

Health Literacy Research Mapping in Iran: ISC Database Evidence

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Background and Objectives: The purpose of this study is to understand the trends in the field of health literacy within the Islamic World Science Citation Center (ISC) database between 2007 and 2024 and to identify the important sub-fields and dimensions of the health literacy concept.

Materials and Methods: This research used bibliometric techniques and co-word analysis. A total of 385 documents were extracted from the ISC database to identify the trends in health literacy-related research. Data processing and network mapping were performed using BibExcel, VOSviewer, and UCINET software. Cluster analysis and strategic diagrams were employed to map the conceptual structure of the studies and identify sub-fields and their interrelationships within this domain.

Results: The findings reveal the existence of ten clusters in this field: (1) Information and media literacy, and the role of libraries in public health; (2) Psychometrics and the validation of health literacy assessment tools; (3) Health literacy, self-care, and quality of life; (4) Lifestyle and coping with diseases; (5) Oral and dental health literacy; (6) Patient e-health literacy; (7) Education and health-promoting behaviors; (8) Educational interventions and preventive behaviors; (9) The health status of women and the older adults; and (10) Diabetes, attitudes, and marital satisfaction.

Conclusion: Through the structural analysis of the articles, emerging topics in health literacy, such as patient e-health literacy and Information and media literacy, and the role of libraries in public health, were identified. The results of this study can serve as a practical roadmap for researchers to enter novel areas within the health literacy domain. Furthermore, it provides a comprehensive perspective on the paradigm shifts within health knowledge.

Keywords: Health Literacy, Health Promotion, Health-Oriented Behaviors, Co-word Analysis, ISC Database

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Introduction

The complexities of the healthcare system and the massive volume of medical information have required individuals to possess competencies beyond basic reading and writing abilities, which are manifested in the core concept of "health literacy". Although having an optimal level of basic literacy is a prerequisite for this, the term encompasses a concept far beyond basic literacy skills (1). The importance of this competency becomes particularly evident when confronting the ambiguity of the healthcare system's structure, the increasing prevalence of chronic diseases, and the necessity for patients to perform complex self-management tasks. Health literacy encompasses a set of skills, knowledge, and self-confidence required to understand information, actively participate in personal and social health, and become familiar with care systems. Promoting these skills contributes to disease prevention and reducing hospitalization rates. In contrast, health literacy is associated with a decline in quality of life, adverse health outcomes, and the inability of individuals to make informed decisions (2).

As perspectives on health have become more complex, this concept has also evolved from a narrow definition, functional health literacy for understanding simple instructions into a set of interconnected dimensions and a multifaceted construct. For instance, the concept of critical health literacy emerged to emphasize the ability to critically evaluate information and participate in decision-making (3). More recently, the rapid integration of advanced technologies, particularly Large Language Models (LLMs) and conversational Artificial Intelligence (AI) like ChatGPT, has fundamentally transformed digital health literacy from a mere search skill into a complex competency for discerning accurate AI-generated health information from algorithmic hallucinations (4). Following this evolution, researchers realized that the responsibility for health literacy should not rest solely on the individual; this paradigm shift led to the emergence of the concepts of individual health literacy and organizational health literacy, encouraging organizations to make their processes more accessible (5). Concurrently, more specialized dimensions, such as mental health literacy and sexual health literacy, were introduced to address specific societal needs. A deficit in understanding and applying all these areas is associated with exacerbated health disparities and poor treatment outcomes; thus, promoting it is recognized as a powerful tool for empowering individuals and achieving social equity (6).

Today, health literacy is recognized as a key, dynamic, and multidimensional indicator of social development. However, the fundamental issue is that the rapid expansion and evolution of these concepts, from functional and critical dimensions to organizational and digital ones, have led to high fragmentation and diversity in how various dimensions of health literacy are used, defined, and focused upon in the scientific literature. In Iran, numerous studies have been conducted in this field; nevertheless, it remains unclear how the conceptual structure of health literacy has been formed in the scientific outputs of Iranian researchers. To achieve a precise mapping of the domestic context, the Islamic World Science Citation Center (ISC) was selected as the most comprehensive regional database covering Iranian scientific journals. However, the lack of a comprehensive picture of which dimensions of health literacy have received more attention in domestic articles, how concepts are interconnected, and what research gaps exist in this area is considered a serious research gap.

Without understanding and analyzing the conceptual map of this field, policymakers and healthcare researchers in Iran cannot grasp current scientific trends and future needs. Therefore, the present study seeks to answer the following question: What is the conceptual structure of health literacy in Persian articles indexed in the Islamic World Science Citation Center (ISC)? Furthermore, what patterns and topics does the communication network of these concepts reveal in the Iranian scientific literature? Answering this question and mapping the scientific landscape of this field can provide a valuable guide for directing future research, macro-level policymaking, and formulating targeted interventions within the country's healthcare system.

Literature Review

Co-word analysis has been utilized in many fields, such as: information literacy (7), financial literacy (8), digital literacy (9), throbbing headaches (10), and resistance economy (11).

A review of the literature indicates that in recent years, multiple studies have attempted to map the conceptual and intellectual structure of health literacy and its related fields at the international level. In a comprehensive overview, Baji et al., while examining the intellectual structure of the health literacy field, identified eight thematic clusters in which healthcare, psychiatry and psychology, public health, social sciences, communication, health services, and medical education had the highest levels of centrality. This integrated structure demonstrates the capacity of health literacy to create a bridge between medical sciences and humanities

(12). In this regard, Karamali et al., by mapping the evolution of this knowledge over time, showed that the keywords communication, depression, health education, and the internet had the highest frequencies, and health literacy concepts were networked into three main clusters (lifestyle, information technology, mental health literacy, and chronic diseases), necessitating synergy among experts from various fields (13). Similarly, Paucar-Caceres found that global research is predominantly focused on public/environmental/occupational health, environmental sciences, health policymaking, healthcare sciences, and communication, with an emerging focus on adult health literacy, low functional literacy, and their roles in promoting empowerment (14).

With the expansion of the dimensions of this concept, research has also shifted toward more specialized domains. Regarding digital health literacy, Yang et al. demonstrated that the definition and assessment tools of health literacy, its relationship with health outcomes and the digital divide, and its influencing factors are the main topics of highly cited articles, and promoting this dimension holds significant potential for reducing health disparities (15). In the area of mental health literacy, Zeng et al. found that the research focus has shifted toward education and interventions, resulting in the formation of seven distinct clusters; understanding these provides a foundation for developing macro-level public health strategies (16). In the field of health information, Xu et al. showed that the internet, health information, health information technology, health literacy, and information exchange are the most widely used topics, and there is a close relationship between COVID-19, mental health, public health, and health information seeking; furthermore, privacy and youth health information were identified as emerging areas for researchers and journal editors (17).

In addition to the direct dimensions of health literacy, interwoven macro-concepts have also been subjected to structural analysis. Makizadeh and Ebrahimi, in their review of the health communication field, reported an upward growth in scientific outputs and identified six thematic clusters dominated by the COVID-19 pandemic, health education, and vaccine hesitancy (18). Finally, in the area of health equity, Sarikhani et al. demonstrated that topics have shifted from foundational discussions such as healthcare, health economics, social determinants of health, and race and ethnicity before COVID-19, to topics like the healthcare workforce, risk factors, maternal and child health, COVID-19, cancer, and mental health in the

post-pandemic era. Concepts such as artificial intelligence, racial inequality, and machine learning have been introduced as key and emerging topics (19).

A review of the aforementioned studies shows that although the evolution and conceptual structure of health literacy and its dimensions at the international level have been well analyzed and clustered, how this conceptual structure has been formed within the context of Persian articles and among Iranian researchers in the ISC database has received less attention; a gap that the present study seeks to fill.

Materials and Methods

Type of the Study

This research is a quantitative, descriptive study that utilized a bibliometric approach and co-word analysis.

Sample

The study population comprised all scholarly documents indexed in the Islamic World Science Citation Center (ISC) database. The specific sample for this study consisted of 385 articles, which were selected and extracted based on the presence of the concept "health literacy" in the title field of the documents.

Materials and Methods of Data Collection

On April 23, 2024, a systematic search was conducted in the Islamic World Science Citation Center (ISC) database with no time restrictions, retrieving documents published between 2007 and 2024. The search strategy utilized the keyword "health literacy" restricted to the "title" field. After applying inclusion criteria (limiting the selection to peer-reviewed research articles) and removing duplicate records, a final sample of 385 articles was extracted. Data extraction, processing, and analysis were performed using Microsoft Excel, BibExcel, UCINET, and VOSviewer. Through multi-stage, 1,420 author keywords were collected. To ensure bibliometric accuracy, these keywords underwent a rigorous cleaning and standardization process. Synonyms, plural/singular forms, and overlapping terms (e.g., merging "e-health literacy" and "digital health literacy," or standardizing variations of "quality of life") were mapped, ultimately yielding 448 unique concepts.

Data Processing and Analysis Procedure

As this is a bibliometric study, the intervention consists of the chronological, step-by-step procedure of data processing, matrix generation, and network mapping.

Concept Extraction & Filtering: The plain text files were imported into BibExcel. Using its natural language processing techniques, the main concepts were extracted based on the standardized author keywords. A cut-off threshold was set at 3, meaning concepts had to appear simultaneously in at least two documents a minimum of three times. The selection of this threshold is scientifically justified by the interdisciplinary nature of health literacy, which bridges medical sciences and social sciences/humanities. In such domains, owing to lexical diversity, the breadth of abstract concepts, and the prevalent use of synonyms, the frequency distribution of keywords is more dispersed compared to pure medical or basic sciences. Consequently, based on the literature, adopting a threshold of 3 serves as an optimal point; it effectively eliminates random terms, typographical errors, and insignificant words while preventing the omission of lower-frequency key concepts, thereby preserving the richness and structural integrity of the conceptual network (11).

Matrix generation and network mapping: Based on the selected cut-off point, a 106x106 symmetric matrix was created in a plain-text file, with the values of the diagonal cells set to zero. This was then converted into a correlation matrix and saved in Excel format. The correlation matrix was imported into VOSviewer. This software measured the association strength between the remaining concepts meeting the threshold—indicating the extent to which two concepts appear together simultaneously compared to other concepts in the sample records (20, 21). The resulting clusters were subsequently named based on the respective weight of the concepts and the consensus of an expert panel. To ensure validity and transparency, the panel consisted of three specialists: two experts in Scientometrics, and one expert in Health Education and Promotion. Initially, the experts independently reviewed the highly weighted concepts and the topological structure of each cluster. Subsequently, a consensus meeting was held to resolve any discrepancies and finalize the most representative and comprehensive title for each cluster.

Network Analysis Indicators and Clustering Algorithm

To establish the network analysis indicators and clustering algorithm, VOSviewer employs a clustering algorithm developed by Waltman and Van Eck, which is fundamentally similar to

the Louvain method. The primary objective of this algorithm is to maximize a modularity function. It structures the network such that the density of connections (edges) within each specific cluster is maximized, while the density of links between different clusters is minimized, ultimately yielding highly coherent thematic boundaries.

Furthermore, to construct the strategic diagram, UCINET software was employed to calculate two critical metrics based on Callon's method, Centrality and Density. "Density" measures the internal cohesion of a cluster by calculating the mean strength of the internal ties among the keywords within that specific cluster. Conversely, "Centrality" assesses the degree of external interaction, calculated by measuring the mean strength of the external ties between the keywords of a focal cluster and those of other clusters in the network (22).

Results

Frequency Distribution of Health Literacy Concepts Based on Co-word Analysis

The frequency distribution of the most highly used concepts during the studied period is displayed in **Table 1**.

Table 1. Top 20 most frequent author keywords in health literacy research (ISC, 2007-2024)

No.	Concept	Frequency	No.	Concept	Frequency
1	Health Literacy	309	11	Type 2 Diabetes	13
2	University Students	37	12	Disease	13
3	Self-Care	27	13	Employees	13
4	Quality of Life (QoL)	24	14	Adolescents	12
5	The Elderly	18	15	Media Literacy	12
6	Females	18	16	Breast Cancer	11
7	Self-Efficacy	16	17	eHealth Literacy	10
8	Patient	15	18	Preventive Behavior	10
9	School Students	15	19	Adults	10
10	Iran	15	20	Health	10

The analysis of the findings in Table 1, which displays the twenty most frequently used concepts in the field of health literacy based on co-occurrence, indicates the formation of the research structure of this field in Iran around several key axes. A major portion of these concepts focuses on specific target populations; the presence of terms such as university students, the elderly, females, patients, and adolescents demonstrates the diversity of the statistical populations in the articles and the researchers' concern for various strata, especially vulnerable groups. On the other hand, Iranian researchers have not viewed health literacy merely as an abstract concept but have linked it to behavioral and psychological outcomes. The presence of concepts such as self-care, quality of life, self-efficacy, and preventive

behavior proves that health literacy is considered a prerequisite for personal empowerment and the adoption of proactive health behaviors. Furthermore, the inclusion of diseases such as type 2 diabetes and breast cancer in this list suggests a close link between studies in this field and the management of chronic diseases, which require a precise understanding of information and continuous self-management by the patient. Finally, the emergence of concepts like media literacy and eHealth literacy alongside the word Iran indicates the alignment of domestic research with global trends and attention to the novel and digital dimensions of health.

Table 2 shows the concepts that have the highest co-occurrence with each other. These concepts appeared simultaneously in at least two documents.

Table 2. High-frequency co-occurring health literacy keyword pairs based on co-occurrence in at least two documents

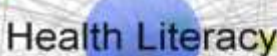
Rank	Co-occurrence	Frequency	Rank	Co-occurrence	Frequency
1	Health Literacy - University Students	31	13	Health Literacy - Diabetes	10
2	Health Literacy - Self-Care	26	14	Health Literacy - Disease	10
3	Quality of Life (QoL) - Health Literacy	22	15	Health Literacy - Adults	10
4	Health Literacy - Females	17	16	Health Literacy - Preventive Behavior	9
5	Health Literacy - Self-Efficacy	16	17	Adolescents - Health Literacy	9
6	Health Literacy - The Elderly	16	18	Health Literacy - Health Promotion	8
7	Health Literacy - Patient	14	19	COVID-19 - Health Literacy	8
8	Health Literacy - Iran	13	20	Smoking - Health Literacy	7
9	Health Literacy - Type 2 Diabetes	13	21	Health Literacy - Lifestyle	7
10	Health Literacy - School Students	12	22	Smoking - University Students	7
11	Health Literacy - Breast Cancer	11	23	Health Literacy - Pregnant Women	7
12	Employees - Health Literacy	11	24	Health Literacy - Education	7

The analysis of Table 2, which shows the words with the highest level of co-occurrence, indicates the conceptual networking of health literacy around three key axes: demographic groups, behavioral-psychological outcomes, and specific diseases. At the top of this table is the pair Health Literacy - University Students (with a frequency of 31), which, alongside the high co-occurrence of health literacy with females, the elderly, school students, patients, and pregnant women, indicates researchers' extensive focus on assessing this indicator in diverse and vulnerable target groups. Regarding outcomes, the deep connection of health literacy with concepts such as self-care, quality of life, self-efficacy, and preventive behavior confirms that in Iranian research literature, this construct is primarily studied as a vital prerequisite for empowering individuals, modifying lifestyles, and promoting health levels. Moreover, the

significant intersection of health literacy with chronic diseases like diabetes type 2 diabetes and breast cancer, as well as emerging crises like COVID-19, highlights the central role of this skill in clinical management and controlling health crises. Another notable point is the presence of concepts like Smoking - University Students and its connection to the category of education, indicating that domestic research has utilized the capacity of health literacy to intervene in high-risk youth behaviors and develop health education programs.

Knowledge Topography: Ten Conceptual Clusters in the Field of Health Literacy

To determine the number of clusters, the cluster analysis section of the VOSviewer software was utilized, the images of which are displayed in Figure 1 and Table 3. As is evident from this image, the concepts of the health literacy field during the studied period fall into ten clusters. The results derived from **Figure 1**, the co-word network map, show that the concepts in the field of health literacy are categorized into ten clusters: (1) Information and media literacy, and the role of libraries in public health; (2) Psychometrics and the validation of health literacy assessment tools; (3) Health literacy, self-care, and quality of life; (4) Lifestyle and coping with diseases; (5) Oral and dental health literacy; (6) Patient e-health literacy; (7) Education and health-promoting behaviors; (8) Educational interventions and preventive behaviors; (9) The health status of women and the older adults; and (10) Diabetes, attitudes, and marital satisfaction.



Network map of documents in

In **Table 3**, the names of the clusters and their important sub-clusters, along with the weight of each concept, are displayed. It should be noted that in this network, Weight1 refers to the Total Link Strength (TLS) of a node, indicating the cumulative strength of co-occurrence connections a specific concept has with other nodes in the network. A higher weight demonstrates the central and key position of that node in facilitating interaction within the network.

Table 3. Names of clusters and core concepts in the health literacy field

Cluster No.	Cluster Name	Concepts & Weight
1	Information and Media Literacy and the Role of Libraries in Public Health	Employees (56), Literacy (52), Health (48), Media Literacy (42), University of Medical Sciences (30), Mental Health Literacy (28), Library (28), Librarians (28), Public Health (22), Social Networks (22), Information Literacy (18), Citizens (18), Mental Health (16), Qualitative Study (16), Social Health (14), Library Users (14), Postpartum Depression (PPD) (12), Coronavirus (12), Primiparous Women (10).

¹ Weight refers to the Total Link Strength (TLS) metric generated by VOSviewer



2	Psychometrics and Validation of Health Literacy Assessment Instruments	Iran (564), Disease (62), Psychometrics (36), Adults (32), Factor Analysis (32), Questionnaire (30), Systematic Review (30), Health Literacy Questionnaire (28), Validation (24), Health Information Literacy (22), Knowledge (20), Instrument (18), Reliability (18), Validity (18), Surgery (16), Social Media (16), Media Consumption (14).
3	Health Literacy, Self-Care, and Quality of Life	Health Literacy (1122), Self-Care (118), Quality of Life (QoL) (110), Self-Efficacy (78), Type 2 Diabetes (60), Health Education (30), High Blood Pressure (30), Treatment Adherence (28), Self-Care Behavior (28), Well-being (26), Social Support (24), Heart Failure (HF) (22), Aging (16).
4	Lifestyle and Adaptation to Diseases	COVID-19 (46), Breast Cancer (44), Lifestyle (40), Health Promotion (32), Anxiety (26), Adaptation (18), University (16), Married Women (16).
5	Oral and Dental Health Literacy	Child (44), Mothers (42), Oral Health Literacy (34), Oral Health (32), Pregnancy (26), Health Behavior (20), Hygiene (16), Oral and Dental (14), Parents (12),
6	Patients' eHealth Literacy	Patient (62), Pregnant Women (38), eHealth Literacy (30), Health Information (28), Hospital (22), Expectant Mothers (20), Prenatal Care (20), Healthcare Centers (16), Multiple Sclerosis (MS) (10),
7	Education and Health-Promoting Behaviors	School Students (62), Adolescents (50), Education (36), Health-Promoting Behaviors (32), Menopause (16), Family Health (14), Body Mass Index (BMI) (12), Health-Oriented Behavior (10),
8	Educational Interventions and Preventive Behaviors	University Students (160), Preventive Behavior (54), Smoking (54), Health Belief Model (HBM) (30), Healthy Lifestyle (18), Health-Related Quality of Life (HRQoL) (18), Educational Intervention (18),
9	Health Status of Females and the Elderly	The Elderly (74), Females (66), Healthcare Services (28), Demographic Variables (14), General Health Status (14), Health Status (12),
10	Diabetes, Attitude, and Marital Satisfaction	Diabetes (50), Attitude (48), Marital Satisfaction (30), Awareness (22), Sexual Satisfaction (22), Behavior (10),

Table 3 presents the 10 main clusters discovered in the co-word network of the health literacy field, along with their key concepts and their respective weights. Examining the data in this table shows that Cluster (3) forms the central core and the main axis of research in this field; such that the concept of health literacy in this cluster holds the highest weight in the entire network, followed by self-care and quality of life, which have the greatest prominence. This indicates the link between health literacy and the personal management of diseases and the enhancement of patients' living standards. Additionally, the presence of the concept Iran with a notably high weight (564) in Cluster (2) is highly significant. While Iran is inherently a geographic tag and such terms may filtered out in bibliometric networks, it was deliberately retained in this study. The primary justification is that in the context of health literacy, Iran

does not merely denote a location; it represents a specific methodological approach focused on the localization and psychometric validation of international assessment tools for the Iranian demographic. Filtering out this term would have disrupted the topological structure of Cluster (2) (Psychometrics and the validation of health literacy assessment tools) and obscured the extensive efforts of Iranian researchers in adapting global knowledge to domestic contexts. From a demographic and audience-targeting perspective, several clusters are dedicated to specific groups; for instance, Cluster (8), centered on educational interventions, focuses on university students and preventive behaviors. In the same vein, Cluster (7) addresses school students and adolescents, Cluster (9) focuses on females and older people, and Cluster (5) deals with children and mothers, illustrating the breadth and diversity of target populations in health literacy studies.

Furthermore, the results indicate that novel and environmental dimensions of health literacy have also caught the attention of researchers. Cluster (1) emphasizes the role of information infrastructures such as libraries, media literacy, and social networks, while Cluster (6) addresses the growing importance of eHealth literacy among patients. Ultimately, the attention to specific diseases in Cluster (4) and Cluster (10) expresses a problem-oriented and clinical approach in a portion of the scientific outputs of this domain.

Strategic Position of Research Clusters

After forming the matrix for each of the clusters and importing it into the UCINET software, the centrality and density scores of the clusters were determined, and a strategic diagram was drawn. It should be noted that the origin of the diagram, based on the mean centrality and density of the clusters, was set at 7.14 and 0.793, respectively. The scores related to the density and centrality of the clusters are displayed in **Table 4**.

Table 4. Density and centrality of clusters derived from the co-word analysis of the health literacy field

NO.	Cluster name	Density	Centrality
1	Information and media literacy, and the role of libraries in public health	0.295	5.6
2	Psychometrics and the validation of health literacy assessment tools	0.353	6
3	Health literacy, self-care, and quality of life	1.857	24.143
4	Lifestyle and coping with diseases	0.472	3.778
5	Oral and dental health literacy	0.944	7.556
6	Patient e-health literacy	0.528	4.222
7	Education and health-promoting behaviors	0.607	4.25



Mashhad University of Medical Sciences



8	Educational interventions and preventive behaviors	1.476	8.857
9	The health status of women and older adults	0.6	3
10	Diabetes, attitudes, and marital satisfaction	0.8	4

Cluster (3), with a value of 24.143, has the highest centrality, and with a value of 1.857, it possesses the highest density. This means there is a high level of connectivity within the co-occurrence network of concepts in this cluster. The highest centrality in terms of influence, connection with other topics, and linking exists in Cluster 3.

The strategic diagram describes the internal relationships and correlation among different thematic clusters. In this diagram, the horizontal axis is often used to present centrality, and the vertical axis is used to present density (23). Melcer et al. introduce the strategic diagram as an attempt to better visualize and display the maturity and cohesion of thematic clusters within a research field (24).

As shown in **Diagram 1** (Strategic Diagram), the diagram is divided into four sections, each forming a quadrant. Clusters located in the first quadrant are cohesive and central to the research field. These main clusters focus on a large portion of the network. Clusters in the second quadrant remain cohesive but lack centrality, each representing smaller, specialized segments of the research area. In the third quadrant, clusters break down; these are the emerging or declining parts of the network. Finally, the fourth quadrant contains clusters that have not yet matured but possess the potential to become core components (25, 26).

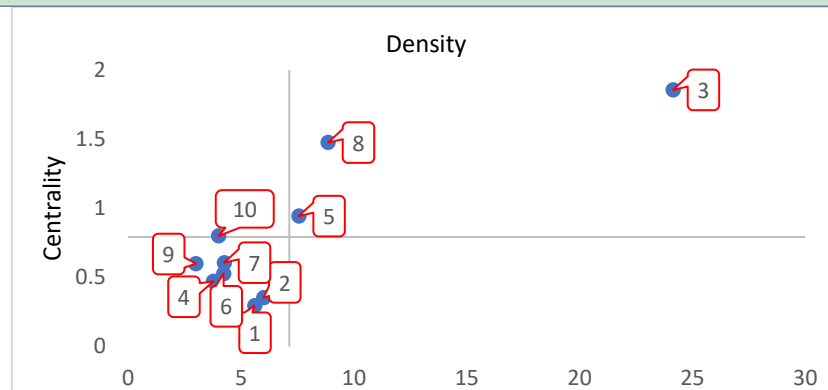


Diagram 1. Strategic Diagram of the Health Literacy Field

According to the strategic diagram, in the first quadrant, (3) Health literacy, self-care, and quality of life; (5) Oral and dental health literacy; and (8) Educational interventions and preventive behaviors are the core thematic clusters of this field. These clusters are cohesive, hold centrality within the research area, and focus on a large segment of the network. The cluster (10) Diabetes, attitudes, and marital satisfaction, which is located in the second quadrant of the diagram, is positioned lower in terms of importance and impact in the research field compared to the first quadrant clusters. This cluster remains cohesive but lacks centrality, representing a smaller, specialized segment of the research area. The clusters (1) Information and media literacy, and the role of libraries in public health; (2) Psychometrics and the validation of health literacy assessment tools; (4) Lifestyle and coping with diseases; (6) Patient e-health literacy; (7) Education and health-promoting behaviors; and (9) The health status of women and the older adults are the emerging or declining parts of the network. The fourth quadrant displays clusters that have not yet matured but have the potential to become core segments; in the present study, no cluster was placed in this section.

Discussion

The current study aimed to map the conceptual and intellectual structure of the health literacy field in scientific outputs indexed in the ISC database. An examination of the strategic diagram and the indices of centrality and density illuminates the hidden angles and evolution patterns of this field in Iran across four analytical quadrants. Comparing these findings with global research literature reveals the extent to which domestic literature has moved in tandem with international trends.

The analyses show that clusters (3), (8), and (5) are located in the first quadrant, indicating the maturity and centrality of these topics as the central core of the co-word network in the

field of health literacy. Cluster (3) holds the highest degree of centrality and density by a significant margin. The concepts of this cluster, such as health literacy, self-care, quality of life, type 2 diabetes, and high blood pressure, show that the ultimate goal of this field is to link health literacy with patients' practical actions and the improvement of their quality of life. This deep connection with chronic diseases aligns with the findings of Karamali et al., who identified health education and chronic diseases as major networked clusters at the international level (15). Alongside this, Cluster (8), focusing on university students, preventive behavior, and health belief models, represents the interventional aspect of these studies. These findings are consistent with the results of the study by Zeng et al., which noted a shift in global research trajectories toward education and interventions (18). Furthermore, the presence of Cluster (5), containing concepts such as child, mothers, oral health, and pregnancy, proves that oral and dental health literacy in vulnerable groups has emerged from being a marginal topic and has made its way into the core of research. Overall, the alignment of this quadrant with global trends demonstrates that Iranian researchers have elevated health literacy from an abstract concept, establishing it as an applied tool for designing interventions and promoting clinical self-care.

Based on the principles of co-word analysis, the clusters in the second quadrant are highly cohesive and mature internally, but their connection to the rest of the network is weak; in other words, they represent isolated, specialized knowledge domains. The exclusive presence of Cluster (10), featuring concepts like diabetes, attitude, marital satisfaction, and awareness indicates the formation of a highly specialized knowledge area in the domestic literature. Researchers in this section have successfully examined the hidden and psychological consequences of diabetes on private aspects of family life. The underlying reason for the isolation of this cluster likely lies in its interdisciplinary nature, uniquely merging endocrinology (chronic disease management) with intimate psychological and family constructs. This specific network behavior directly validates the claim made in the literature review: as the dimensions of health literacy have expanded, research has naturally gravitated toward more niche, specialized areas. This finding is particularly aligned with Baji et al., who highlighted the growing link between health literacy and psychiatry/psychology (12). Consequently, the low centrality of this cluster is perfectly logical; its highly specialized nature

dictates that it engages less with the broader, more general domains of the overall network. Despite this logical justification, however, the practical implication of this isolation remains critical. It suggests that family-centered and psychological approaches are still operating in silos and have not yet been integrated into mainstream public health interventions or general quality-of-life frameworks (Quadrant 1). Bridging this gap requires future research to actively connect family dynamics and marital well-being with broader health promotion strategies, thereby moving these specialized findings from the periphery to the core of healthcare planning.

The concentration of more than half of the clusters (1, 2, 4, 6, 7, and 9) in the third quadrant reflects the dynamism, high diversity, and emergence of new paradigms on the periphery of the health literacy network. These clusters can be logically divided into two categories. The first category comprises emerging and technology-based areas; the placement of (6) Patient e-health literacy and (1) Information and media literacy, and the role of libraries in public health, including social networks and coronavirus aligns with the findings of Yang et al. and Xu et al., who introduced the internet and digital health literacy as highly applied future fields (12, 17). The second category includes methodological domains, such as (2) Psychometrics and the validation of health literacy assessment tools, and a focus on specific groups like females, the older people, and adolescents (Clusters 4, 7, and 9). This thematic dispersion is consistent with the findings of Paucar-Caceres and Sarikhani et al., who emphasized the shaping of research around maternal and child health and reducing health disparities (14, 19). The high density of clusters in this quadrant shows that domestic literature is rapidly absorbing and localizing emerging global concepts, and these areas possess a high potential to transition into the central core in the future.

A critical finding that emerges not from the presence, but from the conspicuous absence of concepts in the extracted network, is the complete lack of attention to "organizational health literacy". Although this concept was highlighted in the introduction as a major global paradigm shift, it failed to form a cluster or even appear as a high-frequency node in the Iranian context. This omission reveals a significant epistemological gap: domestic research has overwhelmingly focused on the "individual-deficit model", assessing the health literacy of patients, students, and vulnerable groups while neglecting the systemic responsibility of

healthcare systems. The absence of this concept implies that researchers and policymakers in Iran have not yet sufficiently evaluated how hospitals, clinics, and care centers can become "health-literate organizations" by simplifying navigation, improving patient-provider communication, and making their processes more accessible. Addressing this structural neglect is essential for moving beyond simply blaming the patient for poor comprehension and towards creating supportive healthcare environments.

The vacancy of the fourth quadrant, which is generally the domain of developing foundational and theoretical concepts, conveys an important epistemological and structural message. The primary reason for this phenomenon might be the rapid transition and early maturation of central concepts; concepts such as self-care and education have quickly become enriched and, rather than stalling at the theorizing stage in the fourth quadrant, have directly transformed into mature interventional tools in the first quadrant of the strategic diagram. The second reason is likely the pragmatic and problem-oriented nature of this field in Iran. As Baji et al. pointed out, health literacy has a high capacity to bridge medical sciences and humanities; however, the absence of foundational concepts indicates that the gaps and needs within Iran's healthcare system are so tangible that researchers have little time to linger on purely theoretical discussions (12). Consequently, the network structure has become transparently polarized. In other words, topics have either directly addressed applied problem-solving in target groups, like the clusters located in the first and second quadrants or are emerging as technological and demographic paradigms in the third quadrant.

Conclusion

The present study, utilizing bibliometric techniques and co-word analysis, provided a comprehensive picture of the intellectual knowledge structure of the health literacy field in scientific outputs indexed in the ISC database. The overall conclusion of the findings indicates that the concept of health literacy in Iranian research literature has transcended being merely a theoretical and cognitive construct and has evolved into a pragmatic and intervention-oriented paradigm. The examination of the ten thematic clusters and the analysis of the strategic diagram revealed that the central core of this field relies on concepts such as self-care, quality of life, and educational interventions. This suggests that domestic researchers view health literacy as a factor for empowering patients to manage chronic diseases, such as diabetes and heart disease, and to modify their lifestyles.

Furthermore, the co-word network map showed that the Iranian scientific community is highly sensitive to the diversity of demographic groups, with a strong focus on specific target populations including, university students, older people, females, and children, particularly in the realm of oral and dental health. However, the early maturation of clinical and educational approaches has led to a type of polarization within the intellectual network of this field, meaning that research has either concentrated within mature, primary clusters like self-care and prevention, or has taken the form of isolated, specialized areas such as investigating the outcomes of health literacy on marital satisfaction, with few foundational or bridging clusters evident in between.

On the other hand, the congestion in the third quadrant of the strategic diagram heralds a transitional phase in Iran's health literacy literature. The entry of concepts such as eHealth literacy, media literacy, and the role of social networks and libraries shows that with the ever-increasing expansion of communication technologies and the occurrence of crises like the COVID-19 pandemic, research trajectories are shifting toward the digital and informational dimensions of health. Although these areas have not yet achieved the necessary cohesion and centrality, they hold the potential to become the mainstream of health-oriented research in the near future.

Based on the findings and the identified structural gaps, the recommendations for future research and macro-level policymaking are prioritized into three-time horizons:

Short-term priorities; Researchers should focus on rapidly validating localized digital health assessment tools to address the immediate needs post-COVID-19 pandemic. Furthermore, efforts must be made to extract highly mature but isolated topics (such as the psychological and marital impacts of chronic diseases in Cluster 10) from the periphery and integrate them into core public health planning.

Medium-term priorities; Given the congestion of emerging topics in the third quadrant, future research trajectories should be directed toward technological and media-driven paradigms. High-priority topics include investigating patients' information literacy when confronting fake news on social networks, the role of libraries in promoting community health, and exploring the integration of artificial intelligence in designing personalized health education interventions (27, 28).

Long-term priorities; A fundamental paradigm shift is required in the Iranian scientific literature from the "individual-deficit model" to "organizational health literacy." Long-term strategic research must focus on evaluating and redesigning healthcare systems. Future studies should investigate how hospitals, clinics, and care centers can be transformed into health-literate organizations by making their physical navigation simpler, their administrative processes more transparent, and their patient-provider communications more accessible, thereby effectively reducing systemic barriers to health equity.

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References

1. Reilly, J. Health literacy. *InnovAiT*. 2020; 13(8), 490–494. <https://doi.org/10.1177/1755738020927064>
2. Estrela, M., Leitão, C., Neto, V., Martins, B., Santos, J., Branquinho, A., Figueiras, A., Roque, F., & Herdeiro, M. T. Educational interventions for the adoption of healthy lifestyles and improvement of health literacy: A systematic review. *Public Health*. 2025; 245, Article 105788. <https://doi.org/10.1016/j.puhe.2025.105788>
3. Nutbeam, D. Health literacy as a public health goal: A challenge for contemporary health education and communication strategies into the 21st century. *Health Promotion International*. 2000; 15(3), 259–267. <https://doi.org/10.1093/heapro/15.3.259>
4. Ayers JW, Poliak A, Dredze M, et al. Comparing Physician and Artificial Intelligence Chatbot Responses to Patient Questions Posted to a Public Social Media Forum. *JAMA Intern Med*. 2023;183(6):589–596. <https://doi.org/10.1001/jamainternmed.2023.1838>
5. Brach, C., Keller, D., Hernandez, L. M., Baur, C., Parker, R., Dreyer, B., Sofaer, S., Lemerise, A., & Schillinger, D. Ten attributes of health literate health care organizations (Discussion Paper). National Academy of Medicine. 2012: <https://nam.edu/perspectives-2012-ten-attributes-of-health-literate-health-care-organizations/>
6. Institute of Medicine. Health literacy: A prescription to end confusion. The National Academies Press. 2004: <https://doi.org/10.17226/10883>



7. Li, Y., Chen, Y., & Wang, Q. Evolution and diffusion of information literacy topics. *Scientometrics*. 2021; 126(5), 4195-4224. <https://doi.org/10.1007/s11192-021-03925-y>
8. Shollapur, M.R., Hulagabali S. C., Kolle S R. Global Research on Financial Literacy: A Bibliometric Analysis. *Journal of Library & Information Technology*. 2023; 43(3), 157-163. DOI: 10.14429/djlit.43.3.18436
9. Park H, Kim H, Park H. A scientometric study of digital literacy, ICT literacy, information literacy, and media literacy. *J Data Inform Sci*. 2021; 6(2), 116–138. DOI: <https://doi.org/10.2478/jdis-2021-0001>
10. Rahimi, S., Soheili, F., Amininia, Y. & Danesh, F. Identifying Emerging Areas and Map Scientific Structure of Throbbing Headaches. *Health Information Management*. 2020; 17(4), 189-198. (In Persian) [doi: 10.22122/him.v17i4.4132](https://doi.org/10.22122/him.v17i4.4132)
11. Rahimi, S. & Soheili, F. Thematic Analysis and Scientific Mapping of Resistance Economy Studies. *Strategic Research on Social Problems*. 2025; 14(1), 41-60. (In Persian) [doi: 10.22108/srsp.2025.143686.2062](https://doi.org/10.22108/srsp.2025.143686.2062)
12. Baji, F., Azadeh, F., Parsaei-Mohammadi, P. & Parmah, S. Mapping Intellectual Structure of Health Literacy Area Based on Co-Word Analysis in Web of Science Database during the Years 1993-2017. *Health Information Management*. 2018; 15(3), 139-145. [doi: 10.22122/him.v15i3.3577](https://doi.org/10.22122/him.v15i3.3577)
13. Karamali, M., Yaghoubi, M., & Parandeh, A. Scientific Mapping of Papers Related to Health Literacy Using Co-Word Analysis in Medline. *Iranian Journal of Health Education and Health Promotion*. 2021; 9(3), 280-295. [https://DOI:10.52547/ijhehp.9.3.280Corpus](https://doi.org/10.52547/ijhehp.9.3.280Corpus)
14. Paucar-Caceres, A., Vélchez-Román, C. Quispe-Prieto, S. Health Literacy Concepts, Themes, and Research Trends Globally and in Latin America and the Caribbean: A Bibliometric Review. *Int. J. Environ. Res. Public Health*. 2023, 20, 7084. <https://doi.org/10.3390/ijerph20227084>
15. Yang K, Hu Y, Qi H. Digital Health Literacy: Bibliometric Analysis. *J Med Internet Res*. 2022; 24(7):e35816. <https://doi.org/10.2196/35816>
16. Zeng, S., Bailey, R., Alkhamaiseh, R.A. et al. Mapping the big picture of mental health literacy in education: a bibliometric analysis. *Humanit Soc Sci Commun*. 2025; 12, 1125. <https://doi.org/10.1057/s41599-025-05026-0>
17. Xu, F., Zhang, H., Wang, Y., & Pan, S. Bibliometric analysis of health information research from 2016 to 2020 confirms interest in how the Internet is used. *Health Information & Libraries Journal*. 2026; 43(1), e70008. <https://doi.org/10.1111/hir.70008>
18. Makkizadeh, F., & Ebrahimi, F. Theme trends and knowledge structure on health communication: Bibliometric analysis in PubMed database. *Informatics in Medicine*. 2022; 32, 101033. <https://doi.org/10.1016/j.imu.2022.101033>
19. Sarikhani Y, Kalavani A, Najibi SM. Scientific Mapping of Global Research on Health Equity by 2023: A Bibliometric Study. *Health Sci Rep*. 2025; 19;8(2):e70478. PMID: 39980817; PMCID: PMC11839487. <https://doi.org/10.1002/hsr2.70478>
20. Van Eck, N. J., & Waltman, L. Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*. 2010; 84(2), 523–538. <https://doi.org/10.1007/s11192-009-0146-3>
21. Van Eck, N. J., & Waltman, L. How to normalize cooccurrence data? An analysis of some well-known similarity measures. *Journal of the American Society for Information Science and Technology*. 2009; 60, 1635–1651. <https://doi.org/10.1002/asi.21075>



22. Callon, M., Courtial, J.P. & Laville, F. Co-word analysis as a tool for describing the network of interactions between basic and technological research: The case of polymer chemistry. *Scientometrics*. 1991; 22, 155–205. <https://doi.org/10.1007/BF02019280>
23. Wu, K., Xi, Y., Liao, X. Analysis on current research of supernetwork through knowledge mapping method. *Knowledge science, engineering and management: 6th international conference, ksem*. 2013; 538-549. https://doi.org/10.1007/978-3-642-39787-5_45
24. Melcer, E., Nguyen, T. H. D., Chen, Z., Canossa, A., El-Nasr, M. S., & Isbister, K. (2015). Games research today: Analyzing the academic landscape 2000-2014. In *Proceedings of the 10th International Conference on the Foundations of Digital Games*, At Pacific Grove, CA, USA <https://adk.elsevierpure.com/en/publications/games-research-today-analyzing-the-academic-landscape-2000-2014>
25. Khasseh, A.; Soheili, F.; Sharif moghaddam, H.; Mousavi chelak, A. Intellectual structure of knowledge of metrics: A co- word analysis. *Information processing & management*. 2017; 53(3): 705-720. <https://www.sciencedirect.com/science/article/abs/pii/S0306457316303338>
26. Soheili, F & Khasseh, A. A. An Analysis of Intellectual Property Rights Research in the Islamic World Science and Technology Citation and Monitoring Institute: A co-word study. *Scientometrics Research Journal*. 2025; 11(2), 181-206. (In Persian) <https://doi.org/10.22070/rsci.2025.19701.1762>
27. Suarez-Lledo, V., & Alvarez-Galvez, J. Prevalence of Health Misinformation on Social Media: Systematic Review. *Journal of Medical Internet Research*. 2021; 23(1), e17187. <https://doi.org/10.2196/17187>
28. Chew, H. S. J., & Achananuparp, P. Perceptions and Needs of Artificial Intelligence in Health Care to Increase Health Literacy: Formative Qualitative Study. *JMIR Formative Research*. 2022; 6(8), e32939. <https://doi.org/10.2196/32939>