



A Review of the Role of eHealth Literacy in the Prevention and Management of Non-Communicable Diseases

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ABSTRACT

Chronic noncommunicable diseases (NCDs) are the leading causes of mortality and disability worldwide, posing substantial challenges to healthcare systems. Their effective prevention and management increasingly depend on innovative digital health approaches. In this context, eHealth literacy defined as the ability to seek, understand, critically evaluate, and apply health information obtained from digital sources has emerged as a key determinant of disease prevention, self-care, and chronic disease management. This study aimed to examine the role of eHealth literacy in the prevention and management of chronic noncommunicable diseases and to summarize the factors influencing eHealth literacy, its outcomes, and strategies for its promotion. A narrative review was conducted by searching national and international scientific databases for studies published between 2020 and 2026. Articles addressing eHealth literacy, digital health, and the prevention and management of chronic noncommunicable diseases were identified, screened for relevance, and included in the review. The findings were synthesized using a descriptive-analytical approach. The reviewed evidence indicates that higher levels of eHealth literacy are associated with improved health behaviors, greater self-care, more informed decision-making, better treatment adherence, and more effective use of digital health services. eHealth literacy is influenced by multiple individual, educational, technological, and organizational factors. The findings further suggest that improving eHealth literacy requires continuous education, strengthened digital infrastructure, access to reliable health information, efforts to reduce the digital divide, and sustained policy support. Despite the growing body of evidence, important gaps remain, including the limited availability of context-specific models, evidence-based educational interventions, and comprehensive strategies for promoting eHealth literacy among individuals with chronic non-communicable diseases. eHealth literacy represents a fundamental component of digital health and an essential prerequisite for the effective prevention and management of chronic noncommunicable diseases. Strengthening eHealth literacy can enhance individuals' engagement in managing their own health, improve the effectiveness of digital health services, reduce the burden of chronic diseases, and increase the efficiency of healthcare systems. Accordingly, the development of educational policies, empowerment programs, and evidence-based interventions should be prioritized.

Keywords: eHealth literacy; digital health; chronic noncommunicable diseases; disease prevention; disease management.

1. Introduction

Chronic noncommunicable diseases (NCDs) constitute one of the most persistent and consequential public health challenges of the contemporary era. Unlike acute infectious conditions, NCDs generally develop over prolonged periods, require continuous monitoring and treatment, and are strongly influenced by interactions among behavioral, environmental, metabolic, social, and healthcare-related determinants. Cardiovascular diseases, diabetes, cancers, and chronic respiratory diseases collectively contribute substantially to premature mortality, disability, impaired quality of life, and escalating healthcare expenditure throughout the world. Their chronic and multifactorial nature means that effective control cannot depend solely on episodic medical treatment; rather, prevention, early detection, sustained self-management, modification of behavioral risk factors, adherence to therapeutic recommendations, and long-term engagement with healthcare systems are essential components of disease control (1). Health literacy has therefore become increasingly important within NCD prevention strategies because individuals must continuously interpret health information, evaluate risks, make lifestyle decisions, and participate actively in the management of their conditions (2). This need is particularly significant in Iran, where noncommunicable diseases represent a major component of the national burden of disease and exhibit important demographic and sex-related disparities, reinforcing the need for effective population-level prevention and disease-management strategies (3).

At the same time, healthcare systems are undergoing rapid digital transformation. Internet-based information resources, electronic health records, patient portals, telemedicine, mobile health applications, wearable devices, social media, artificial intelligence-supported services, and other digital technologies increasingly mediate interactions between individuals and health information. Digital health technologies offer considerable potential to facilitate prevention, remote monitoring, continuity of care, patient education, behavioral modification, and chronic disease management. Nevertheless, successful implementation depends on much more than technological availability. Digital health initiatives may encounter barriers related to infrastructure, workflow integration, organizational

readiness, usability, professional competencies, trust, and user acceptance. Recent evidence concerning digital health technology implementation emphasizes that technological innovations achieve meaningful healthcare value only when implementation barriers and facilitating conditions are addressed simultaneously (4). At the national level, the successful development of eHealth systems similarly depends on appropriate governance, infrastructure, stakeholder engagement, interoperability, legal and ethical frameworks, and the capacities of those expected to use such systems (5).

Within this rapidly changing environment, electronic health literacy, or eHealth literacy, has emerged as a central concept connecting health literacy with individuals' ability to function effectively in digital environments. Norman and Skinner originally conceptualized eHealth literacy as the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge obtained to addressing or solving health problems (6). Subsequent conceptual development has demonstrated that eHealth literacy is not equivalent to technical competence or Internet access alone. Rather, it incorporates several interrelated competencies encompassing health literacy, information literacy, media literacy, digital literacy, critical appraisal, communication, and the capacity to transform information into appropriate decisions and health-related actions (7). Contemporary definitions similarly emphasize that digital health literacy involves the ability to locate, understand, assess, communicate, and appropriately use health information and services available through electronic technologies (8). The Global Digital Health Partnership has consequently framed digital health literacy as a foundational capacity for meaningful and equitable engagement with increasingly digitized health systems (9).

The relevance of eHealth literacy is especially pronounced for individuals affected by chronic diseases because successful disease management frequently occurs outside formal clinical environments. Patients with diabetes, cardiovascular diseases, chronic respiratory disorders, and other long-term conditions must often monitor symptoms, interpret health measurements, follow medication schedules, modify diet and physical activity, identify warning signs, communicate with healthcare providers, and evaluate

information encountered through digital media. Evidence from systematic reviews and meta-analyses indicates that digital health literacy is meaningfully associated with health-related behaviors, suggesting that individuals with stronger eHealth literacy may be better positioned to translate available information into healthier choices and more effective self-management (10). The broader association between health literacy and behaviors such as physical activity also illustrates how information-related competencies can facilitate lifestyle practices relevant to the prevention and management of NCDs (11). Furthermore, research specifically examining patients with common chronic diseases indicates that digital health literacy has become highly relevant to their capacity to navigate information, digital interventions, and ongoing disease-management demands (12).

The potential benefits of eHealth literacy extend beyond information acquisition. Individuals with adequate eHealth literacy are more likely to recognize their information needs, use appropriate search strategies, distinguish credible from unreliable sources, critically appraise claims, and apply relevant information in decision-making. These competencies have become increasingly important because digital environments expose users not only to scientifically valid health information but also to misinformation, commercially motivated content, contradictory recommendations, and material that may be difficult to interpret. Research examining determinants and outcomes of eHealth literacy among adults has demonstrated that eHealth literacy is associated with a complex range of personal characteristics and health-related outcomes, highlighting its role as an intermediary between access to digital information and meaningful health action (13). In the context of health promotion and prevention, eHealth literacy also provides an important foundation for designing digital technologies that users can understand and employ effectively rather than merely making technologies technically available (14).

However, eHealth literacy is not distributed equally across populations. Sociodemographic inequalities in digital health literacy are consistently reported, with factors such as age, educational attainment, income, socioeconomic position, and related characteristics influencing people's capacity to participate effectively in digital health environments (15). A more recent global synthesis has

further demonstrated that eHealth literacy is shaped by a broad configuration of demographic, socioeconomic, psychological, behavioral, and technology-related determinants rather than by a single individual characteristic (16). These disparities are particularly important in chronic disease populations because groups with the greatest need for sustained healthcare may simultaneously face some of the greatest barriers to digital engagement. The digitalization of health services may therefore improve accessibility for some populations while inadvertently increasing inequities for others unless interventions are explicitly designed to address differences in access, skills, confidence, and health information needs.

Healthcare professionals constitute another critical dimension of the eHealth literacy landscape. As healthcare becomes increasingly digitized, physicians, nurses, allied health professionals, and other healthcare providers must be capable not only of operating digital systems but also of retrieving and critically evaluating electronic information, appropriately using digital clinical tools, communicating with patients through electronic environments, and guiding patients toward credible resources. A systematic review of eHealth literacy among hospital healthcare providers demonstrated that digital health competencies among professionals vary and that deficiencies may limit effective use of digital technologies in clinical practice (17). More recent evidence has identified multiple determinants of digital health literacy among healthcare professionals, encompassing demographic characteristics, previous experience, digital competencies, attitudes, organizational conditions, and educational opportunities (18). The importance of these abilities has consequently led to recognition of digital health literacy as a prerequisite for healthcare professionals to realize the clinical and organizational value of digital technologies (19).

Digital health technologies are particularly promising in chronic disease care because mobile health applications and other remote technologies can facilitate monitoring, health education, communication, behavioral support, and continuity of care. Nevertheless, healthcare providers report both opportunities and practical challenges in using mobile health approaches for chronic noncommunicable diseases, indicating that implementation depends on acceptability, usability, resources, technical support, workflow

considerations, and confidence in digital systems (20). Concerns regarding privacy and security further complicate the adoption of digital technologies. Mobile health applications handle sensitive personal and clinical information, and inadequate security can undermine both user trust and institutional willingness to integrate such technologies into healthcare delivery. Evidence concerning secure mobile health application development identifies multiple technical and organizational challenges that must be addressed to ensure that digital health platforms remain safe, trustworthy, and suitable for widespread healthcare use (21).

Because eHealth literacy is modifiable, educational interventions represent a particularly important strategy for reducing these barriers. A growing body of research has investigated interventions aimed at improving individuals' ability to obtain, evaluate, and use electronic health information. Scoping evidence indicates substantial heterogeneity in intervention populations, formats, educational components, and evaluation methods, while also showing increasing interest in structured approaches to strengthening eHealth literacy (22). Within Iran, an educational intervention based on Freire's educational model among healthcare providers provides evidence that theory-informed education can be applied specifically to improving eHealth literacy in professional healthcare populations (23). More broadly, educational approaches to health literacy among patients with chronic conditions such as diabetes emphasize the need for multidimensional programs that address informational, behavioral, educational, and organizational components rather than relying on simple information provision (24).

Iranian research provides an important contextual foundation for understanding eHealth literacy. Studies conducted among healthcare service users and students have demonstrated that eHealth literacy varies according to individual characteristics and patterns of Internet and information use. Research among patients attending a military hospital in Tehran identified predictive factors related to eHealth literacy, illustrating the importance of contextual and demographic characteristics in shaping people's ability to use electronic health information (25). Similarly, investigation among students at Gonabad University of Medical Sciences provided evidence regarding

levels of Internet-based eHealth literacy within a young and educated population, indicating that familiarity with online environments does not necessarily guarantee optimal health-information competencies (26). A broader review of Iranian eHealth literacy studies has likewise highlighted growing national interest in the field while pointing to variations in populations, measurement approaches, and determinants examined across studies (27).

The Iranian literature also demonstrates the importance of communication channels, health education, and institutional interventions in shaping health literacy. Social media may serve as a major source of health information during crises and can contribute to improving citizens' eHealth literacy when information is accessible, credible, and appropriately communicated (28). More general investigations of health literacy and health-promoting behaviors have emphasized that individual competencies need to be supported by effective policies and organizational measures if health information is to translate into healthier behavior at the community level (29). Reviews focused specifically on digital health literacy similarly stress that improving this capacity requires systematic education, access to reliable digital resources, attention to information quality, and strategies designed for populations at risk of inadequate literacy (30). In medical education, the development of structured e-learning models also provides an institutional mechanism through which universities can strengthen digital learning competencies and prepare healthcare professionals for increasingly technology-dependent health systems (31).

Taken together, these findings demonstrate that eHealth literacy is best understood as a multidimensional capability embedded within a wider digital, educational, clinical, and organizational ecosystem. Its effectiveness depends on the interaction of individual skills with accessible technologies, credible information, supportive healthcare professionals, usable digital systems, appropriate educational programs, and enabling policies. This perspective is particularly important for NCD prevention and management because the chronic nature of these diseases requires continuous patient participation, repeated health-related decisions, and sustained interaction with both information and healthcare services. At the same time, the expanding availability of digital resources creates the possibility of supporting

patients between clinical encounters, facilitating self-monitoring, encouraging lifestyle modification, and improving access to guidance. Nevertheless, these benefits cannot be assumed merely because technologies exist; they depend on whether patients and professionals can use them critically, confidently, safely, and effectively.

Despite the rapid expansion of the literature, important limitations remain in the available evidence. Existing studies differ substantially in their definitions and measurement of eHealth literacy, target populations, healthcare contexts, digital environments, and evaluated outcomes (7). Many studies have concentrated on describing eHealth literacy levels or identifying associated factors rather than examining how different components of eHealth literacy operate across the prevention-to-management continuum of chronic disease. Intervention evidence is also heterogeneous, and further clarification is needed regarding which educational strategies produce sustainable improvements and how those improvements translate into meaningful health outcomes (22). At the same time, implementation research shows that even improvements in users' capabilities may be insufficient without appropriate organizational infrastructure and implementation support (4). These issues underscore the importance of integrating individual, educational, technological, professional, and system-level evidence rather than examining each dimension in isolation.

Accordingly, there is a need for an integrative synthesis that places eHealth literacy specifically within the context of chronic noncommunicable disease prevention and management, while simultaneously considering its determinants, behavioral and clinical implications, barriers to effective digital engagement, and strategies for improvement. Such a synthesis is particularly relevant as healthcare systems increasingly depend on digital channels to deliver health information and services and as chronic disease populations assume greater responsibility for self-management. Clarifying the current evidence can help identify areas in which eHealth literacy can strengthen prevention, informed decision-making, treatment adherence, self-care, digital service utilization, and patient-provider interaction while also revealing inequalities and implementation challenges that may prevent these benefits from being realized.

Therefore, the present study aimed to review and synthesize the existing evidence on the role of eHealth literacy in the prevention and management of chronic noncommunicable diseases, with particular attention to its determinants, outcomes, barriers, and strategies for its promotion.

2. Methods and Materials

The present study was conducted as a narrative review to examine the role of eHealth literacy in the prevention and management of chronic noncommunicable diseases. To identify and retrieve relevant evidence, a comprehensive literature search was performed in major international databases, including PubMed, Scopus, Web of Science, ScienceDirect, and Google Scholar, as well as Iranian databases, including the Scientific Information Database (SID), Magiran, and Civilica. The search strategy was developed using the keywords "eHealth literacy," "digital health," "chronic noncommunicable diseases," "prevention," and "disease management," combined with the Boolean operators AND and OR. The search was limited to articles published between 2020 and 2026. The inclusion criteria comprised original research articles, review articles, systematic reviews, and meta-analyses published in peer-reviewed journals, available in full text, and directly addressing the role of eHealth literacy in the prevention or management of chronic noncommunicable diseases. Studies were excluded if they were duplicate publications, conference abstracts, theses, non-scientific reports, publications lacking scientific credibility, or were not directly relevant to the objectives of the present review. Following the initial search, all retrieved records were screened based on their titles, abstracts, and full texts. Studies that met the eligibility criteria and demonstrated the greatest relevance to the objectives of the review were included in the final analysis. The extracted data were subsequently organized according to the main themes of the review, including the concept of eHealth literacy, factors influencing eHealth literacy, its role in the prevention and management of chronic noncommunicable diseases, strategies for promoting eHealth literacy, and existing research gaps. The findings were synthesized using a descriptive-analytical approach to provide a comprehensive overview of the current state of knowledge in this field.

3. Findings and Results

The review and analysis of studies published between 2020 and 2026 indicate that eHealth literacy has emerged as a fundamental component of digital health and a key determinant in the prevention, control, and management of chronic noncommunicable diseases. The findings demonstrate that individuals with higher levels of eHealth literacy are better able to search for, critically evaluate, and appropriately apply reliable health information. Consequently, they exhibit greater engagement in self-care, healthier lifestyle behaviors, improved adherence to treatment, more informed health-related decision-making, and more effective utilization of digital health services. Furthermore, the reviewed evidence suggests that eHealth literacy not only contributes to improved health outcomes but also enhances patient–provider communication, reduces reliance on health misinformation, and supports higher-quality health-related decision-making. The findings also indicate that eHealth literacy is influenced by multiple determinants, including individual characteristics,

educational attainment, access to digital technologies, the quality of communication infrastructure, organizational support, and health system policies (see Table 1).

Across the reviewed studies, educational interventions, empowerment programs, the expansion of digital health infrastructure, the development of credible digital health content, training in health information appraisal skills, and greater involvement of universities and healthcare organizations were consistently identified as the principal strategies for improving eHealth literacy. In addition, the review of the existing literature revealed that although numerous studies have investigated the status of eHealth literacy across different population groups, important research gaps remain. These include the lack of context-specific models, the limited number of interventional studies, the scarcity of longitudinal investigations, and the absence of comprehensive frameworks for promoting eHealth literacy among individuals with chronic noncommunicable diseases. These gaps underscore the need for further research in this field (see Figure 1).

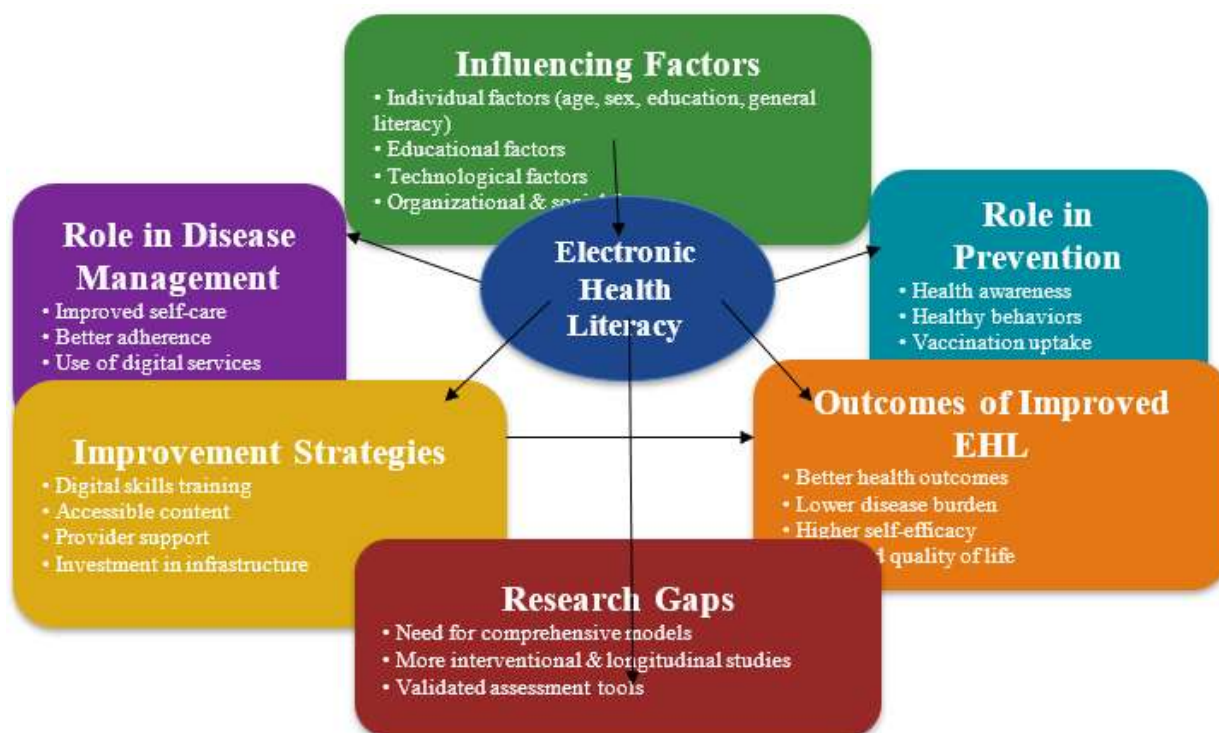
Table 1

Summary of main findings of the review of studies.

Findings	Summary of Findings
General status of studies	Research trends indicate an increase in attention to e-health literacy in recent years.
Role in prevention	Increasing awareness, lifestyle modification, participation in screening, and reducing risk factors for chronic diseases.
Role in disease management	Improving self-care, adherence to treatment, informed decision-making, and effective use of digital health services.
Effective factors	Individual, educational, technological, and organizational factors have the greatest impact on e-health literacy.
Improvement strategies	Education, development of digital infrastructure, production of reliable content, policymaking, and participation of universities and health organizations.
Improvement strategies	Lack of indigenous models, intervention studies, longitudinal studies, and evaluation of the effectiveness of e-health literacy promotion programs.

Figure 1

The role of eHealth literacy in the prevention and management of noncommunicable diseases.



4. Discussion and Conclusion

The findings of the present review indicate that eHealth literacy has become a fundamental component of contemporary digital healthcare and plays an important role in both the prevention and management of chronic noncommunicable diseases. The synthesis of the reviewed evidence showed that individuals with higher levels of eHealth literacy are generally better able to search for relevant health information, evaluate its credibility, interpret digital health content, and apply the acquired information in health-related decision-making. These competencies appear to facilitate health-promoting behaviors, self-care, adherence to treatment, appropriate use of digital health services, and more active participation in disease management. At the same time, the review demonstrated that eHealth literacy is not determined solely by individual digital skills; rather, it is influenced by a combination of individual, educational, technological, organizational, and social factors. The results further identified education, improvement of digital infrastructure, production of reliable health information, organizational support, and supportive

polymaking as major strategies for strengthening eHealth literacy. Finally, the review revealed several important gaps in the current evidence base, including the limited number of longitudinal and interventional studies, the lack of context-specific models, and insufficient evaluation of comprehensive eHealth literacy promotion programs.

The finding that eHealth literacy contributes to the prevention of chronic noncommunicable diseases can be explained by its influence on individuals' capacity to obtain and use health information before disease develops or progresses. Effective prevention increasingly requires individuals to recognize modifiable risk factors, interpret health recommendations, assess the credibility of online information, and translate such information into everyday behaviors. Health literacy has been identified as a central element of NCD prevention because it enables people to make informed choices concerning lifestyle, risk reduction, screening, and preventive healthcare (2). The present findings are also consistent with evidence showing that health literacy is associated with physical activity, one of the most important behavioral factors in chronic disease prevention (11). Similarly, systematic evidence has demonstrated a relationship between eHealth literacy and

health-related behaviors, indicating that people with greater capacity to navigate electronic health information are more likely to engage in beneficial health practices (10). Thus, eHealth literacy may contribute to prevention not merely by increasing exposure to information but by improving the quality of interpretation and application of that information.

The preventive role of eHealth literacy is particularly relevant in the current digital environment, in which individuals are exposed to large volumes of health information from websites, applications, social media, online communities, and other electronic sources. The availability of information does not necessarily lead to improved health behavior because users must be capable of distinguishing reliable evidence from misinformation, commercial claims, and unverified recommendations. From this perspective, eHealth literacy functions as a critical filter between information exposure and health-related action. The original eHealth literacy framework emphasized that individuals require a combination of analytical, informational, and technological skills to derive meaningful health benefits from electronic resources (6). More recent conceptual analyses have similarly shown that eHealth literacy encompasses multiple competencies beyond basic digital access, including understanding, critical appraisal, and application of electronic health information (7). Consequently, improved eHealth literacy can strengthen preventive behavior by helping individuals make evidence-informed decisions rather than simply increasing their access to digital information.

The findings also demonstrated that eHealth literacy has an important role in the management of established chronic disease. Chronic illnesses require continuous self-management, repeated decision-making, lifestyle adjustment, treatment adherence, symptom monitoring, and communication with healthcare professionals. In this context, patients with greater eHealth literacy are better positioned to locate disease-specific information, understand treatment instructions, interpret health indicators, use digital monitoring technologies, and communicate more effectively with healthcare providers. This interpretation is supported by the systematic review and meta-analysis of patients with common chronic diseases, which emphasized the relevance of digital health literacy for patients who must continuously interact with health information and digital services as part

of long-term disease management (12). Similarly, evidence concerning determinants and outcomes of eHealth literacy in adults indicates that higher literacy is associated with favorable health-related outcomes and more effective engagement with health information (13).

The growing use of mobile health technologies further strengthens the relationship between eHealth literacy and chronic disease management. Mobile applications, remote monitoring systems, telemedicine, and other digital tools can support medication management, symptom tracking, behavioral modification, communication, and continuity of care. However, the benefits of these technologies are contingent upon patients' and healthcare professionals' ability to use them correctly and interpret the information they generate. Studies of healthcare providers' experiences with mHealth for chronic noncommunicable diseases have shown that such technologies may facilitate management and follow-up, while their effectiveness is influenced by usability, resources, digital competence, organizational readiness, and professional acceptance (20). This supports the present review's conclusion that eHealth literacy should not be viewed as an isolated personal characteristic but as one component of a broader digital health ecosystem.

Another important finding concerned the multidimensional determinants of eHealth literacy. The reviewed evidence indicated that age, education, socioeconomic status, digital experience, self-efficacy, access to technology, quality of digital infrastructure, and organizational support can all influence an individual's ability to use digital health information effectively. This finding is consistent with the systematic review and meta-analysis by Estrela et al., which identified significant sociodemographic determinants of digital health literacy and showed that digital health competencies are unequally distributed across population groups (15). Likewise, a recent global systematic review and meta-analysis found that eHealth literacy is influenced by a broad range of demographic, socioeconomic, behavioral, psychological, and technology-related factors (16). These findings suggest that inadequate eHealth literacy should not be interpreted simply as an individual deficiency. Rather, it may reflect broader inequalities in education, technology access, digital exposure, social resources, and healthcare environments.

The influence of contextual factors is also evident in Iranian studies. Research among patients referring to a military hospital in Tehran indicated that eHealth literacy is associated with multiple predictive factors, emphasizing the importance of demographic and contextual characteristics in determining individuals' capacity to access and use electronic health information (25). Similarly, research among students at Gonabad University of Medical Sciences showed variability in Internet-based eHealth literacy even within a relatively educated population (26). Reviews of Iranian research have also suggested that eHealth literacy has received increasing attention but that differences remain across populations and methodological approaches (27). Together, these findings reinforce the need for context-sensitive interventions rather than assuming that a single educational strategy can be equally effective across all populations.

The results of the present review further highlighted the importance of healthcare professionals' digital health literacy. Healthcare providers increasingly use electronic health records, telemedicine systems, online evidence resources, decision-support tools, and digital communication platforms. Their competencies therefore influence not only their own professional performance but also patients' ability to navigate digital healthcare environments. A systematic review among hospital healthcare providers demonstrated variability in eHealth literacy and identified the need for greater attention to digital competencies within professional education (17). More recent evidence has similarly shown that digital health literacy among healthcare professionals is shaped by individual, educational, professional, and organizational determinants (18). Andersson also emphasized that digital health literacy is a key requirement for healthcare professionals to realize the potential value of digital technologies in clinical practice (19). These findings support the present review's conclusion that improving eHealth literacy should involve both patients and healthcare personnel.

The finding that educational interventions represent a major strategy for enhancing eHealth literacy is also strongly supported by previous studies. Education can improve information-searching skills, critical appraisal, digital confidence, recognition of misinformation, and effective use

of electronic health services. The scoping review of eHealth literacy interventions showed increasing use of structured educational strategies aimed at strengthening digital health competencies, although considerable heterogeneity exists in program design, target groups, and outcome measures (22). In Iran, an intervention based on Freire's educational model among healthcare providers demonstrated the feasibility of using structured and theory-based educational approaches to improve eHealth literacy (23). Similarly, research into health literacy education among patients with diabetes has highlighted the need for multidimensional educational programs adapted to patients' specific needs and healthcare environments (24). These findings suggest that education should move beyond passive information provision and instead develop practical competencies for searching, evaluating, interpreting, and applying digital health information.

The role of universities and educational institutions is particularly important in this regard. Incorporating digital health competencies into professional and academic curricula may help prepare future health professionals for technology-intensive healthcare environments. Educational institutions can also contribute through e-learning systems and innovative models that improve digital learning and information-management skills. The development of e-learning models for medical universities illustrates the broader institutional potential of educational systems to support digital competency development (31). At the community level, social media and other communication platforms may also contribute to health education when they disseminate reliable and understandable information. Research conducted in Iran has shown that factors related to social media use can influence citizens' eHealth literacy, particularly during health crises (28). However, because social media also facilitates misinformation, educational efforts must incorporate critical appraisal and source-evaluation skills.

The findings also showed that technological and organizational infrastructure is necessary for translating eHealth literacy into meaningful health outcomes. Even highly literate users may struggle to benefit from digital health services when platforms are difficult to use, Internet access is unreliable, systems are fragmented, or organizational support is lacking. Reviews of national

eHealth implementation have identified governance, infrastructure, interoperability, stakeholder engagement, organizational readiness, and implementation capacity as important determinants of success (5). More recent evidence concerning digital health technology implementation similarly identifies organizational, technical, workflow, and human factors as critical barriers and facilitators (4). Therefore, strategies aimed at improving eHealth literacy should not focus exclusively on changing individuals; they should also improve the environments in which digital health competencies are exercised.

Security and privacy represent another important dimension of this issue. Digital health systems routinely process sensitive medical information, and concerns about confidentiality, unauthorized access, and data misuse can reduce users' willingness to engage with digital services. A systematic review of secure mobile health application development identified numerous security-related challenges that may compromise confidence in digital health technologies (21). Trust is therefore likely to influence whether eHealth literacy translates into actual digital health use. Individuals may possess adequate digital skills yet avoid electronic services if they perceive systems as unsafe or unreliable. Accordingly, the development of secure, transparent, and user-centered digital health platforms is complementary to educational efforts.

The present review also identified broader policy implications. Health literacy promotion is most effective when supported by institutional and public policy frameworks rather than treated solely as an individual responsibility. Research in Iran has emphasized relationships among health literacy, health-promoting behaviors, and relevant policies, suggesting that organizational and policy-level measures are essential for population-level improvement (29). Reviews of digital health literacy similarly emphasize the need for comprehensive strategies involving education, reliable information resources, infrastructure, and policy support (30). The Global Digital Health Partnership likewise recognizes digital health literacy as an important foundation for equitable engagement with digital health systems (9). These perspectives are consistent with the present findings and suggest that digital health literacy should be integrated

into broader NCD prevention and health-system transformation policies.

Finally, the research gaps identified in the present review are important for interpreting the existing literature. Much of the evidence remains descriptive or cross-sectional, limiting conclusions about causality and long-term changes in eHealth literacy. Furthermore, variation in definitions and measurement approaches complicates comparisons across studies (7). Although intervention research is growing, the available programs differ substantially in duration, content, populations, and outcome assessment (22). The literature also indicates that successful digital health implementation depends on complex interactions between users, technologies, healthcare organizations, and policy environments (4). Therefore, the future development of the field requires greater methodological standardization, longitudinal evidence, intervention trials, context-specific models, and evaluation of whether improvements in eHealth literacy ultimately produce sustained changes in clinical and behavioral outcomes. Overall, the findings of the present review support the conclusion that eHealth literacy is a strategic capability for chronic disease prevention and management and that its promotion requires coordinated educational, technological, organizational, and policy-level action.

The present review has several limitations that should be considered when interpreting its findings. First, because the study was conducted as a narrative review rather than a systematic review or meta-analysis, the process of study identification, selection, and synthesis did not include all of the methodological procedures typically required for formal systematic evidence synthesis, which may have increased the possibility of selection bias. Second, the included studies differed considerably in their populations, conceptual definitions, measurement instruments, health conditions, digital environments, and reported outcomes, limiting direct comparison across studies. Third, the literature on eHealth literacy is rapidly evolving, and newly emerging technologies such as artificial intelligence-based health assistants, advanced wearable devices, and generative digital health platforms may not yet be adequately represented in the available evidence. Fourth, much of the reviewed evidence was cross-sectional, restricting causal interpretation of relationships between eHealth literacy and

health outcomes. Finally, differences in healthcare systems, socioeconomic conditions, digital infrastructure, and cultural characteristics across countries limit the extent to which findings can be generalized uniformly to all populations and settings.

Future research should place greater emphasis on longitudinal, experimental, and intervention-based designs capable of clarifying the causal and temporal relationships between eHealth literacy and chronic disease outcomes. Randomized controlled trials are needed to evaluate the effectiveness of different educational approaches and to determine which intervention components produce sustainable improvements in digital health competencies, self-care, treatment adherence, and health-related behaviors. Researchers should also develop and validate context-specific models and measurement instruments that reflect cultural, linguistic, socioeconomic, and technological differences across populations. Greater attention should be directed toward older adults, individuals with limited general literacy, rural populations, people with disabilities, socioeconomically disadvantaged groups, and patients with multiple chronic conditions. Future studies should additionally examine emerging technologies, including artificial intelligence, conversational health agents, wearable devices, remote monitoring platforms, and personalized digital interventions, while evaluating issues of usability, trust, security, equity, and misinformation. Comparative and implementation studies across different healthcare systems would also help identify the organizational and policy conditions required for successful eHealth literacy promotion.

In practice, healthcare systems should treat eHealth literacy as an integral component of chronic disease prevention and management rather than as an optional digital skill. Healthcare organizations should provide structured and continuous training for both patients and professionals in searching for health information, evaluating source credibility, recognizing misinformation, interpreting digital health data, and using telemedicine, patient portals, and mobile health applications. Educational programs should be adapted to users' literacy levels, cultural backgrounds, age, disease characteristics, and access to technology. Health authorities and healthcare institutions should also improve access to reliable, comprehensible, and user-friendly digital

health information while strengthening Internet and technological infrastructure in underserved communities. Digital health developers should apply user-centered design principles, ensure privacy and data security, and involve patients and healthcare professionals throughout system development. Finally, eHealth literacy indicators should be incorporated into chronic disease prevention programs, professional education, institutional quality-improvement initiatives, and national digital health strategies so that the effectiveness and equity of digital healthcare can be continuously evaluated and improved.

Authors' Contributions

All authors contributed substantially to the study and to manuscript development, and all approved the final version.

Declaration

The authors declare that artificial intelligence tools were used only to assist with language editing, translation, and improvement of the manuscript's readability. All conceptualization, study design, data collection, data analysis, interpretation of findings, and final approval of the manuscript were performed by the authors. The authors take full responsibility for the accuracy, integrity, and originality of the content.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

The study placed a high emphasis on ethical considerations. Informed consent obtained from all participants, ensuring they are fully aware of the nature of the study and their role in it. Confidentiality strictly maintained, with data anonymized to protect individual privacy. The study adhered to the ethical guidelines for research with human subjects as outlined in the Declaration of Helsinki.

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