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Abstract

The concept of health literacy has been defined by the World Health Organization for 25 years. During this period, thousands of publications related to health literacy have been produced in the literature. The aim of this study is to examine publications from the last 10 years concerning the concept of health literacy and to identify topics associated with health literacy in these studies. This article provides a general overview of research conducted on the concept of health literacy using bibliometric methods. The Web of Science (WoS) database was utilized as the data source for gathering information. Over the last 10 years, it has been determined that there have been 17,864 studies conducted on health literacy. This study has examined the distribution of these studies by year, author names, the most frequently used 20 keywords, and the relationships between these keywords. The results of the bibliometric analysis indicate that a variety of topics related to health literacy have been explored. Among these, the most prevalent ones include mental health literacy, health improvement, and mental health. In order to comprehend the concept of health literacy, it is essential to accurately identify the associated sub-concepts. Clearly elucidating the multifaceted relationship between these identified sub-concepts and health literacy is of great importance. The presence of diverse publications in the literature related to sub-concepts associated with health literacy highlights the need to examine these publications, providing a basis for planning future studies.

Introduction

The World Health Organization (WHO) defined health literacy in its Health Promotion Glossary report published in 1998 as "the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand, and use information in ways which promote and maintain good health" (WHO, 1998). Originally focusing solely on individuals' reading and comprehension skills for written information, health literacy has evolved into a concept encompassing numerous factors that affect a person's ability to access, comprehend, and utilize health information from various sources. (Batterham et al., 2016).

At least one-third of the global population experiences difficulties in perceiving health-related issues. The primary cause of these perception issues is the variation in individuals' health literacy levels (Raynor, 2012). It is acknowledged that individuals with particularly low literacy levels have a negative impact on public health and healthcare services (Berkman et al., 2010). In a study, it was found that more than one-third of American adults have limited health literacy, contributing to adverse health outcomes. Health literacy is also indicated to impact patient safety, access to healthcare, and the quality of healthcare services (Hersh et al., 2015). Although health literacy is included in many global health policies, implementing the principles of health literacy in routine practice is not easy. Individuals with low health literacy impact healthcare utilization rates and lead to worse health outcomes compared to those with higher health Literacy (Batterham et al., 2016).

Health literacy is a concept that has significant effects on individual health and public health. This topic is associated with numerous health issues. This study utilizes the Web of Science database to examine publications related to health literacy and conduct bibliometric analysis. Bibliometric analysis is a research field attracting increasing interest within the scientific community, and its importance is particularly growing with the rapid development of the internet. This analysis is becoming a fundamental methodology for evaluating research in the literature. Various articles providing a comprehensive overview of bibliometric analysis exist in many research fields, including management, economics, health, innovation, and entrepreneurship. This research will provide a foresight for future studies on health literacy. The results of the research will guide in understanding the significant issues in this field and potential solutions.

Method

Bibliometric analysis is a research method commonly used to understand global research trends in a specific field through the analysis of academic publications in databases such as WoS (Web of Science). This method typically focuses on metrics such as publication numbers, citations, and author collaborations, aiming to reveal significant trends and relationships in the output of scientific studies through statistical analysis. In this study, an analysis has been conducted on publications related to the concept of "Health Literacy" published in the last 10 years in WoS (Web of Science) using Wosvier.

Results

All categories from the core database of WoS were selected with the keyword "health literacy," and a search was conducted considering the period from 2013 to 2023 (the last 10 years). As a result of the search, 17,864 studies related to the concept of health literacy were identified. Word mining, citation analysis, and bibliometric mapping analyses were performed using the VOSviewer software. As a result of the literature review, the frequency of author keywords in publications related to the concept of health literacy is presented in the table below.

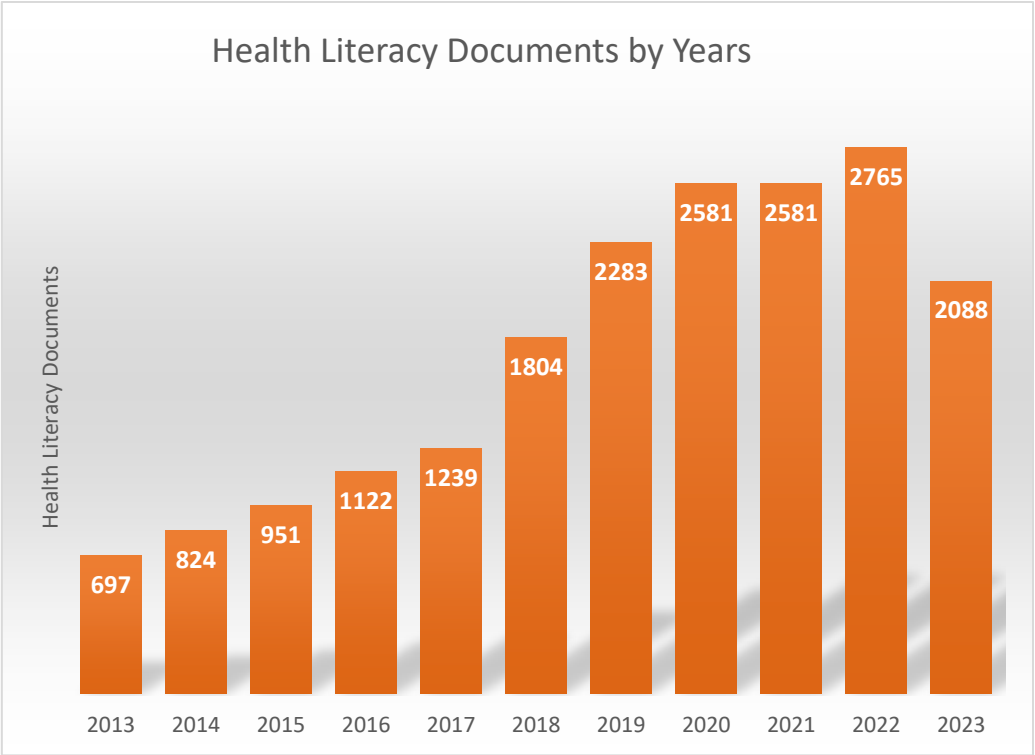

Figure 1. Health literacy documents by years

When examining the distribution of publications related to health literacy over the years, there is a notable increase in the last 5 years. It can be said that the number of studies related to health literacy has increased by more than threefold in the last 10 years. The keywords found in studies related to health literacy, their frequencies, and connection strengths are provided in Table 1.

In the examination of publications based on the concept of health literacy, the most frequently used keyword is the term 'health literacy'. The concept of mental health literacy is in the second place, while the concept of health improvement is in the third place in terms of keyword frequency. Recently, among the top 10 keywords in health literacy studies, the global COVID-19 pandemic is observed.

Figure 1 depicts other sub-keywords associated with the main keyword "health literacy". The relationships between these keywords are illustrated, showing connections both within health literacy and with other sub-keywords. On the figure, the relationships between sub-keywords have been considered, and they are depicted using different colors. These colors represent 6 groups, namely red, green, blue, navy blue, yellow, and purple.

Table 1. Author keywords associated with health literacy

	Keyword	Occurrences	Total Link Strength
1.	Health Literacy	5925	4679
2.	Mental Health Literacy	672	658
3.	Health Promotion	438	636
4.	Mental Health	507	633
5.	Patient Education	476	631
6.	Covd-19	510	610
7.	Health Education	382	538
8.	Depression	330	519
9.	Self-Management	287	403
10.	Education	320	389
11.	Knowledge	293	389
12.	Stigma	277	388
13.	Health Communication	255	386
14.	Readability	273	370
15.	Communication	287	345
16.	Public Health	257	321
17.	Adolescents	236	314
18.	Health İnformation	186	314
19.	Diabetes	219	306
20.	Ehealth	167	300

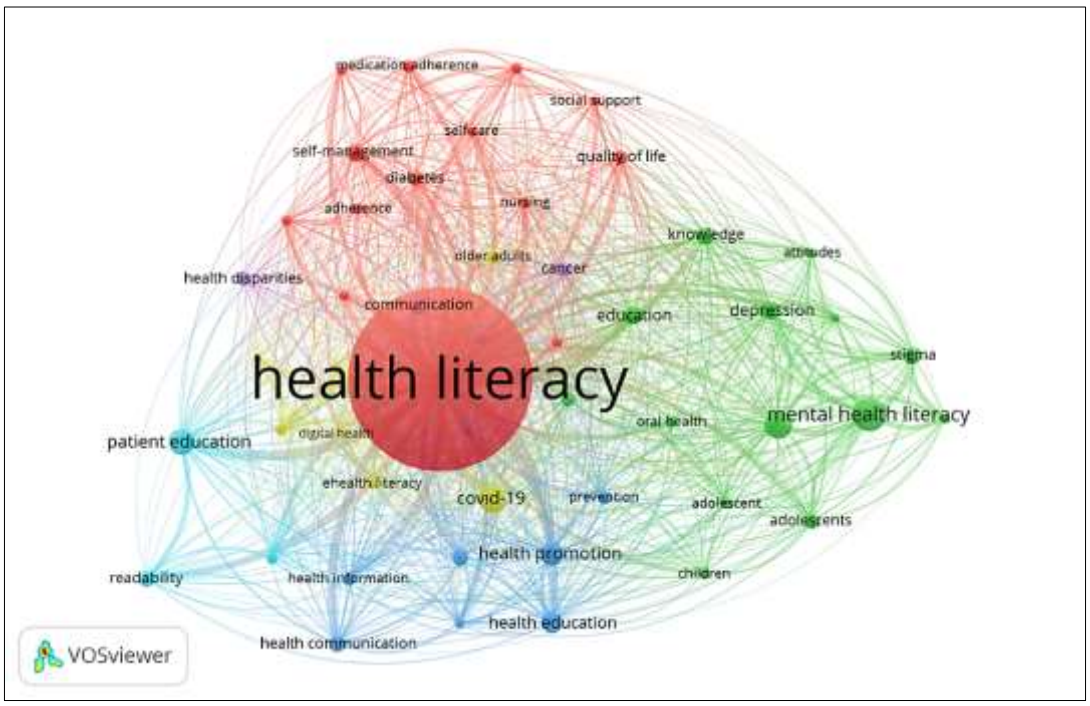

Figure 1. Health literacy author keyword frequency

In the above figure, it can be observed that six subsets are formed in association with the main concept of health literacy. These subsets are:

- Cluster 1- red: adherence, chronic disease, diabetes, health literacy, hypertension, nursing, medication adherence, primary care, quality of life, self-care, self-efficacy, self-management, social support, systematic review.
- Cluster 2- green: adolescents, anxiety, attitudes, children, depression, education, help-seeking, knowledge, mental health, mental health literacy, oral health, stigma.
- Cluster 3- navy blue: empowerment, health communication, health education, health information, health promotion, prevention, public health, social media.
- Cluster 4- yellow: covid-19, digital health, ehealth, ehealth literacy, mhealth, older adults, telemedicine.

- Cluster 5- purple: cancer, communication, health disparities, qualitative research.
- Cluster 6- blue: ınternet, patient education, readability.

In Figure 2, the relationship between the sub-keyword "mental health literacy" and other keywords is illustrated. It is observed that mental health literacy is associated with various subtopics such as depression, education, quality of life, health education, health improvement, health communication, etc.

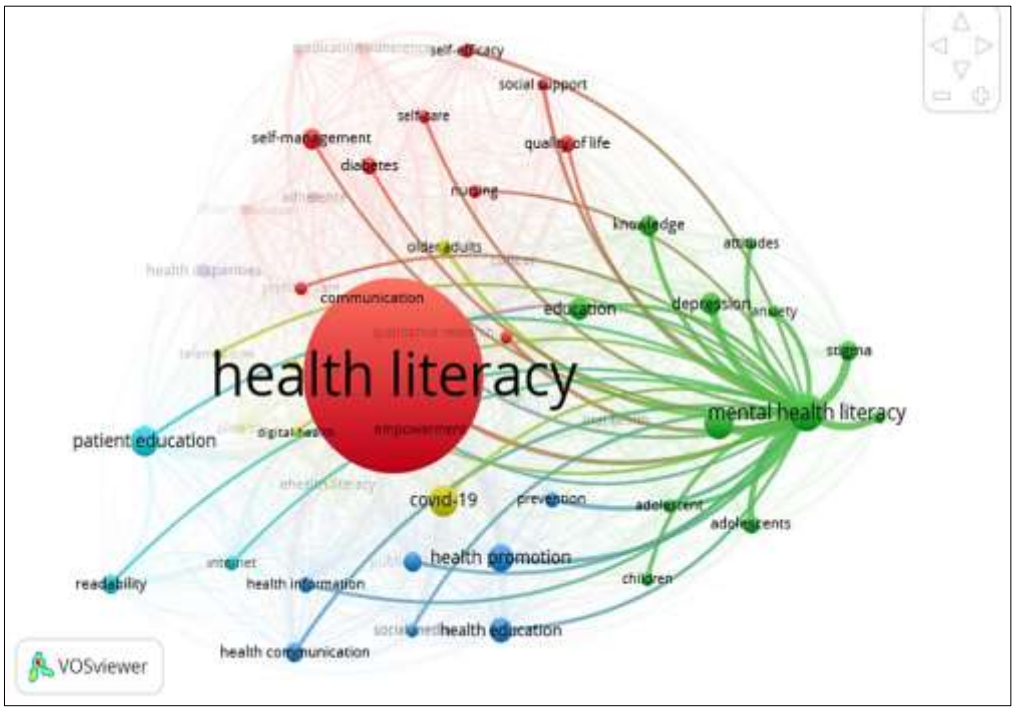

Figure 2. Mental health literacy author keyword frequency

In Figure 3, the relationship between the sub-keyword "health promotion" and other keywords is illustrated. It is observed that health promotion is associated with various subtopics such as readability, prevention, health knowledge, health education, chronic diseases, etc.

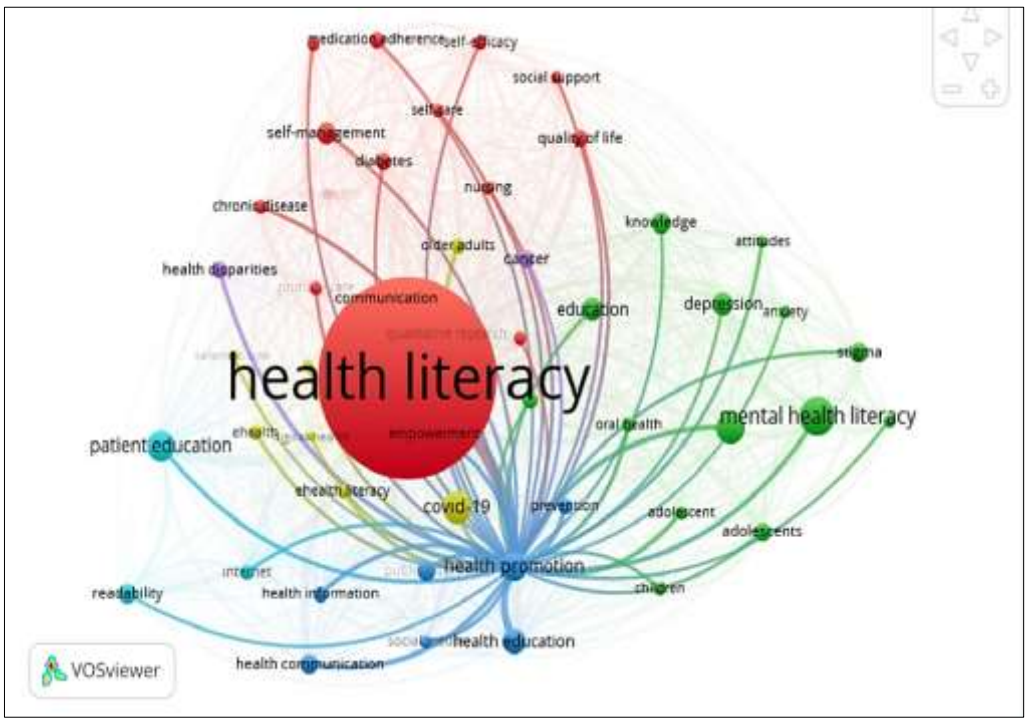

Figure 3. Health promotion author keyword frequency

In Figure 4, the relationship between the sub-keyword "mental health" and other keywords is illustrated. It is observed that mental health is associated with various subtopics such as children, adolescents, stigma, cancer, patient education, etc.

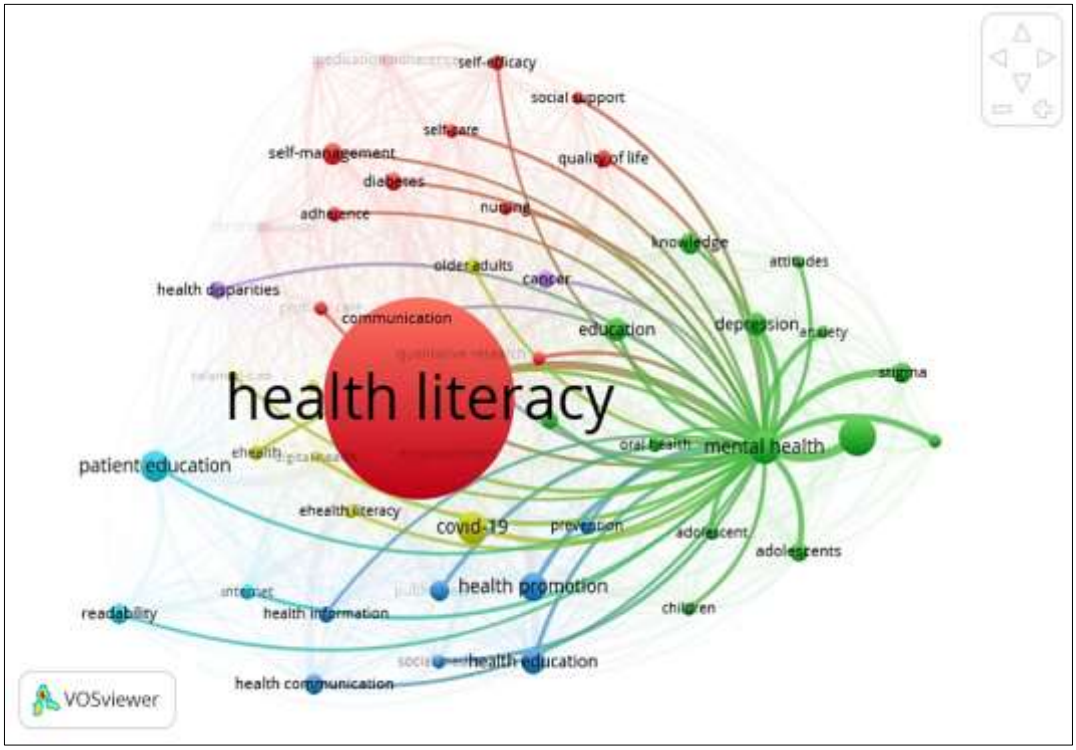

Figure 4. Mental health author keyword frequency

The relationship of the sub-keyword "patient education" with other keywords is shown in Figure 5. It is observed that patient education is associated with various subtopics such as readability, health knowledge, health education, health inequality, etc.

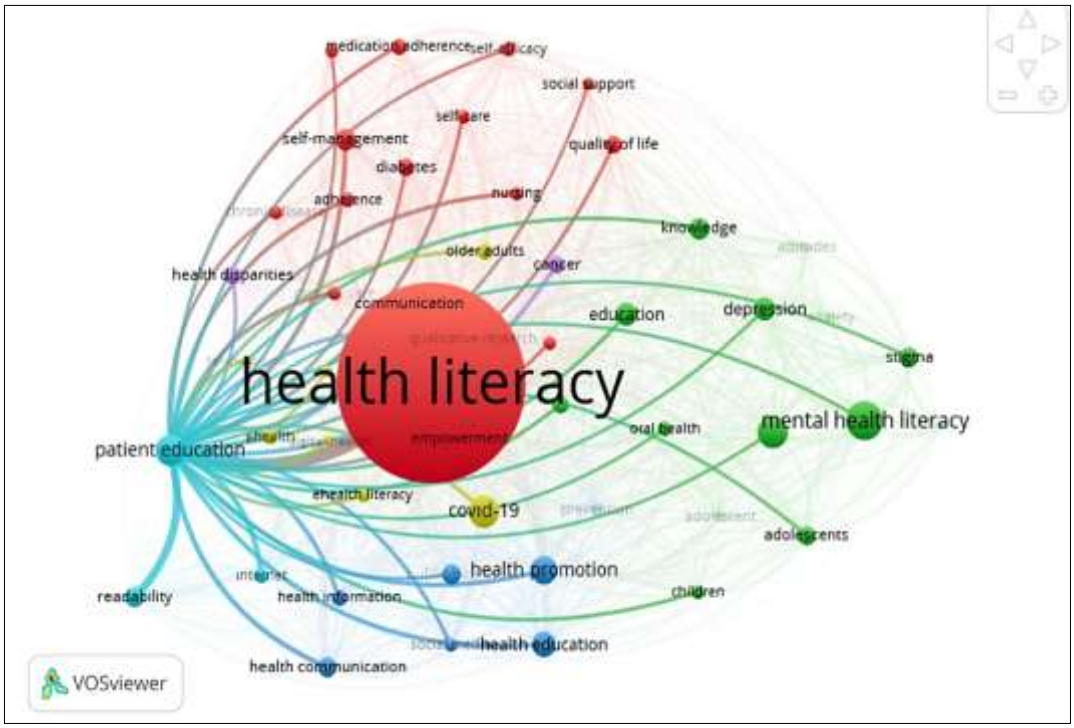

Figure 5. Patient education author keyword frequency

The relationship of the sub-keyword "Covid-19" with other keywords is depicted in Figure 6. It is observed that Covid-19 is associated with various subtopics such as self-care, social support, older adults, e-health, adherence etc.

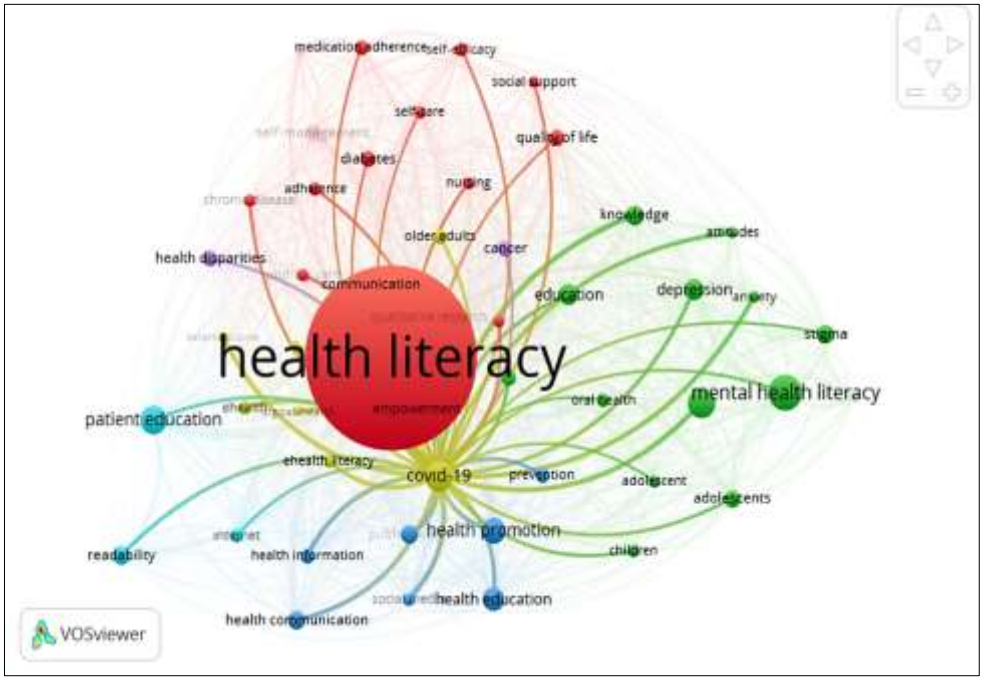

Figure 6. Covid-19 author keyword frequency

The relationship of the sub-keyword "health education" with other keywords is depicted in Figure 7. It is observed that health education is associated with various subtopics such as health promotion, e-health literacy, health communication, health disparities, Covid-19, etc.

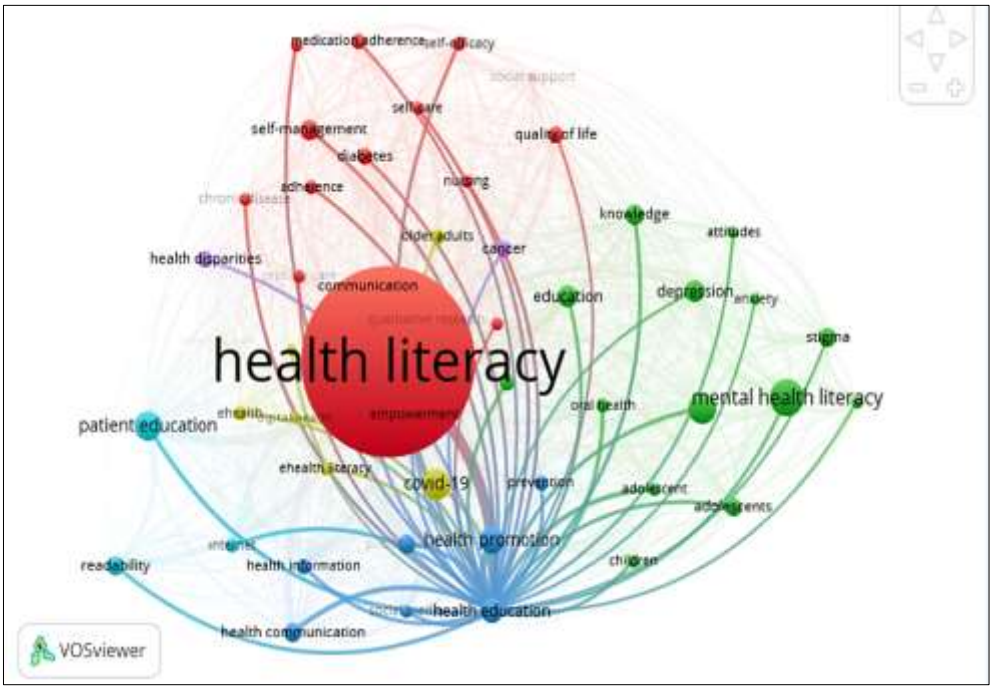

Figure 7. Health education author keyword frequency

The relationship of the sub-keyword "depression" with other keywords is depicted in Figure 8. It is observed that depression is associated with sub-factors such as stigma, anxiety, social support, adult individuals, quality of life, etc.

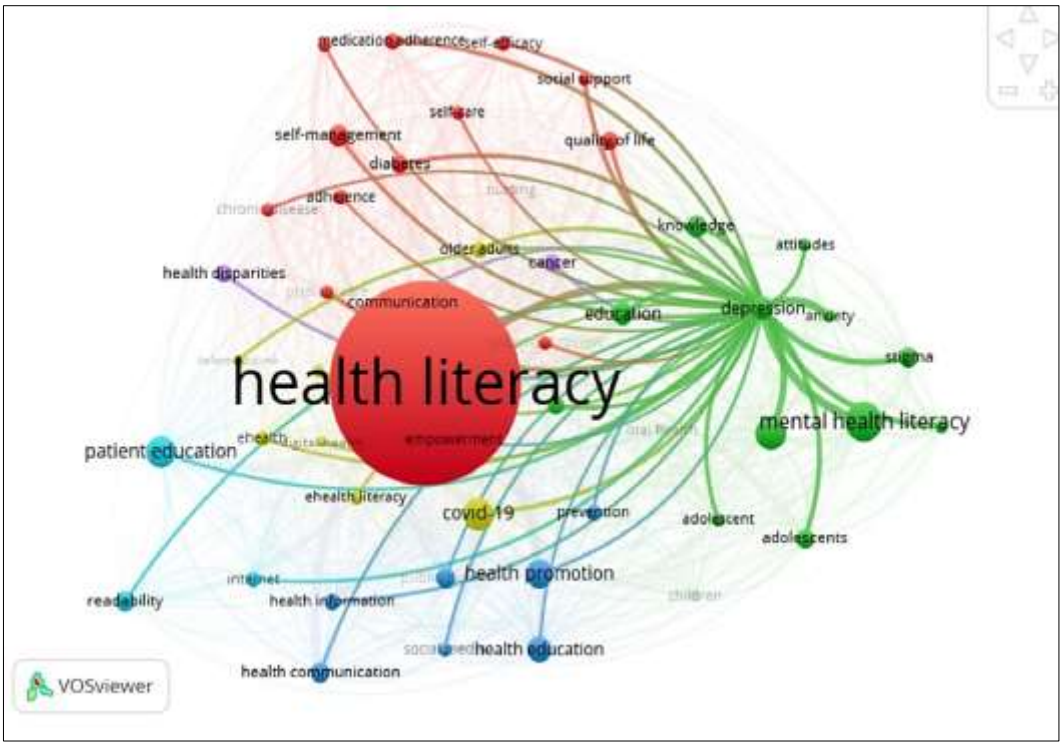

Figure 8. Depression author keyword frequency

The relationship of the sub-keyword "self-management" with other keywords is depicted in Figure 9. Self-management is observed to be associated with sub-factors such as adherence, self-care, health disparities, patient education, communication, etc

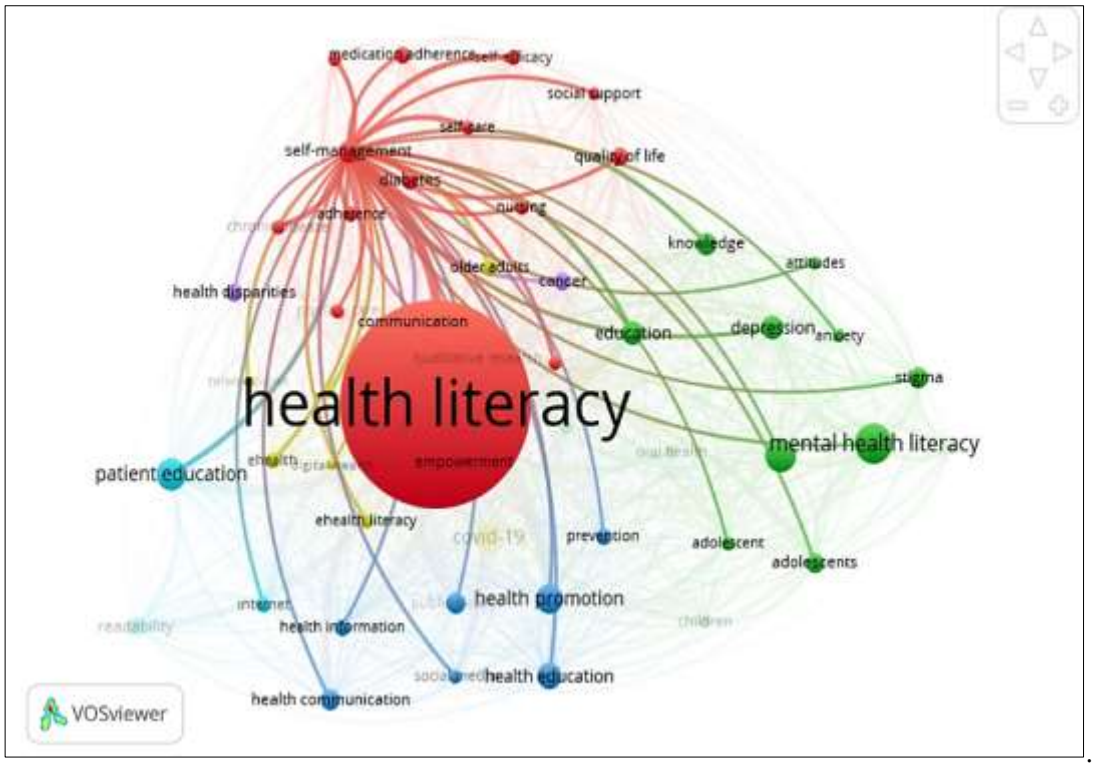

Figure 9. Self-management author keyword frequency

The relationship of the sub-keyword "education" with other keywords is depicted in Figure 10. Education is observed to be associated with sub-factors such as oral health, depression, cancer, qualitative research, nursing, diabetes, etc.

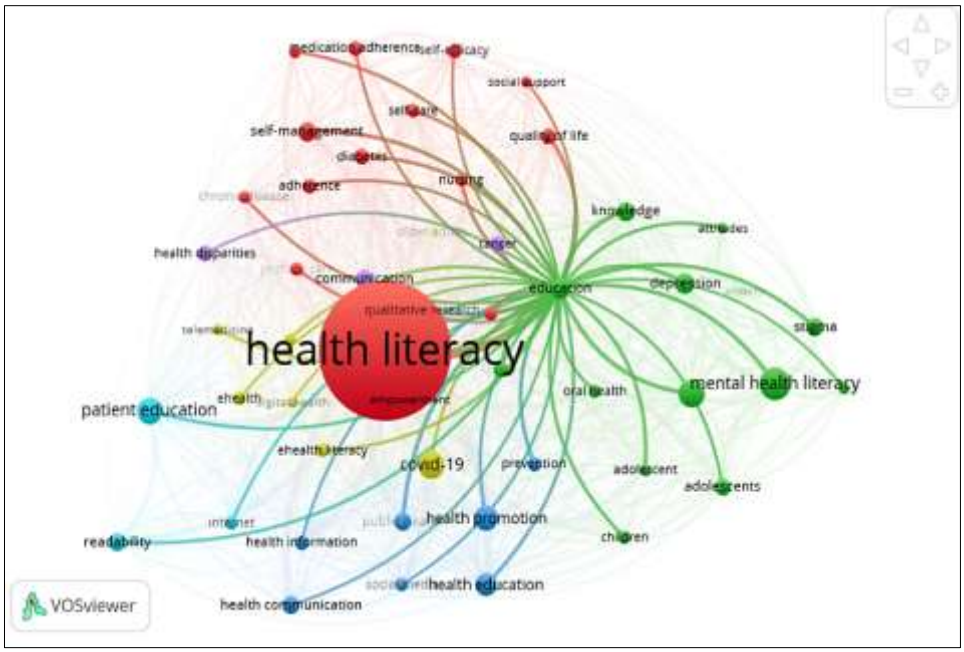

Figure 10. Education author keyword frequency

Figure 11 provides information about authors who have published articles based on the keyword "health literacy." It is observed that authors, similar to keywords, are categorized into 6 groups. Additionally, the figure highlights the citations made by authors to each other. It is notable that Wolf, Michael S. has received the most citations for his work on health literacy. Secondly, Richard H. Osborne has received the second-highest number of citations.

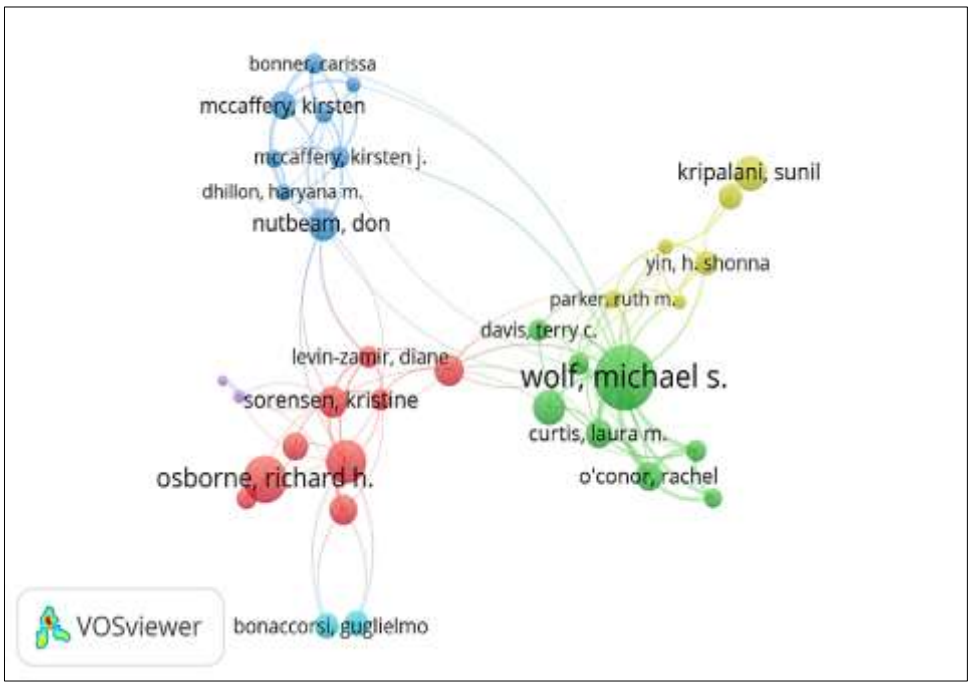

Figure 11. Authors who have used the concept of health literacy

Discussion

It has been argued that health literacy emerged as an important concept for individuals with mental health issues to overcome these negative situations (Coles & Coleman, 2010). It has been observed that many individuals with mental health disorders face difficulties in seeking treatment due to negative attitudes and perceptions (Fleary et al., 2022). The lack of sufficient information and fear of being stigmatized by society have been

explained as some of the barriers to accessing treatment (Sareen et al., 2007). In a different study, the need to improve mental health literacy was emphasised as arising from the complexity of access to services. The limited availability of studies aimed at improving mental health literacy underscores the necessity for the development and monitoring of interventions in this field (De Silva, 2020).

In a study examining the relationship between health literacy and the health behaviors of adolescents, the importance of encouraging adolescents to participate in health literacy-enhancing practices is emphasized. Improving health during adolescence helps prevent negative health outcomes in later stages of life (Park et al., 2017). In a different study, a relationship between students' health literacy and health-promoting behaviors was observed, indicating that as students' health literacy levels increased, they exhibited more health-promoting behaviors (Ozturk, 2020). Similarly, adolescents with low health literacy were found to have a lower likelihood of exhibiting health-promoting behaviors compared to other adolescents (Chang, 2011). Low health literacy is associated with deteriorating overall health, unhealthy eating, weight gain, and engaging in problematic behaviors (Park et al., 2017). Fleary et al. (2018) mentioned the importance of health literacy in imparting health-promoting behaviors to adolescents and emphasized that health literacy should be addressed in school settings. Adding a curriculum that includes basic health information and healthy lifestyle behaviors would be a positive step in increasing students' health literacy. The goal is not only to inform students but also to empower them to take responsibility for their health by developing their health knowledge and supporting their help-seeking skills (Hagell et al., 2015).

A significant relationship has been identified between all dimensions of health-promoting behaviors and health literacy (Chahardah-Cherik et al., 2018). In a study, the necessity of focusing on improving patients' health literacy and thus enhancing their health levels was emphasized (Bayati et al., 2018). In a different study examining the relationship between health literacy and individuals' health behaviors, the importance of encouraging adolescents to participate in health literacy-enhancing practices was highlighted. It has been observed that improving health prevents negative health outcomes in later stages of life (Park et al., 2017). In another study, a relationship between health literacy and health-promoting behaviors was observed, indicating that as health literacy levels increased, individuals exhibited more health-promoting behaviors (Ozturk, 2020). Fleary et al. (2018) mentioned the importance of health literacy in imparting health-promoting behaviors to students and emphasized that health literacy should be addressed in school settings. Adding a curriculum that includes basic health information and healthy lifestyle behaviors would be a positive step in increasing students' health literacy. The goal is not only to inform students but also to empower them to take responsibility for their health by developing their health knowledge and supporting their help-seeking skills (Hagell et al., 2015).

When analyzed at the societal level, mental health literacy is generally found to be insufficient (Kelly et al., 2007). Individuals with low health literacy have been observed to underutilize healthcare services, leading to a negative impact on their mental health. Additionally, previous negative experiences with healthcare services are anticipated to result in low health literacy, and this, in turn, may adversely affect their mental health (Milner, 2019).

Numerous studies have emphasized that the level of mental health literacy is lower in young people and various public policies need to be developed to eliminate this negative situation. These policies can guide young people in learning about their mental health and recognizing ways of protection (Samapıo et al., 2022). It is argued that strategies for mental health literacy should be evidence-based, designed with social awareness, developmentally appropriate, applicable throughout the lifespan, inclusive, and culturally sensitive (Gorczynski, 2021). In a different study, it is claimed that increasing mental health literacy presents some challenges and these challenges can be addressed with a carefully developed program. Mental health literacy programs should be inclusive, consider economic opportunity inequality, and address social issues such as discrimination and their impact on mental Health (Henderson, 2023).

The materials provided during the patient education process should ensure suitability for individuals with varying levels of health literacy. Ensuring the comprehensibility of forms in the patient education process enhances the patient's ability to access and utilize appropriate hospital services. Providing patients with more accessible health education materials will encourage them to actively participate in their care by fostering confidence in decision-making about their treatments (Demarco, 2010). A study conducted on patients with hearing impairment examined an issue related to the readability of educational materials. The inability of the patient to perform simple tasks to ensure the proper functioning of the hearing aid led to their return to the healthcare facility. This situation resulted in the patient experiencing loss of time, money, and disappointment (Nair, 2010). The provision of a patient education program to individuals with chronic diseases has been documented to increase their disease-specific knowledge. Patient education programs have encouraged patients

to play a more active role in their illness processes, resulting in an enhancement of their health literacy (Eckman, 2012).

The study revealed a negative relationship between health literacy and depressive tendencies in diabetic women (Hsu, 2020). It has been demonstrated that, compared to women, men in both Covid-19 positive and negative groups have higher health literacy scores. Previous studies have shown that, especially in elderly adults, men tend to have worse health outcomes (Tang, 2020). Therefore, improving health literacy can be a strategic approach to prevent and minimize the outcomes of Covid-19, particularly in men and the elderly (Do, 2020). It has been found that higher health literacy scores in individuals with Covid-19are associated with a lower probability of depression. This result is consistent with previous studies (Wang, 2020). It is also noted that higher health literacy is associated with lower Covid-19 fear and a lower probability of depression (Nguyen, 2020).

Improving health literacy through health education depends on long-term strategies and their implementation through specific efforts. The establishment of this system should begin from school age. In this way, lifelong habits, skills, and decision-making processes that can impact community health will be positively influenced (Auld, 2020). Health education is also a paramount responsibility of healthcare providers. Therefore, it is recommended to teach healthcare workers health literacy education strategies and skills to effectively communicate with patients with low health literacy levels (Bahramian, 2020). In health education provided by healthcare professionals, confirming understanding is a critical component of the training. However, validation methods are limited to questioning rather than using interactive skills such as feedback. The effectiveness of methods or tools used in health education needs to be tested with effective tools from the patient's perspective to confirm understanding of instructional materials. It is argued that establishing individual learning styles would be beneficial to enhance the effectiveness of patient education and health literacy (Kim, 2020).

There has been a relationship found between inadequate health literacy and individuals' tendencies toward depression (Hsu, 2020). In a study encompassing 224 patients in Australia, it was observed that depressive feelings were associated with low health literacy (Maneze, 2016). A study conducted in South Korea showed that individuals with low health literacy had significantly more depressive symptoms (Rhee, 2017). In a study in the United States, health literacy was found to be significantly associated with depressive symptoms (Kuczmarski, 2015). In a different study, individuals with lower health literacy were found to have 1.2 times higher odds of depression (Gazmararian, 2000).

Patients with adequate and limited health literacy showed different outcomes in self-management. Individuals with limited health literacy exhibited poorer performance in certain self-management behaviors. Reinforcement of previously taught behaviors led to greater improvement in the limited literacy group (Kim, 2004). To enhance self-management programs with a focus on empowering patients to manage their care, a system that centers on families should be implemented. Health care professionals should not only provide adaptable health literacy education programs but also create supportive environments, strengthen the social support function, and connect patients' self-management behaviors to social support resources (Chen, 2018). There were found to be significant relationships between critical health literacy and self-management behavior (Heijmans et al. 2015), but van der Heide et al. (2013) found that critical health literacy was not associated with patients' perceived abilities to perform self-management behaviors. It is emphasized that targeted self-management support activities based on patients' health literacy capacity should be developed through the collaborative participation of family, community, and the medical system (Qiu, 2020).

In a conducted study, it has been observed that obtaining an additional year of education has a positive and significant impact on health literacy for women. However, it has been found that it does not have a significant effect for men (Celidoni,2023). Low educational attainment has been found to be associated with poor overall health (Mackenbach et al., 2008), and it has been linked to a decline in physical and mental health (Lee et al., 2010). It is believed that strategies aimed at reducing inequalities in health through education may provide greater benefits than the focus on health literacy alone. Adapting health information to be more accessible, understandable, and usable by individuals facing challenges in reading and numeracy is suggested to enhance opportunities for them to protect or improve their Health (Van Der Heide, 2013).

Conclusion

Health literacy is an important concept, and when conducting studies related to this concept, it is crucial to define the sub-concepts associated with it. There are no limitations to the sub-concepts associated with health

literacy, and this concept encompasses all terms related to public health. In our literature search on health literacy using the Web of Science (WoS), it was observed that 17,864 documents were generated in the last 10 years. Among these publications, the top 5 sub-concepts most frequently studied in relation to health literacy were identified as mental health literacy, health promotion, mental health, patient education, and Covid-19.

The findings obtained within the scope of this study serve as a guide for researchers considering work in this field. By correlating the obtained results with other studies in the literature, a more comprehensive approach to the topic of health literacy has been adopted. Additionally, the insights gained will contribute to enriching the literature on health literacy and encouraging future researchers to approach the subject from different perspectives.

Recommendations

- A comprehensive analysis can be conducted on prominent themes such as mental health literacy and health promotion; for instance, the relationship between mental health literacy and general health literacy could be explored in greater depth.
- Through the expansion of keyword analyses, the interplay between emerging topics such as pandemics, climate change, and health literacy can be explored in greater depth.
- Comparative analyses of health literacy levels across different countries and their implications for healthcare systems can be undertaken, with priority given to studies investigating the influence of cultural differences on health literacy.

Scientific Ethics Declaration

*The authors declare that the scientific ethical and legal responsibility of this article published in JESEH journal belongs to the authors.

*In addition, since the study was based on scanning open access documents in WoS, ethical approval was not required.

Acknowledgements or Notes

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