Evaluation of assessment tools used for judging the quality of online patient educational information on cardiovascular diseases: a narrative review

Amy Lin, Jordan Menczer, Misa Mi

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Amy Lin[1]; Jordan Menczer[2]; Misa Mi[3]

[1]Oakland University William Beaumont School of Medicine Rochester US
[2]McGaw Medical Center of Northwestern University Chicago US
[3]Department of Foundational Medical Studies Oakland University William Beaumont School of Medicine Rochester US

Corresponding Author:
Amy Lin
Oakland University William Beaumont School of Medicine
586 Pioneer Dr
Rochester
US

Abstract

Background: Patients use the Internet to seek guidance on various medical conditions. Cardiovascular diseases (CVD), the leading cause of global mortality, require clear and reliable information for effective patient management. Low health literacy can hinder patients' understanding and participation in their healthcare. Given the lack of regulatory guidelines on the quality of health information on CVD, it is imperative to assess the quality of tools used to evaluate online resources.

Objective: The objective of this review is to investigate if and what assessment tools or instruments were used for judging the quality of online patient educational information on CVD.

Methods: A comprehensive literature search was conducted with PubMed, ERIC, PsycINFO, and Scopus. Primary studies were included if they were published between 2013 and 2023 and focused on evaluating the quality of assessment tools used to evaluate web-based text educational materials on CVD. Title and abstract screening followed by full-text article selection were conducted to select the final set of articles for inclusion.

Results: Of the 22 studies included, 16 articles used assessment tools to evaluate the quality and reliability of CVD online materials; the most popular tool used is DISCERN Instrument followed by HONcode Certification and JAMA Benchmark criteria. The average DISCERN score across the 16 articles is 38.79 (range 15-75), indicating poor quality. Eighteen articles analyzed readability of information, and the most frequently used assessment tool is the Flesch-Kincaid Grade Level. The mean reading grade level of the articles was 11.24. Four articles included a tool to assess understandability and actionability, 2 articles assessed accessibility, and 1 article assessed cultural sensitivity.

Conclusions: Most materials assessed on CVD topics have poor credibility and are written well above the sixth-grade reading level suggested by the American Medical Association (AMA) and the US Department of Health and Human Services (HHS). Content creators and clinicians should employ quality assessment tools prior to publishing to ensure readable, trustworthy information for patients and families.

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Amy Lin B.S.[1], Jordan Menczer M.D.[2], Misa Mi, Ph.D.[3]
[1]Oakland University William Beaumont School of Medicine, Rochester, Michigan
[2] McGaw Medical Center of Northwestern University, Chicago, Illinois
[3]Department of Foundational Medical Studies, Oakland University William Beaumont School of Medicine, Rochester, Michigan

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Background: Patients use the Internet to seek guidance on various medical conditions. Cardiovascular diseases (CVD), the leading cause of global mortality, require clear and reliable information for effective patient management. Low health literacy can hinder patients' understanding and participation in their healthcare. Given the lack of regulatory guidelines on the quality of health information on CVD, it is imperative to assess the quality of tools used to evaluate online resources**.**
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Keywords: cardiovascular diseases; online health information; patient education; health literacy

Introduction

In the contemporary era of digital health information, the internet has become an indispensable source for patients seeking educational resources on various medical conditions, including cardiovascular diseases (CVD). According to the 2018 Health Information National Trends Survey, over 70% of people reported they first utilized the Internet to get health information before seeing a physician[1]. This trend shows the influential role played by online platforms in shaping healthcare decision-making. However, there are no current regulatory guidelines on the quality, accuracy, or readability of this information. Content is not peer reviewed; statements can be misleading, out-of-date, or even biased in an attempt to sell products or engage in unlicensed health product promotion. Furthermore, the reading level may not be appropriate for the public, making it difficult to

comprehend [2].

Cardiovascular diseases, encompassing a spectrum of conditions affecting the heart and blood vessels, is the leading cause of death globally[3]. Patients navigating the complexities of CVD management rely heavily on online resources for information related to prevention, treatment options, and lifestyle modifications. Studies have shown that low levels of health literacy may increase the risk of all-cause mortality[4]. When online resources are written at a reading level above the average U.S. adults' abilities, it hinders patients' understanding and their ability to participate in their healthcare[5]. The American Medical Association (AMA) and the United States Department of Health and Human Services (HHS) advocate for patient education materials to be crafted at a sixth-grade reading level[6,7], emphasizing the importance of clear, accessible language to promote better health outcomes.

Ensuring that online materials are accurate, clear, and reliable is crucial due to the potential negative impact of misinformation on patients' decisions and health outcomes. Despite the increasing reliance on online platforms for health information, there has not been any systematic review evaluating online patient education materials on cardiovascular diseases. The purpose of this review is to investigate if and what assessment tools or instruments were used for judging the quality of online patient educational information on CVDs.

Methods

Search Strategy

Comprehensive searches of literature published from December 2013 to April 2023 were conducted with databases, PubMed, PsycINFO, Embase, and Scopus with a combination of subject headings and keywords representing the concepts of "cardiovascular diseases," "health information," "internet-based," "web-based," "psychometrics," "quality," "readability," "accessibility." Literature search results were imported into the Covidence platform, which was used for title and abstract and full text screening.

Inclusion Criteria

Primary studies published between 2013 and 2023, focused on evaluating the quality of web-based patient/consumer education on cardiovascular diseases freely available on the Internet, containing evaluation tools assessing the quality, readability, and accessibility of web-based educational materials.

Exclusion Criteria

Articles were excluded if they were reviews, systematic reviews, articles without any empirical data or without full-text articles, and only focusing on video-based educational materials on YouTube. Articles that evaluated sponsored websites, medical device companies, or websites that required a login were also excluded.

Statistical Analysis

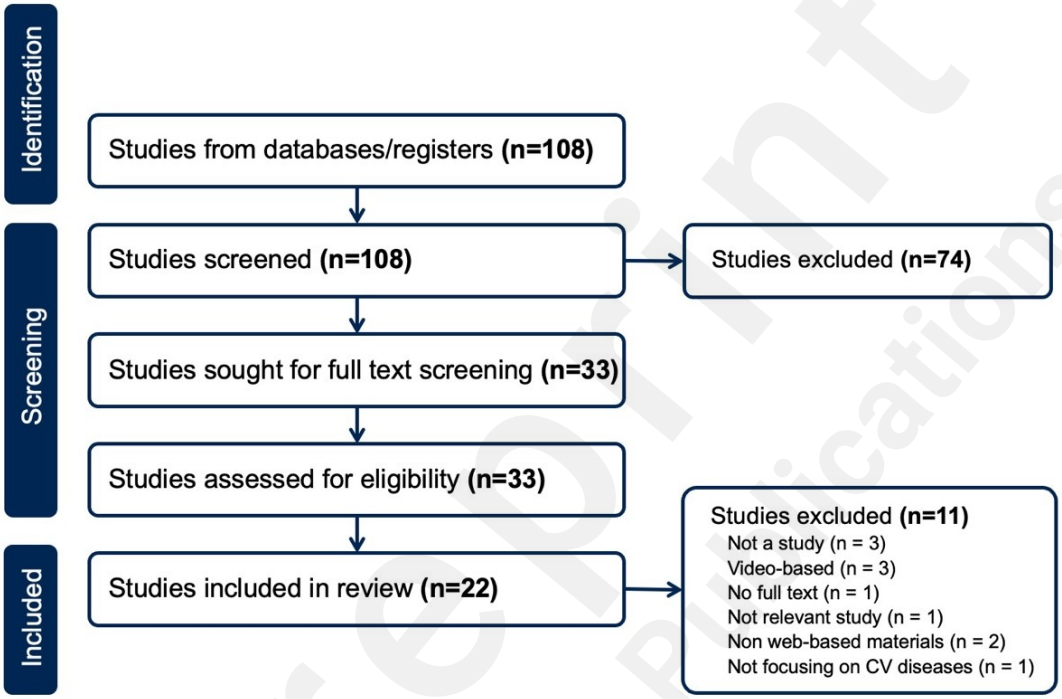
Data from selected studies were extracted on types of assessment tools or instruments used: quality, credibility, readability, understandability, actionability, accessibility, and cultural sensitivity. Extracted data was synthesized, and the use of assessment tools and criteria was analyzed for frequency and mean.

Results

Study Characteristics

The initial literature search identified 108 studies. After title and abstract screening, 33 studies were evaluated for full text screening, yielding a final set of 22 studies for inclusion in the review (Multimedia Appendix 1). The PRISMA flow diagram of the article selection process is shown in Figure 1.

Figure 1. Flow diagram of the study selection process.



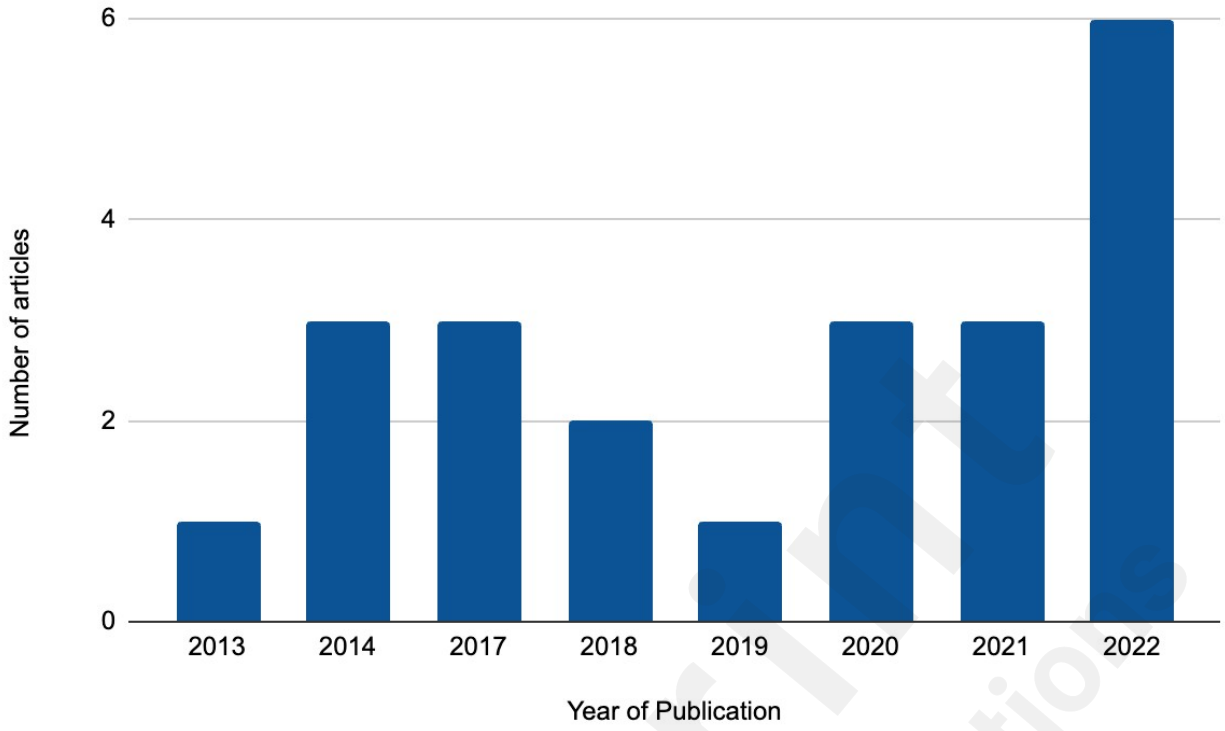


Figure 2. Yearly distribution of reviewed studies.

The distribution of the year of publication of the studies included is shown in Figure 2. The frequency of the cardiovascular-related terms evaluated by the studies is listed in Table 1.

Table 1. Frequency of CVD-related terms evaluated in the studies.

Cardiovascular-Related Terms	Frequency
Abdominal Aortic Aneurysm Repair	1
Acute Myocardial Infarction	1
Angiotensin receptor blockers	1
Behcet's Disease	1
Brain aneurysms	1
Carotid artery stenting	1
Carotid endarterectomy	1
Cardiovascular Disease	2
Deep Vein Thrombosis	1
Heart Failure	3
Intermittent Claudication	2
Intracranial aneurysms	1
Peripheral Artery Disease	3
Raynaud's phenomenon	1
Stroke	2
Systemic Sclerosis	1
Varicose veins	1
Vascular Anomalies	1
Venous malformation sclerotherapy	1

venous thrombosis	1

Evaluation outcomes

Quality and Reliability

Of the 22 studies included, 16 (72.73%) articles used assessment tools to evaluate the quality and reliability of CVD online materials. Eight (50%) of the articles used 1 tool, 6 (37.5%) used 2 tools, and 2 (12.5%) used more than 3 tools to measure quality and reliability. The frequency and mean scoring are shown in Table 2. The most popular tool used was DISCERN Instrument[8] (n=9), with an average score of 38.79 (range 15-75), indicating poor quality. Seven studies evaluated the HONcode Certification[9] and showed that on average 22% of websites had the HONcode seal. The JAMA Benchmark score [10] was reported in 5 studies with a pooled mean score of "fair quality". Other instruments used by the studies included the University of Michigan Consumer Health Website Evaluation Checklist [11], EQIP Instrument[12], AHA Education Guidelines for Heart Failure[13], Ingledew Measurement[14], and LIDA Measurement Tool [15].

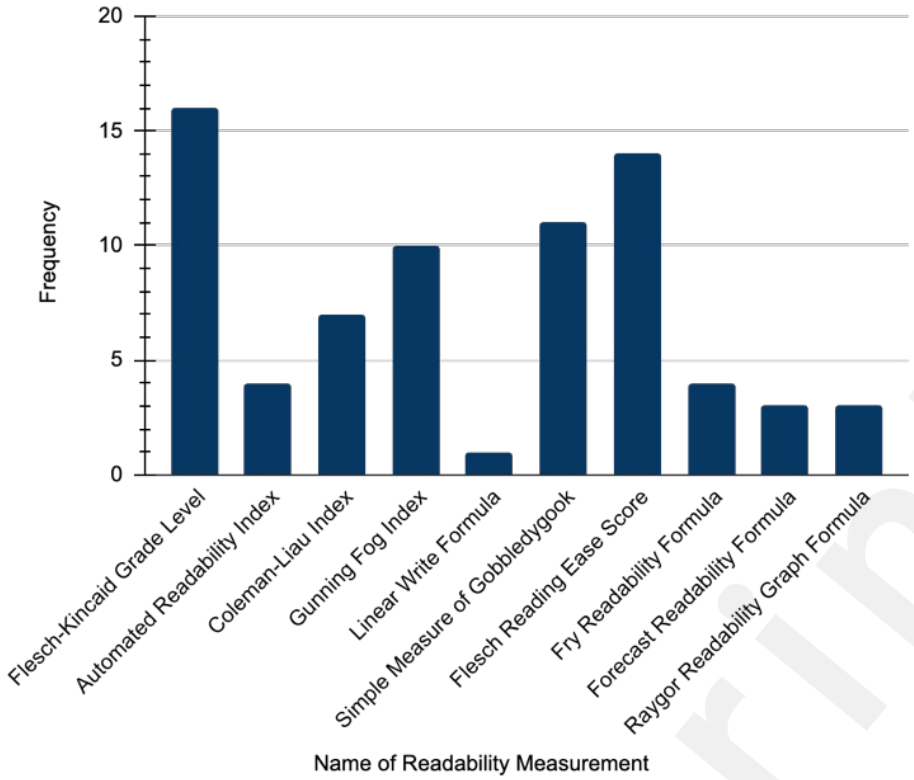
Table 2. Quality/Reliability Measurement Frequency and Mean Scoring

Name of Quality/Reliability Measurement	Frequency	Mean Scoring
DISCERN Instrument[8]	9	38.79
HonCode Certification [9]	7	22% of websites overall had the Honcode seal
JAMA Benchmark Criteria[10]	5	Fair quality
University of Michigan Consumer Health Website Evaluation Checklist[11]	1	Low credibility
EQIP Instrument[12]	1	Satisfactory credibility
AHA Education Guidelines for Heart Failure[13]	1	73% met the criteria
Ingledew Measurement[14]	1	68.3% of websites were accurate
LIDA Measurement Tool[15]	1	Poor credibility

Readability

Overall, 18 out of 22 studies (81.82%) performed a readability assessment of the online materials. Eleven studies out of 22 (57.89%) used more than 3 tools, 5 (26.32%) used 2 tools, and 3 (15.79%) used 1 tool for readability analysis. The most frequently used assessment tool was the Flesch-Kincaid Grade Level[16] (Figure 3). The mean reading grade levels for websites assessed by each article ranged from 7.15 to 14 (Multimedia Appendix 2). The mean reading grade level for all websites was 11.24 out of 12 grade levels.

Figure 3. Frequency of use of readability measurement



Understandability and Actionability

Four articles used the Patient Education Tool for Print Materials[17] to assess understandability and actionability[18, 19, 20, 21]. The average understandability score across these articles is 65%, and the average actionability score is 35% (Table 3). These scores, falling below the 70% threshold, indicate that the evaluated materials were not adequately understandable and lacked actionability.

Table 3. Mean understandability and actionability scores assessed by each article.

Article name that assessed understandability and actionability	Mean understandability score	Mean actionability score
Bonner et al., 2019 [18]	87%	61%
Cajita et al., 2017 [19]	56.30%	34.70%
Lee et al., 2021 [20]	50%	19.80%
Scott et al., 2020 [21]	68.50%	23.10%
Average mean score	65%	35%

Accessibility and Cultural Sensitivity

Two articles evaluated the accessibility of the websites[22, 23]. Each of the following assessment tools was used by one of these articles: Alexa[24], Web Rank[25], and Ingledew[14]. One article assessed cultural sensitivity using the Cultural Sensitivity Assessment Tool[26].

Discussion

Principal Results

To the authors' knowledge, this is the first review examining the assessment tools used for judging

the quality of online patient educational information on cardiovascular diseases. The results of this study reveal that the majority of online patient education materials were of poor credibility. This was demonstrated by a mean DISCERN score of 38.56. This finding is consistent with other studies examining patient education websites on various health topics, such as ophthalmology, neurological disorders, and cancers[27, 28, 29, 30].

The second most used method to examine credibility was the HonCode Certification with only 22% of the websites demonstrating the seal. This may be due to the fee associated with displaying the seal on a website domain and the controversy of the seal. The HONcode seal, despite implementing a real-time feature, faces persistent challenges, particularly regarding fraudulent use and the reliance on users to verify its validity. As a result, we suggest that website text should be assessed with the DISCERN Instrument and JAMA Benchmark Criteria. Both tools assess multiple aspects of credibility, including information currency, authorship, references, sources, and benefits and risks of treatment.

A majority of online patient educational content related to cardiovascular diseases exceeds the recommended sixth-grade reading level advised by the AMA and HHS. Since ensuring readability in patient education is vital for fostering accessible and equitable healthcare communication, content creators bear the responsibility of producing information that is easily comprehensible for patients. We suggest that future website text should be measured with 3 or more readability tools prior to publishing, considering factors such as word-to-sentence and syllable-to-word ratios, as well as average word length. Utilizing multiple tools can offer a more comprehensive assessment and help ensure that the content is accessible to a broader audience.

Four out of 22 articles assessed websites for understandability and actionability using the Patient Education Tool for Print Materials. Understandability is evaluated by material content, use of numbers, word choice, material organization and layout and use of visual aids. Actionability is evaluated by assessing whether the reader would be able to identify the next steps required to take action based on the information provided. This observation is noteworthy due to the central goal of patient education, which aims to encourage self-care. Notably, according to Scott et al. (2020)[21], more than half (53%) of the websites examined received an actionability score of 0. This score implies that the information provided on these websites lacked practical guidance, making it difficult for patients to implement any of the presented insights. Given this finding, we recommend that content creators take steps to enhance the actionability of health-related information. One effective approach is to incorporate actionable elements such as checklists, charts, and visual aids. These tools can empower patients by providing tangible steps and visual representations, facilitating better comprehension and encouraging active engagement in managing their health.

Furthermore, 1 out of 22 articles analyzed websites for cultural sensitivity, utilizing the Cultural Sensitivity Assessment Tool. This finding holds significance, as it emphasizes the importance of ensuring that all individuals, regardless of their ethnicity, gender, or cultural background, have access to health information on the Internet that is both suitable and accurate. To address this concern, we recommend that content creators proactively assess their text for cultural sensitivity. This practice aims to enhance the inclusivity of health-related content and ensures that it resonates with a diverse audience.

Limitations

This review specifically considered studies in English with available full-text, potentially introducing selection bias. The exclusion of grey literature limits the scope of the review. Additionally, due to the dynamic nature of online content, there's a possibility that the review may not encompass the most up-to-date data.

Conclusion

This study highlights several key challenges in the quality of online patient educational content related to cardiovascular diseases. The majority of content is of poor quality, exceeding recommended reading levels, highlighting the need for enhanced quality and readability for better accessibility and equity in healthcare communication. The study also notes a lack of actionability on many websites, emphasizing the importance of refining health information to empower patients in self-care. The study advises content creators to use multiple readability tools before publishing and highlights the importance of cultural sensitivity for diverse audiences in healthcare communication. Moving forward, content creators should adopt comprehensive strategies, integrating readability, actionable elements, and cultural sensitivity to enhance healthcare communication, promote patient empowerment, and achieve accessible and equitable healthcare information.

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Conflict of Interest

None declared.

Abbreviations

AMA: American Medical Association
CVD: cardiovascular diseases
HHS: United States Department of Health and Human Services

Supplementary Files

Multimedia Appendixes

Citation list of articles included in the review.
URL: http://asset.jmir.pub/assets/a634329fb5f866d304b4fa5d911f82be.doc

Mean grade reading level of websites analyzed by individual article.
URL: http://asset.jmir.pub/assets/27c65a2a2538159689d87bc2e7977f57.doc