater standardization in data selection and enhancing the reproducibility of the study, as recommended.[7] The selection process initially consisted of screening titles and abstracts, followed by evaluation against eligibility criteria, full-text reading of the selected articles, and subsequent verification of whether they addressed the research question.

Data from the selected articles were extracted and organized into a Microsoft Excel® database, including identification of title, language, country, journal, and year; methodological aspects such as study design, approach, objectives, and sampling; and critical analysis encompassing main results and conclusions. Finally, a synthetic presentation of the key characteristics of the analyzed studies and a compilation of the results were provided.

Results

The search strategies identified 2.199 records, of which 327 were removed as duplicates. From the remaining 1.872, a total of 1.530 were excluded after screening titles and abstracts, leaving 342 records. Of these, 55 studies were excluded for not meeting the eligibility criteria. In the end, 287 articles were assessed in full, of which 16 were considered eligible for inclusion in the study synthesis, as shown in Figure 1.

Figure 1. Flowchart of selection and screening of articles included in the scoping review.



Source: Authors' elaboration (2024).

Chart 2 presents the characterization data of the selected articles, the professionals involved in the FHL process, the FHL strategies and the main findings.

Chart 2. Characterization of the selected articles.

Authors / Year / Country	Professionals involved in FHL	FHL Strategies	Main Findings
DeWalt DA. et al. / 2004 / USA[8]	Team of physicians, pharmacists, nurses, and health educators	An educational booklet for patients with low education and heart failure (HF). The booklet was incorporated into a disease management intervention that also included a one-hour individualized educational session and scheduled follow-up calls.	Results suggest that these patients may have improved Health-Related Quality of Life (HRQoL) with such a program, although the baseline average knowledge score was 67% and did not improve after the intervention. Since no randomized clinical trial was conducted, definitive conclusions cannot be made.
DeWalt DA. et al. / 2006 / USA[9]	Physicians and pharmacists	One-hour educational session with a clinical pharmacist or health educator during a regular clinic visit. Patients received an educational booklet developed for low-literacy patients and a digital scale, scheduled follow-up calls from the physician, and an educational pamphlet.	In the unadjusted analysis, the control group improved 5 points in the MLHFQ and the intervention group improved 1 point; the difference was not statistically significant. After adjusting for baseline differences, the difference was 2 points, suggesting no effect on HF-related quality of life. Knowledge, self-efficacy, and self-care behaviors improved more in the intervention group.
Morrow DG. et al. / 2007 / USA[10]	Physicians and pharmacists	Two versions of diuretic medication instructions were presented. After reviewing them for 1 minute, participants indicated which version was more useful.	Older adults with lower health literacy and cognitive skills were more likely to prefer patient-centered instructions, suggesting these help patients most in need of clear and precise self-care information. Older adults with higher skills preferred pharmacy-style instructions with more drug interaction details.
Baker DW. et al. / 2011 / USA[11]	Health educator	Intervention group received intensive education and self-care training based on social cognitive theory and adult learning theory. It included specific instructions using daily weights for diuretic self-adjustment, an individualized plan developed with the physician, 5–8 follow-up calls, an educational manual, and a digital scale.	The *Teach to the Target Method* (TTM) group had significantly greater knowledge gains than the *Brief Learning Education* (BLE) group. Improvements in self-efficacy were higher in the TTM group. Both groups showed substantial and statistically significant improvements in self-care behaviors.
Eckman MH. et al. / 2012 / USA[12]	Physicians, nurses, research assistant	"Living with Coronary Artery Disease—Doing Your Part" booklet (20 pages, 5th grade reading level), covering lifestyle/behavioral changes, drug therapy, cholesterol, blood pressure, etc.; plus a video featuring diverse patients discussing experiences.	The video + booklet group showed greater knowledge and significant improvements in health behaviors (exercise, weight loss) compared to the booklet-only group. Both groups increased questioning of physicians/nurses about CAD after the intervention.

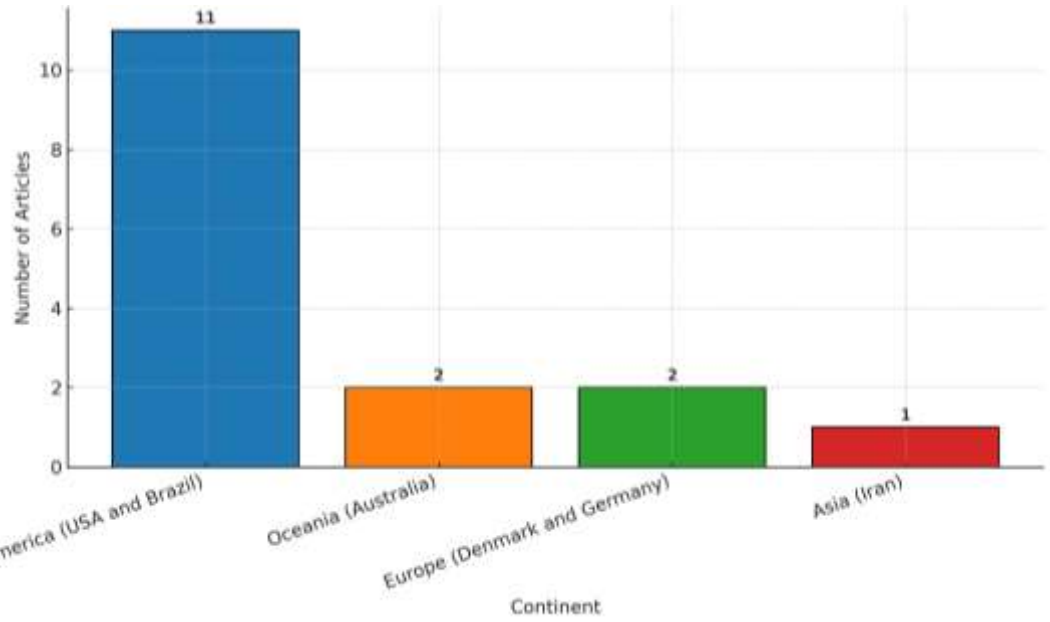
Kripalani S. et al. / 2012 / USA[13]	Physicians and pharmacists	"Universal Medication Schedule" tool; updated quarterly with pharmacy records, summary letters, reminder calls, and postcards.	Adherence rates: combined interventions 36.9%, illustrated schedule 34.2%, postcard reminder 28.3%, usual care 31.2%. No statistically significant differences (p=0.58).
Noureldin M. et al. / 2012 / USA[14]	Physicians and pharmacists	Verbal and written instructions to promote understanding of prescriptions and adherence; included therapy cards and calendar-type matrices.	For patients with adequate health literacy, the intervention significantly increased adherence compared to usual care. For those with inadequate literacy, adherence also improved compared to usual care. However, adequate-literacy patients in usual care had higher refill completion rates than intervention.
Glatz J. et al. / 2014 / Germany[15]	Physiotherapists, nutritionists, psychologists, physicians	Patient education program divided into 6 modules (cardiovascular system, exercise, medication, nutrition/hydration, coping and stress, treatment options/self-control).	At discharge and 6-month follow-up, intervention group had significantly greater knowledge and improved BP compared to control.
Regalbuto R. et al. / 2014 / USA[16]	Physicians	Discharge instructions (6-part structure).	Patients with HF had limited understanding of discharge instructions, especially regarding follow-up and medications, despite guideline-based instructions (JCAHO).
Dickson VV. et al. / 2015 / USA[17]	Health educators	Three-hour individual sessions over one month with a trained educator focusing on self-care skills.	Significant improvement in self-care maintenance and monitoring of specific symptoms (e.g., weight, ankle edema). Self-care management improved, especially recognition of symptoms and treatment effectiveness evaluation.
Wu JR. et al. / 2016 / USA[18]	Physicians and nurses	Collected demographics, clinical data, literacy (S-TOFHLA), NYHA/BNP scores, HF medications, hospitalization and mortality.	Older HF patients more likely to have low health literacy and less likely to receive ACEI or β-blockers. Poorer health outcomes were predicted by age and literacy. When literacy was added to the model, age was no longer significant.
Tongpeth J. et al. / 2018 / Australia[19]	Cardiology specialists, IT specialists, game designers	Smartphone app combined with validated instruments (ACS Response Index, satisfaction questionnaires). Patients rated usefulness, clarity, and acceptability.	87.3% satisfaction. All participants rated the app highly. Clear usefulness in recognizing/responding to ACS symptoms.
Kanudsen MV. et al. / 2019 / Denmark[20]	Physiotherapists, nurses, nutritionist, physicians	12-week tele-rehabilitation program (exercise, diet counseling, education, psychosocial support).	At 6 months, rehospitalization occurred in 11% of both groups. No baseline differences in PAM or literacy between completers/dropouts. Health literacy improved slightly in both groups (intervention 9.2%, control 8%). No significant difference between groups.

Beauchamp A. et al. / 2020 / Australia[21]	Multidisciplinary health team	Individually prescribed aerobic/strength training 6–12 weeks of participation and 12 one-hour education sessions.	Suggested improvements in HL aspects, especially related to information needs. Participants reported better ability to manage condition and navigate health system.
Hakimzadeh Z. et al. / 2023 / Iran[22]	Nurses and physician	FHL intervention: booklet, two 1–1.5h face-to-face training sessions, continued education/support via WhatsApp or Telegram groups.	No baseline differences. At follow-up, intervention group had significantly higher FHL scores and subscale scores vs. control ($p<0.001$).
Bartolazzi F. / 2020 / Brazil[23]	Physician	Patients with atrial fibrillation were recruited (≥18 years, anticoagulation use). Data were collected from records and interviews; FHL was measured using the validated Short Assessment of Health Literacy for Adults, and adherence was measured with the treatment adherence instrument.	100 patients, mean age 68.8, 54% women. 74% ≤ elementary education, 79% inadequate FHL, 66% non-adherent to OAC. No significant association between inadequate FHL and non-adherence (OR 1.48; 95% CI 0.47–4.61; $p=0.49$).

FHL: Functional Health Literacy; **HF:** Heart Failure; **HRQoL:** Health-Related Quality of Life; **MLHFQ:** Minnesota Living with Heart Failure Questionnaire; **TTM:** Teach to the Target Method; **BLE:** Brief Learning Education; **CAD:** Coronary Artery Disease; **BP:** Blood Pressure; **JCAHO:** Joint Commission on Accreditation of Healthcare Organizations; **NYHA:** New York Heart Association; **BNP:** B-type Natriuretic Peptide; **ACEI:** Angiotensin-Converting Enzyme Inhibitors; **S-TOFHLA:** Short Test of Functional Health Literacy in Adults; **IT:** Information Technology; **ACS:** Acute Coronary Syndrome; **PAM:** Patient Activation Measure; **CR:** Cardiac Rehabilitation; **HL:** Health Literacy; **AF:** Atrial Fibrillation; and **OAC:** Oral Anticoagulants. **Source:** Authors' elaboration.

It can be observed in Figure 2 that most of the studies originated from the American continent, primarily from the United States (n = 10; 62.5%).[8–14,16–18] One study was conducted in Brazil.[23] Among the others, two were from Australia,[19 21] one from Denmark,[20] one from Germany,[15] and one from Iran.[22].

Figure 2. Distribution of the studies by continent, 2024.



Source: Authors' elaboration.

Regarding language, English was the most predominant, used in 14 studies (87.5%),[8–14,16–22] while only one was written in German[15] and one in Portuguese.[23]

The studies were published between 2004 and 2023, with predominance in the period from 2011 to 2023 (n = 13; 81.25%). The year 2012[12–14] had the highest number of publications (n = 3; 18.75%), followed by 2014,[15,16] with two publications. With respect to journals, no clear prevalence was observed; *Patient Education and Counseling* and *Journal of Cardiac Failure* each accounted for two publications.

In terms of study type, randomized clinical trials were the most prevalent (n = 7; 43.75%),[9–11,13–15,20] as a means of validating the FHL strategies developed. It is noteworthy that two articles (12.5%)[12,16] did not specify the type of study conducted. As for methodological approach, all studies were characterized by a quantitative nature.

Concerning the themes of educational technologies designed for FHL, those focused on knowledge of management and/or self-care in Heart Failure (HF)[8–11,14,16–18] were the most prominent. Less frequent were studies addressing themes specifically related to Cardiac Rehabilitation,[15,20,21] Coronary Artery Disease (CAD),[12,13] Acute Coronary Syndrome (ACS),[19] Ischemic Heart Disease,[22] and Atrial Fibrillation (AF).[23]

With respect to healthcare professionals involved in FHL practices, physicians were the most frequently cited (n = 13; 81.25%),[8–10,12–16,18,20–23] followed by pharmacists (n = 5; 31.25%).[8–10,13,14] In some cases, physicians and pharmacists worked together in implementing literacy strategies,[9,10,13,14] while in others a multidisciplinary team was involved.[8,15,20,21] In only two studies, health educators[11,17]—volunteers without specific formal training but trained to apply FHL technologies—participated.

In relation to FHL strategies, there was a wide variety of interventions, as demonstrated in Chart 2. Healthcare professionals used tools ranging from educational booklets to videos and apps to promote patient literacy. Individual sessions and follow-up telephone calls were also frequently cited as effective strategies, allowing ongoing monitoring of patients and clarification of questions.

Discussion

Overall, the strategies used for health education and improvement of functional health literacy among the studied populations included: booklets/manuals/educational leaflets,[8,9,11,12,22] postcards,[13] apps,[19] educational sessions,[8,9,15,20,21,23] instructions,[10–12,14,16] training/exercise programs,[11,12,20–22] telephone follow-up,[8,9,11,13,22] use of media such as videos,[12] and other formats.[9,13,14,17,19]

The use of booklets/leaflets was observed in five of the 16 studies (31.25%), three of which were combined with telephone follow-up[8,9,11] or with media such as videos.[12] The booklets addressed topics such as: information on diseases affecting the study populations, e.g., HF[22] and Acute Coronary Syndrome (ACS);[19] non-pharmacological treatments such as lifestyle changes, physical and dietary habits, and cessation of harmful practices (smoking, alcohol); and pharmacological treatments, including prescribed medications and usage guidance. These strategies proved effective and were accompanied by professionals and/or written in simplified language (5th grade reading level).

The study by Baker et al.[11] used manuals to reinforce patient instructions, whereas Kripalani, Schmotzer, and Jacobson[13] employed postcards with reminders regarding medication use and other relevant topics.

Exercise and training were also interventions in five of the 16 studies (31.25%). In each case, sessions were individualized and focused on improving endurance. Knudsen et al.[20]

implemented 60-minute supervised sessions for 12 weeks, alongside dietary and psychosocial counseling, similar to Beauchamp, Sheppard, Wise, and Jackson,[21] who conducted 1-hour multidisciplinary sessions over 6–12 weeks.

Educational sessions and instructions appeared in ten of the 16 studies (62.5%).[8–12,14,16,20,21,23] For instance, DeWalt et al.[9] delivered a one-hour educational session involving booklet reading with an educator. Other studies[9,11,20] complemented instructions with team-based reviews of educational content. These sessions generally addressed topics such as symptom recognition, self-care practices, healthy lifestyles, and appropriate medication use.

Glatz et al.[15] combined education, monitoring, and communication with primary care providers, using oral instructions, texts, and pictorial materials to aid learning and adherence.

Telephone and electronic interventions appeared in seven of the 16 studies (43.75%).[8–11,13,19,22] Some used calls or messaging apps for ongoing patient follow-up, while Eckman et al.[12] employed 30-minute videos with testimonials from patients with CAD, providing relatable learning experiences.

Several studies[8–10,22] also used questionnaires to assess intervention effectiveness. Regalbuto et al.[16] tested patients' comprehension of discharge instructions (diet, daily weighing, medication) to tailor literacy-level-appropriate tools. Wu et al.[18] assessed HF severity, β-blocker/ACEI use, functional literacy (S-TOFHLA), and hospitalizations, while Tongpeth, Du, and Clark[19] evaluated knowledge, beliefs, and acceptability of educational apps for HF. In another study,[10] patients indicated preferences regarding what medication information was most useful (name, purpose, interactions, dosage, schedules, side effects).

Across studies, ten of the 16 (62.5%)[8,9,11,13,15,17,19–22] emphasized providing patients with disease-related information in sessions or training formats. This format showed high patient acceptance, as essential topics (diet, daily weighing, medications, etc.) were grouped into a holistic care approach—addressing not only clinical issues but also health-promoting behaviors.

From an educational perspective, health education is seen as a driver of behavior change, autonomy, and quality of life.[25] This review encountered findings[25] suggesting improvements in patients' quality of life following educational interventions. Although the literature shows current efforts remain insufficient and highlights the need for greater

investment in health education for individuals with established cardiovascular disease (e.g., myocardial infarction), evidence points to advances in quality of life and reduced recurrence of adverse events.[26]

Greater willingness to improve health was observed among groups exposed to literacy-focused interventions, though effect sizes were modest.[9,11,13,14,20,22] This raises discussion on the need to sensitize patients through continuous care, lifestyle promotion, and addressing barriers to self-management, including socioeconomic, cultural, and system-level factors.[27]

After the various interventions, increased knowledge and self-care behaviors were observed, but older adults were more prone to low health literacy.[8–11,13,17,20] Current literature still shows limited appropriation of health-related knowledge by older adults. FHL for this population should be fostered through dialogue and reflection on coping strategies, with recognition and reinforcement of competencies among vulnerable groups.[28]

A key barrier for patients with low FHL is limited communication skills, leading to reluctance in clarifying doubts, insecurities, or uncertainties, thus hindering active participation in treatment.[29] Educational interventions in waiting rooms are therefore critical to strengthen patient-professional relationships and address unresolved questions.[30,31]

Several studies[8,9,11,14,16,17] showed improvements in HF-related literacy after health education interventions. Regarding quality of life in HF patients, behavior change through self-care is essential. For example, a study in Rio de Janeiro showed that among 50 outpatients, there remained poor understanding of condition, diet, and medications. Improvements in teaching processes can enhance disease management, adherence, and prevention of complications.[32]

Remote monitoring was also notable, with studies[9,11,13,16,19,20,22] using telephone follow-up. Its effectiveness and low cost made it a successful strategy. Corroborating this, a systematic review of randomized trials found that multidisciplinary interventions (health education and telephone monitoring) reduced rehospitalizations for HF decompensation by 25%.[33]

This review aimed to present the FHL strategies used with chronic cardiac patients as a synthesis of existing scientific evidence. A limitation was the inclusion of only one gray

literature source. Future validation studies are expected to address these gaps and provide more effective educational strategies.

Conclusions

Based on the findings of this scoping review on functional health literacy, it can be inferred that the technologies used as tools for health education, in general, suggested positive effects on behaviors, such as improvements in self-care. Although the overall scenario appears promising, the data reported in the articles reflect insufficient efforts to support consistent statements regarding definitive changes in knowledge and behaviors. The study also revealed limited understanding among patients regarding their health condition—particularly older adults, who therefore deserve special attention.

Several modalities were identified as tools for improving health self-management. Booklets or educational leaflets proved effective, as they are illustrative and accessible to diverse audiences, and remote health monitoring through telephone calls or messages was also highlighted as a feasible strategy. This scoping review demonstrated that the topic of functional health literacy and strategies for its development in chronic cardiac patients under outpatient follow-up remains relatively underexplored. Therefore, further studies employing different designs are recommended to better elucidate this reality and the actions implemented for this purpose.

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Submitted: September 26, 2023
Accepted: May 20, 2025
Published: September 22, 2025

Authors' contributions	
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All authors approved the final version of the manuscript.	
Conflict of interest:	There is no conflict of interest.
Funding:	This research received no funding.

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