ICOMMEDIG
November 2025, Vol.2 No. 1, pp.461-479
.E-ISNN: 3090-0603

Digital Health Literacy: Bibliometric Analysis of Publication Concept Development and Trends

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Abstract

Following the COVID-19 pandemic, there has been a shift in the development of global public health literacy. During this situation, the public has already started to appreciate just how important health information is in the lives of individuals and families. Amid the COVID-19 crisis in early 2020, digital health technology was thrust into the forefront as a means to deliver care at scale. The physical contact bans and the actual urgency of receiving in-depth info regarding the type of virus, prevention efforts (health protocols) and the healing process (vaccines), well are leading us all to exclusively use digital media. The opening of access to this service will make it easier for the public to get the health information they need, so it is hoped that it can encourage a healthy lifestyle for the wider community. The objective of the present article is to identify geographic trends in research on DHL globally from 2016-2025 using bibliometric analysis. The research was conducted using a systematic literature review method using the VOSviewer application. Data was obtained through a specific search for "digital health literacy" from the Scopus database, then processed and visualized using VOSviewer. The results of the study show an increase in the number of DHL research publications in 2020 due to the COVID-19 pandemic. This study also identified five fundamental concepts in DHL, namely Information Seeking & Access, Information Comprehension, Critical Appraisal, Application & Problem Solving, and Technological & Interactive Proficiency. This study concludes that there's any urgency to develop and mainstream research on digital health literacy, especially in developing countries such as Indonesia.

Keywords: health communication, digital health literacy, health information behavior, VOSviewer, bibliometric.

INTRODUCTION

The development of information and communication technology (ICT) has fundamentally changed the way individuals' access, understand, and apply information, and the health sector is no exception. Healthcare services are now moving towards a digital ecosystem (*e-health era***),** marked by the emergence of various telemedicine platforms, applications, and online-based health information resources. The various digital health systems that currently exist have a positive impact on increasing accessibility and efficiency that can be obtained by the community (Khoirunisah et al., 2024). The opening of access to this service will make it easier for patients to get the health information they need, so it is hoped that it can encourage a healthy lifestyle for the wider community.

The COVID-19 pandemic in early 2020 was a catalyst that accelerated the massive adoption of digital health technology. The limitation of physical contact and the urgent need for comprehensive information about the type of virus, prevention efforts (health protocols), and the healing process (vaccine) have led the global community to fully switch to digital resources. A research results indicate that telemedicine service use became first preference users health service in the environment COVID-19 pandemic in Indonesia and shared most patients are satisfied with telemedicine (Sari & Wirman, 2021). Data also indicates an increase in application downloading and significant improvement to accessing of websites for health articles occurred during 1st to 4th quarters of 2021, driven by increase of a healthy lifestyle due to public awareness in the pandemic (Media Informasi, 2022)

Internet as a source for medical information, remote consultation and health update has become increasingly popular. That directly sets urgency to people's capability in processing information Identifies subjective global burden; lack of profound sense of competition Population Details On the Indonesia Scale For those who like to obtain that platform at once, you can try visiting 4dchart. This growth in access is mirrored by the increase of internet use to find health information (Asosiasi Penyelenggara Jasa Internet Indonesia (APJII), 2023).

With the rise of social media, health influ-encers -(people or professionals who are popular on social media for posting about health) have emerged as well. These groups are generally the first and primary health information sources for the public, well ahead of traditional mass media or official health organizations.

Studies have demonstrated the dominance of social media in seeking informationirrespective of health issues, such as mental health in Indonesia (Katadata Insight Center (KIC), 2025). Another study observed that news

sources, including social media and peers were common sources for receiving COVID-19 information among adolescents (by 58% % and by 80%, respectively) indicating drift from conventional sources for healthrelated information (Nu Htay et al., 2022). Instagram, and the like, have even become all the rage. In Indonesia, social media (in particular Instagram) has been reported to be the most preferred platform for access health information (up to 93.3% on each sample).

This latest health influencer phenomenon is a one-two punch. Health influencers, on one hand - they do some good by being a part of popularizing health awareness and making complex medical information more accessible. On the down side, however, misinformation spread and health hoaxes are a serious issue. It is critical to ensure that members of the public are able to discriminate credible sources of information (fact-based and misleading) about the infectious disease.

The surge in digital trends following COVID-19 and the growth of information sources, including influencers, indicate that traditional health literacy is simply no longer sufficient anymore. What people need are more concrete abilities, in the form of Digital Health Literacy (DHL).

Digital health literacy is not confined to access to the internet but also encompasses accessing (searching, finding), understanding (comprehension), appraising its credibility and usefulness for problem-solving (e.g., how to distinguish scientifically evidence-based influencer from hoax spreaders) and applying these skills in interpreting digital information for solving health problems. Just failing to become competent in digital health literacy will widen the digital divide possibly leading to hazards for the public, as t now makes decisions based on misinformation.

Considering the current shift towards digital health literacy and the upwards incline in publications since the pandemic, there is a pressing need to chart this conceptual evolution within academia. Thus, the objective of this study is to perform a bibliometric analysis in order to visualize conceptual evolution as well as publication trends and main research focus of scientific documents related with digital health literacy. The study is anticipated to profile a definitive research agenda overview of digital health literacy, and make recommendations based on the evidence for policy, practice and future research, specifically in the digital age.

Accordingly, the intent of this study can be discoursed to respond to the above leprous problems thus:

1. How is the theme of digital health literacy addressed in scientific research in the health and communication area?

2. How is research on DHL being communicated?
3. What is implications of digital health literacy for theory and practice?

THEORETICAL FRAMEWORK

In the current interdisciplinary literature, digital or electronic health literacy (DHL), often seen as a synonym (though some nuances can be observed) is generally defined as the ability to "access, comprehend and use information in ways which promote and maintain good health" from e-Sources (Aloi et al., 2025; Darabi et al., 2025)Specifically, DHL refers not solely to locating of information online but also encompasses the cognitive capacity to critically appraise available information and apply it in everyday life to address health problems and make informed decisions about medical issues (Carton-Erlandsson et al., 2025; Julesz, 2024)

More precisely, digital health literacy refers to the technical and cognitive skills required for accessing and interacting with the digital environment. This includes the ability of the individual to evaluate the quality, credibility and relevance of information available in the internet (Chae et al., 2025; Hindelang et al., 2025). Moreover, digital health literacy also takes into account their capability in using and navigating through diverse digital health tools successfully including telemedicine platforms, mobile health apps as well as wearable monitors (AlShaikh & Alwadai, 2025)

With the widespread use of technology in health services now, the need for digital health literacy is increasing. Digital health literacy is recognized as a determinant of clinical outcomes, and it is an important concept for patients to effectively use and benefit from digital health devices (Huh & Song, 2025; Kim et al., 2025). With the widespread use of technology in health services now, the need for digital health literacy is increasing. Digital health literacy is recognized as a determinant of clinical outcomes, and it is an important concept for patients to effectively use and benefit from digital health devices (Shabbir et al., 2025).

1.1. Table of Definitions of Digital Health Literacy by Experts

No	Defining Factors	References
1	Digital health literacy (DHL), also known as electronic health literacy, involves using the internet to access, understand, and evaluate health-related information to address health issues	(Darabi et al., 2025)
2	Digital health literacy refers to how well people understand and use digital tools for health. It is crucial for patients to effectively engage with and benefit from digital health tools	(Kim et al., 2025)

3	Digital health literacy is a growing need to prepare students for both professional and personal digital challenges, and should be embedded into medical curricula	(Shabbir et al., 2025)
4	Digital health literacy is a key factor influencing clinical outcomes, especially with the widespread use of digital technologies in healthcare	(Huh & Song, 2025)
5	Digital health literacy is defined as the ability to seek, find, understand, and evaluate health information from electronic sources and apply that knowledge to solve a health problem	(Aloi et al., 2025)
6	Digital health literacy is defined as the ability to assess health information from electronic sources and utilize the acquired knowledge to address or resolve health-related issues	(Julesz, 2024)
7	Digital health literacy is an individual's ability to critically evaluate available health information. It involves assessing the quality and appropriateness of internet information to obtain and apply it for health-related decisions	(Chae et al., 2025)
8	The ability of an individual to effectively use digital health tools, including telemedicine platforms, mobile health applications, and wearable device	(AlShaikh & Alwadai, 2025)
9	Digital health literacy encompasses the ability to access and comprehend health information, as well as the capacity to critically evaluate and appropriately apply it in daily life	(Carton-Erlandsson et al., 2025)
10	Digital health literacy is assessed using the G-eHEALS scale, which measures an individual's ability to seek, appraise, and apply health information from digital sources. It includes confidence in navigating online health resources and evaluating their credibility	(Hindelang et al., 2025)

Source : Research Data's, 2025

METHODOLOGY

The study was carried out in conjunction with a systematic literature review that makes use of bibliometrics for conducting a quantitative analysis of the literature for identifying the trends, patterns and principal research

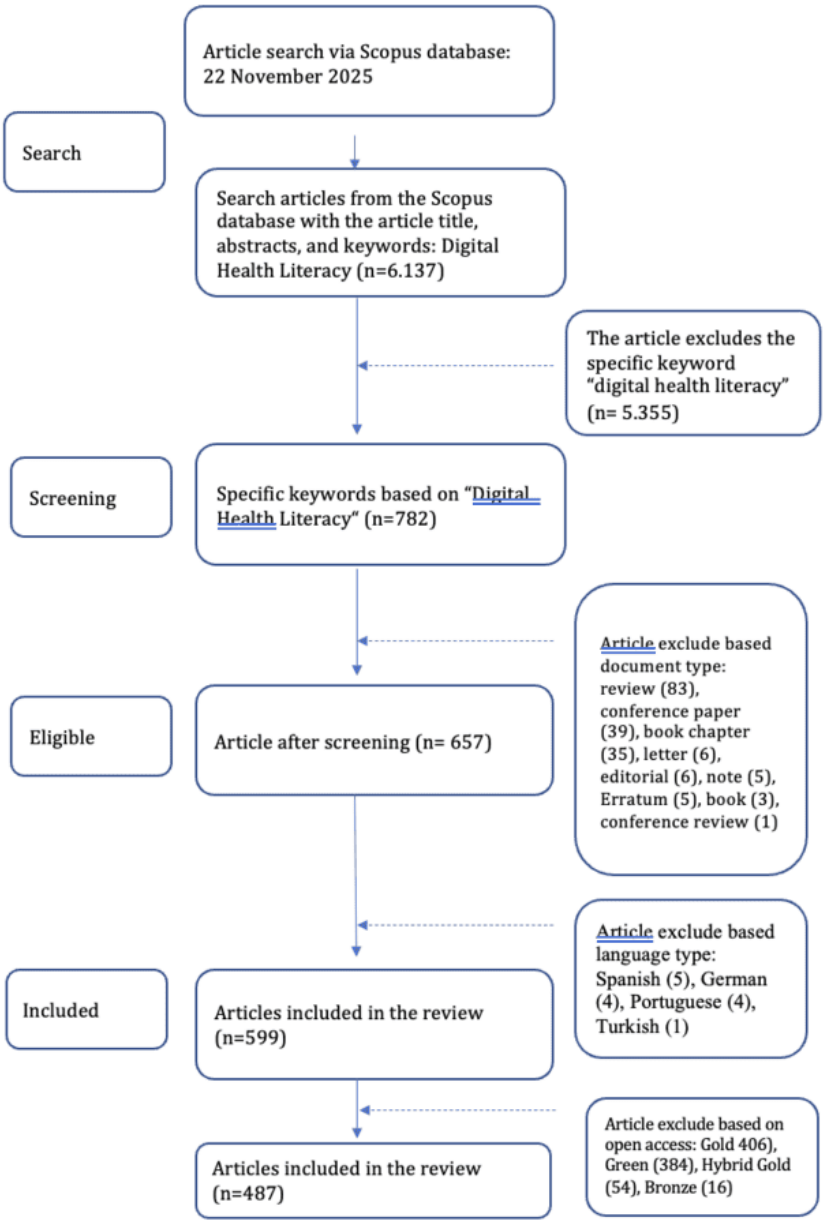
entities in a field of study. Based on structures such as Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA), the method guarantees a comprehensive and reproducible literature review to achieve a clear and transparent step of what is being studied. The inclusion criteria are as follows: (1) articles published up to November 22, 2025, (2) publications on English language-only and(3) focusing on digital health literacy (Chotisarn & Phuthong, 2025; Hadi et al., 2020)

VOSviewer, a visualization of published bibliographic data tool, was used to perform the bibliometric analysis by analyzing citation network, author collaborations and co-occurred keywords which indicate the intellectual structure and dynamics of research in this field. One of the uses is through providing an overview and analysis on past literature findings over a particular period time, where it helps set up the ground for specific research questions by highlighting certain gaps in existing knowledge (Siddaway et al., 2019)

The two methods both cover the development, historical flow and prospective direction of research in this particular field, thus becoming very useful for interdisciplinary studies to further understand. In scientific publications as well, bibliometric analysis is strategically employed and instrumentation of this was introduced by Bertrand et al. (1970) in order to rate journals according to their economic seriousness. (Marzi et al., 2025)

One of the first steps of this research is to identify the key words used; and is carried out by an approach known as macro (top-down) in which one searches from broad trajectory up to more specific studies and topics. Accordingly, considering the restriction of previous studies and no existing research on such topic, this study sets keyword "digital health literacy" as concentration in the title, abstract, and keyword section of article. Furthermore, Scopus is used by authors to search for literature, locate experts and track the most cited articles.

1.1. Figure of Screening Scopus Articles



Source : Research Data's, 2025

According to the findings gained on November 22, 2025 from the Scopus database by using the article titles, abstracts and key words: "Digital Health Literacy", there were altogether 6,137 documents. Taking into account these emerging results, an extended screening procedure was performed. First, references that did not include the exact keyword "digital health literacy" were removed (n=5,355), resulting in 782 articles. Moreover, the

screening level based on the nature of document; Articles excluded are reviews (83), conference paper (39), book chapter (35), letter (6), editorial material (6), note (5), erratum (5), books and monograph 3(books) & conference review 1. The 2nd stage led to 657 eligible articles.

We then additionally filtered for language and excluded articles in Spanish (n = 5), German (n = 4), Portuguese (n = 4), and Turkish (n = 1) leaving us with 599 articles. Subsequently, adaptations were made with regard to open access status yielding a final count of 487 articles for the present review.

RESULTS AND DISCUSSION

This research uses the Scopus database to see the extent of the scientific writing trend that raises the issue of health literacy in the digital space. As 487 articles were successfully collected after going through several screening phases. We then processed this data based on several aspects. First, we measure it through the identification of the number of articles published. Second, how digital health literacy research can evolve from year to year. Third, how is the portrait of the distribution if viewed based on each journal publisher. Finally, this study will also analyses the most influential elements in the topic of digital health literacy, including authors, affiliates, and countries involved.

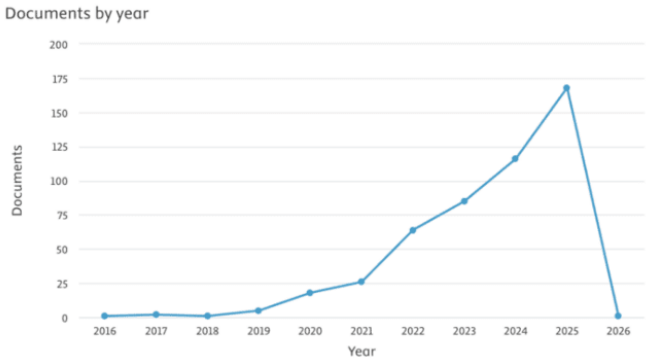
1. The Development of Digital Health Literacy in the Context of Scientific Research

Based on data taken from the Scopus database, it has been confirmed that during 2016-2025, scientific papers on digital health literacy include 487 articles; this shows that investigations into digital health literacy are experiencing significant growth, as illustrated in Figure 2.1.

The exploration of digital health literacy began its progressive development over the past decade, specifically starting in 2020. The inaugural study was conducted by Fernandez-Luque & Staccini (2016) and titled "*All that Glitters Is not Gold: Consumer Health Informatics and Education in the Era of Social Media and Health Apps*" which marked the emergence of the term now known as digital health literacy.

Currently, research on digital health literacy is starting to attract the attention of a large number of academics who concentrate on improving health information seeking behavior, the use of e-health services, and the quality of life of patients (Abdoh, 2022; Basnet et al., 2025; Keles et al., 2025)Furthermore, digital health literacy contributes significantly to self-efficacy and self-care behaviors for patients (Son & Han, 2025)

Figure 2.1. Document by Year



Source : Scopus Database

Since 2016, literature on digital health literacy has begun to emerge, but it has only shown a significant growth spike after 2020. Although the number of publications is increasing rapidly until it peaks in 2025, it creates opportunities for future researchers to delve deeper into the quality, effectiveness, and direction of these ever-evolving research trends. The surge in the number of these studies occurred because at that time the world was experiencing the COVID-19. A global event that forces everyone to avoid interaction with others. From this point of view, COVID-19 has taught humanity that healthy living behaviors cannot be underestimated. Lifestyle is a basic need that the human body needs. Then, from COVID-19, public awareness of the need for a healthy life spread widely and increased very rapidly. People are starting to be compulsive about various activities that can increase not only endurance, but also physical fitness.

During the pandemic, people also began to be aware of the need for health literacy. And because there is a lot of free time at home, the internet is the main means of finding information. This then changes people's behavior patterns in accessing information related to health needs. From the beginning they did not really care about health information, then made health information an indispensable need. Here, then, shows the role of the academic community in an effort to contribute to society through a more in-depth analysis of knowledge about lifestyle, health education, medicines, etc. This knowledge is done by producing scientific articles which we now know as health literacy in the digital world.

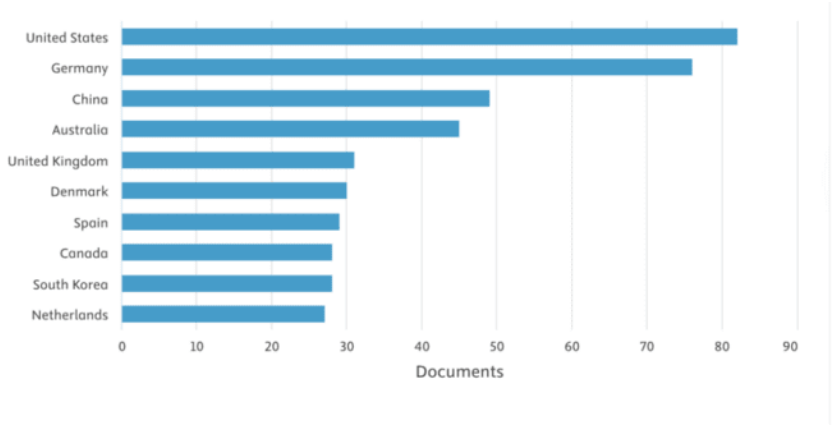
2. Digital Health Literacy Research Landscape

The analysis of the distribution of research on digital health literacy in 487 articles was carried out by categorizing articles based on classifications

such as country, region, affiliation, source, and author, with limitations only on the top 10 in each classification. In-depth insights on digital health literacy will provide benefits for academics and practitioners in clarifying future research agendas, especially in the sustainable advancement of the digital health literacy paradigm.

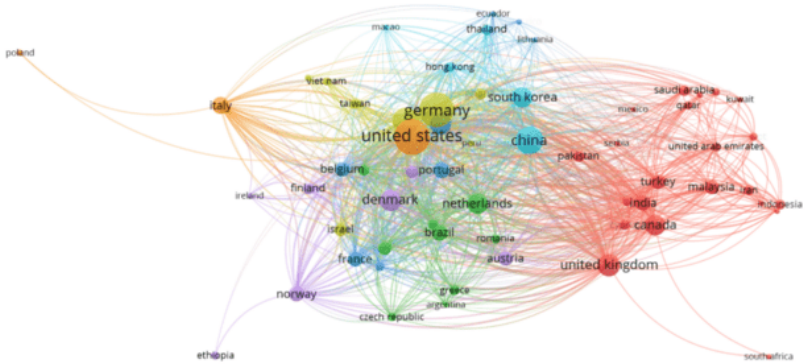
First, the allocation of scientific research related to digital health literacy categorized by country or geographic region is dominated by the United States with 82 articles, Germany with 76 articles, China with 49 articles, and Australia with 45 articles.

Figure 2.2. Documents by country



Source : Scopus Database

Figure 2.3. Network Country Visualization



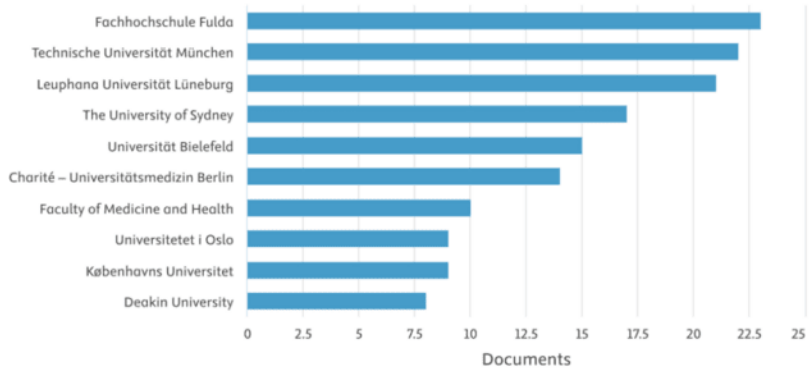
Source : VOSviewer Output

The finding from network visualization reflects a strong northeastern of developed countries in the digital health literacy research field. The US was found to play a leading role with the largest node size, indicative of the largest number of contributions as well as prominent influence in this worldwide conversation. This dominance is further compounded by the European powers of Germany and United Kingdom, who also have considerable nodes. While the domination of Western countries is clearly there, with China emerging as one of the major nodes, this shift is significant when Asian continent representatives started to take a more central place in digital health literacy literature development.

Second, the distribution of digital health literacy-related scientific research by institutional affiliation is overwhelmingly led by institutions of higher education coming from Europe in general and Germany in particular. This feature was indicated prominently by the Fachhochschule Fulda (Germany) with 23 contributions, Technische Universität München (Germany) with 22 contributions, as well as Leuphana Universität Lüneburg (Germany) with 21 articles.

Other leading contributors the University of Sydney (Australia) with 17 articles, Universität Bielefeld (Germany; 15 papers), and Charité - Universitätsmedizin Berlin (Germany) with 14 articles. This result signals a change in geographic focus with respect to other topics, which tend to emphasize the digital health ecosystem of developed countries.

Figure 2.4. Documents by Affiliation



Source : Scopus Database

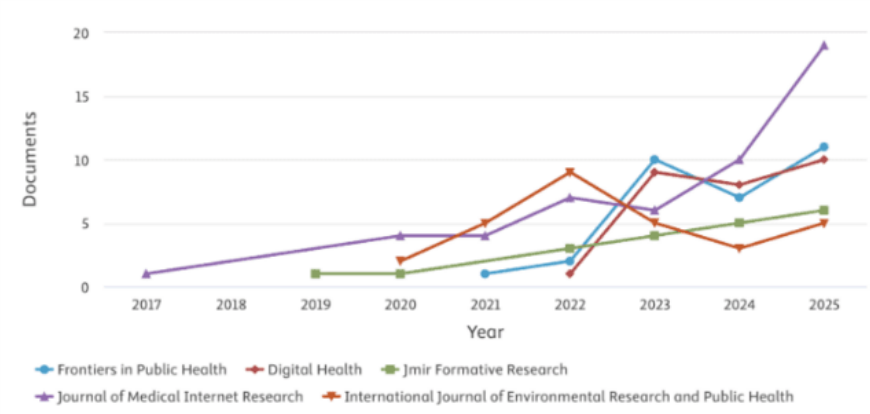
Of the 6 (six) best universities of the ranking, 5 (five) are located in Germany (Fulda, TUM, Leuphana, Bielefeld, Charité). This suggests that Germany is currently a global hub for digital health literacy research. This is

possibly the result of Germany's state-of-the-art regulation on healthcare digitalisation (such as the Digital Healthcare Act or DVG).

Third, the allocation of research on digital health literacy based on publication sources is significantly dominated by the Journal of Medical Internet Research. The journal shows the highest growth consistency, starting in 2017 and experiencing a sharp spike until it peaks in 2025 with nearly 20 articles per year.

Other prominent sources that characterize this publication landscape are Frontiers in Public Health and Digital Health, both of which show a sharp positive upward trend post-2021. On the other hand, the *International Journal of Environmental Research and Public Health* briefly dominated in 2022, but experienced a significant decline in publication trends in the following years, while *JMIR Formative Research* showed steady but moderate growth.

Figure 2.5. Number of articles by sources



Source : Scopus Database

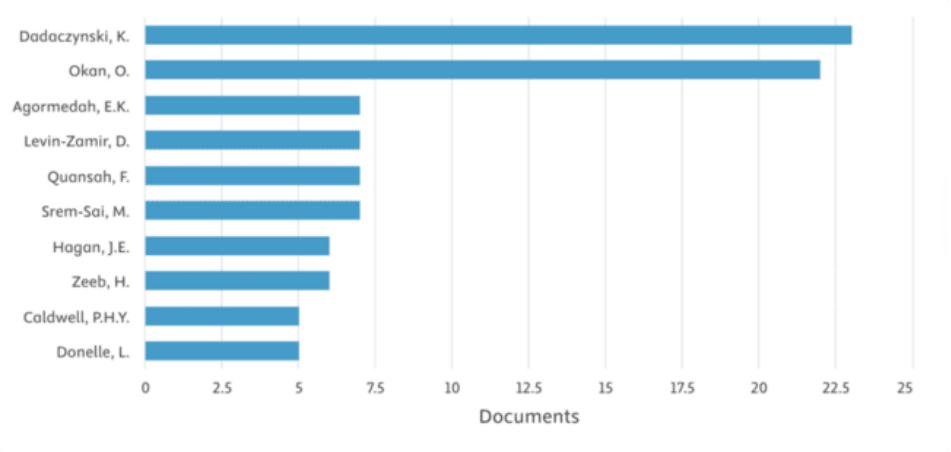
The conclusion is that the *Journal of Medical Internet Research* is the market leader in this topic. The drastic increase from 2023 to 2025 shows that researchers increasingly trust this journal as the *primary venue* to publish breakthrough findings related to digital health literacy

Fourth, the distribution of related research *Digital Health Literacy* Based on the author, it is revealed that there is a very prominent dominance of the two main researchers, it is different from the pattern of even distribution in general.

The list of top 10 authors is led by Dadaczynski, K. with 23 articles and followed by Okan, O. with 22 articles. The productivity of these two authors far exceeds that of the other authors on the list, with the next group such as

Agormedah, E.K., Levin-Zamir, D., Quansah, F., and Srem-Sai, M. each contributing 7 articles. Meanwhile, other authors such as Hagan, J.E. and Zeeb, H. followed with a range of 5 to 6 articles.

Figure 2.6. Count of Publication by Authors



Source : Scopus Database

3. Theoretical and Practical Implications in Digital Health Literacy

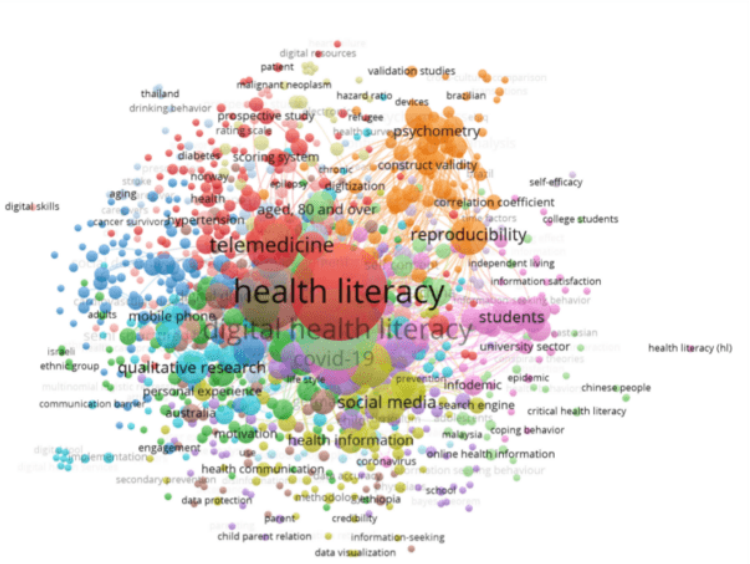
An examination was carried out on 487 manuscripts collected from the Scopus repository. VOSviewer is used to illustrate that the results of this study could have theoretical and pragmatic implications for future investigations into digital health literacy.

The results of metadata analysis using VOSviewer will help researchers and practitioners to better understand the assumptions and findings related to digital health literacy. The results of this bibliometric analysis can show which variables have been extensively researched by previous researchers and which variables have not been explored extensively, thus serving as a foundation for future studies.

From a practitioner's perspective, the results of the literature analysis using VOSviewer will help healthcare professionals in implementing digital health literacy programs in a sustainable manner in the future and promote effective digital health strategies for the wider community

The frequency of keywords that often appear are *Health literacy (301), Digital Health Literacy (217), Digital Health (141), EHealth Literacy (96), Telemedicine (88), Medical Information (67), COVID 19 (84), Adolescent, Social Media (49), Health Care Personnel (45).*

Figure 2.7. Co-occurrence framework and representation of key terms



Source: VOSviewer Output

Table 2.1. Keyword by Authors

Rank	Keyword	Total Link Strength
1	Health Literacy	6914
2	Digital Health Literacy	3998
3	Digital Health	3377
4	EHealth Literacy	2718
5	Telemedicine	2412
6	Medical Information	2072
7	COVID 19	1956
8	Adolescent	1573
9	Social Media	1329
10	Health Care Personnel	1250

Source: VOSviewer Output

Based on the results of mapping and examination of previous investigations, a gap (*deficiency*) has been identified in previous studies, where most priority studies have been carried out in developed *nations* or regions with highly established digital infrastructure, such as the United States and Germany. Therefore, future research should be conducted in developing countries or regions with significant *digital divide* challenges.

Such studies can bridge gaps in previous research and provide more comprehensive information on digital health literacy studies in improving patient empowerment and public health outcomes, which can be explored in a

universal context as well as its effectiveness in various cultural settings and socio-economic conditions. In this context, digital health literacy can play an important role in reducing health disparities and improving social well-being in a sustainable manner.

Figure 2.7. The Experience of DHL as Described by the Researchers

Source : Research Data's, 2025

The foundation of Digital Health Literacy is established on five basic dimensions that are interconnected with one another, beginning from Information. Seeking & Access. This component is a general facilitator that, with a direct reference to an individual's simple effectiveness in navigating the web to search for health resources through a number of electronic sources (Darabi et al., 2025; Aloi et al., 2025). Such factors include a person's technical search skills in selecting optimal search keywords, the ability to use search engines effectively, and also physical access to health websites or mobile health apps.

After information is achieved, the cognitive process moves on to Information Comprehension – understanding and assimilating meaning in terms of content (Kim et al., 2025; Carton-Erlandsson et al., 2025). As such, this skill refers to the ability of the person to re-cast or readapt information that she reads in her own language and also have no difficulty understanding medical instructions or digital drug dosages.

In the digital age, characterized by a high risk of misinformation, the third dimension (Critical Appraisal) is key as cognitive antidote. This idea derives from the ack of confidence in the validity, the truthworthiness and trust as well of the reliability of information before believing it (Chae et al., 2025; Julesz, 2024). Signs that success has been achieved at the level of source can also be observed in skepticism toward sensational information, ability to identify author or institution credibility and a tendency to cross-reference with other reputable outlets.

What the validated scores "boil down to" is the ability to Apply Knowledge & Problem Solving; which is defined as "the functional knowledge capacity involving medical information and the ability to apply that information explicitly in solving a problem or making a decision", including knowing when you should see a doctor, or even changing your daily lifestyle habit (Aloi et al., 2025).

The entire series of processes above is supported by the fifth dimension, namely *Technological & Interactive Proficiency*, which is related to the mastery of *tools*. This dimension includes the ability to operate digital devices and interact effectively with modern health ecosystems, such as telemedicine platforms, *mobile health* applications, and *wearable* devices (AlShaikh & Alwadai, 2025; Huh & Song, 2025). Indicators include ease in having consultations with a doctor online, and the ability to read and understand own personal data including heart rate from smart devices confidently.

CONCLUSION

There has never been a better time to study how individualised information-seeking behaviour changes, and the way we do so in response to world-wide social and political change is reflected in the number of articles about COVID-19. Based on bibliometric analysis of Scopus, the health emergency had driven transformation in seeking and utilizing information as a first mover. This is indeed easily observable in Germany, where the legislative Digital Healthcare Act (DVG), among others, had a direct stimulation of scientific production. Not only has the presence of such legal framework helped to systematize digital health practices, but they have also contributed to a rich academic ecosystem in a (potentially) causal relationship with increasing number of German institution-issued publications concerning digital health literacy. This highlights the importance of the institutional and legal infrastructure in determining the map of information behaviour research.

Moreover, the worldwide leadership position of both USA and Germany in this area is backed up by strong interinstitutional cooperation which

translates into quite a volume of coauthored papers defining the boundary of current research. Although output is dominated by high-income countries, mapping undergo analysis with VOSviewer tool reveals the increasing significance of Indonesia in the global digital health literacy discussion. Indonesia does not yet fall under the ten top producer countries, and regarding its demographic weight as the fourth most populous country on earth, this finding is of strong relevance within a mapping analysis. The development implies the beginning of digital health literacy in Indonesian academia. Yet the gap in output when compared to their developed world peers suggests that focused institutional support, and a bolstering of academic traditions, is needed in order to narrow the research divide in the Global South.

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