AG EDITOR

REVIEW

Mapping the Scientific Landscape of Social Media's Role in Digital Health: A Bibliometric and Network Analysis Using Biblioshiny, VOSviewer and Citespace

Mapeo del panorama científico del papel de las redes sociales en la salud digital: un análisis bibliométrico y de redes utilizando Biblioshiny, VOSviewer y Citespace

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ABSTRACT

This bibliometric analysis explores social media's role in digital health, examining its impact on health communication, patient engagement, and public health awareness while also addressing challenges such as misinformation, privacy concerns, and digital health literacy. The study utilizes Scopus as the bibliographic database and employs Biblioshiny, VOSviewer, and CiteSpace for data analysis and visualization. Key analyses include Annual Scientific Productions, Most Relevant Authors, and Network Visualization of Co-Citation of Cited Authors, which highlight the growth of research output, influential scholars, and academic collaboration networks. In addition, Most Relevant Sources and Timezone Network Visualization of Co-Citation of Cited Journals explore leading journals, while also weighing their influence in the shaping of the digital health discourse. The study of Countries' Scientific Production and Network Visualization of Bibliographic Coupling of Documents shows research outputs and networks at global levels. A Co-Occurrence Analysis of Author Keywords identifies themes that are dominant and emerging, with trend topics like AI-driven digital health solutions, Mobile Health apps, and digital interventions for chronic disease management. Thematic Evolution and Thematic Mapping portray the shift from generic digital health discussions to more specialized evidence-based applications. The study discovers gaps in research dealing with AI ethics, counteracting misinformation, and being inclusive in digital health interventions. Some practical implications suggest interdisciplinary efforts, formulation of digital health policies, and finding ways to improve digital literacy for ensuring equitable healthcare solutions. These findings give interesting insights into the scientific landscape of social media in digital health, further inspiring researches and policy developments.

Keywords: Social Media; Digital Health; Bibliometric Analysis; Biblioshiny; VOSviewer; Citespace.

RESUMEN

Este análisis bibliométrico explora el rol de las redes sociales en la salud digital, examinando su impacto en la comunicación sanitaria, la participación de los pacientes y la concienciación sobre la salud pública, a la vez que aborda retos como la desinformación, las preocupaciones sobre la privacidad y la alfabetización en salud digital. El estudio utiliza Scopus como base de datos bibliográfica y emplea Biblioshiny, VOSviewer y CiteSpace para el análisis y la visualización de datos. Los análisis clave incluyen Producciones científicas anuales,

Autores más relevantes y Visualización en red de la cocitación de autores citados, que destacan el crecimiento de la producción científica, los académicos influyentes y las redes de colaboración académica. Además, Fuentes más relevantes y Visualización en red de la cocitación de revistas citadas por zona horaria exploran revistas líderes, a la vez que sopesan su influencia en la conformación del discurso sobre la salud digital.El estudio de Producción científica de los países y Visualización en red del acoplamiento bibliográfico de documentos muestra los resultados y las redes de investigación a nivel mundial. Un análisis de coocurrencia de palabras clave de autor identifica temas dominantes y emergentes, con tendencias como soluciones de salud digital basadas en IA, aplicaciones móviles de salud e intervenciones digitales para el manejo de enfermedades crónicas. La evolución temática y el mapeo temático reflejan la transición de debates genéricos sobre salud digital a aplicaciones más especializadas y basadas en la evidencia. El estudio revela lagunas en la investigación sobre la ética de la IA, la lucha contra la desinformación y la inclusión en las intervenciones de salud digital. Algunas implicaciones prácticas sugieren esfuerzos interdisciplinarios, la formulación de políticas de salud digital y la búsqueda de maneras de mejorar la alfabetización digital para garantizar soluciones de salud equitativas. Estos hallazgos ofrecen perspectivas interesantes sobre el panorama científico de las redes sociales en la salud digital, lo que inspira aún más la investigación y el desarrollo de políticas.

Palabras clave: Redes Sociales; Salud Digital; Análisis Bibliométrico; Biblioshiny; VOSviewer; Citespace.

INTRODUCTION

In recent years, social media has emerged as a transformative force in digital health, fundamentally reshaping how health information is disseminated, consumed, and acted upon.[1,2] Platforms such as Twitter, Facebook, Instagram, YouTube, and LinkedIn have facilitated real-time health communication, patient engagement, and public health awareness, enabling the rapid spread of critical medical information.[3,4] During global health crises such as the COVID-19 pandemic, social media played an instrumental role in risk communication, telemedicine, and community support.[5,6] Healthcare organizations, practitioners, and researchers now increasingly leverage social media for health promotion, digital epidemiology, and policy advocacy.[7] The integration of artificial intelligence (AI) and big data analytics into social media health discussions has further amplified its relevance, allowing for predictive analytics and sentiment analysis in healthcare trends.[1,3]

Despite the apparent benefits, social media's involvement in digital health is a double-edged sword, with misinformation, privacy, and data security issues persisting to hamper its efficacy.[8] The rapid propagation of unfounded health claims and conspiracy theories has fueled significant public health risks, emphasizing the need for stringent content moderation and digital literacy initiatives.[9,10] While social media platforms offer a democratized space for health discourse, ensuring the credibility and validity of health-related information is a paramount concern.[11] As digital health technologies evolve, it is essential to understand the multifaceted dynamics between social media and healthcare to enhance its benefits while mitigating its risks.[8]

The interdisciplinary nature of social media's role in digital health extends beyond communication to domains such as behavioral health, health informatics, and patient-centered care.[12] Studies have explored the effectiveness of social media in health interventions, self-care management, and patient education, emphasizing its ability to foster peer support networks and patient advocacy.[13] The participatory nature of social media encourages individuals to share experiences, seek health advice, and engage with healthcare professionals in ways that were previously inaccessible.[14] This shift towards digital engagement has revolutionized the doctor-patient relationship, allowing for more inclusive and responsive healthcare models.[15]

The emergence of digital health has been precipitated by innovation in information and communication technologies (ICTs), changing healthcare paradigms from traditional face-to-face interactions to internet-based platforms.[16,17] Social media, as part of digital health, has played a key role in enabling interactive, real-time health discussion, hence shaping patient behavior, medical decision-making, and public health policy.[16,18] Increased reliance on digital health technologies demands an evidence-based understanding of social media's contribution to healthcare research, education, and policy practice.[19,20] While qualitative reviews of social media's contribution to digital health exist, a bibliometric analysis is needed to measure its scholarly impact, uncover main research clusters, and ascertain its trajectory in the digital health arena.[21,22]

Due to the rise in studies on social media and digital health, new methods and tools are needed to study the influence, trends, and main causes in this area.[23] Bibliometric analysis can help to review research achievements, highlight important studies, and expose the main trends in digital health research influenced by social media.[24,25] By employing advanced bibliometric tools such as Biblioshiny, VOSviewer, and CiteSpace, this study aims to provide a comprehensive analysis of how research in this area has evolved over time, highlighting emerging themes, dominant authors, and collaborative networks.[26]

Bibliometric analysis is a quantitative research method that evaluates scholarly literature through citation patterns, co-authorship networks, and thematic mapping.[27] Unlike traditional literature reviews, which may

be subjective and limited in scope, bibliometric analysis provides an objective and comprehensive overview of research trends.[28,29] By analyzing citation metrics, keyword co-occurrence, and authorship collaborations, this study seeks to map the evolution of social media in digital health research.[30,31] The analysis will also reveal the impact of specific articles, research institutions, and countries in shaping the discourse on digital health, offering valuable insights for academics, practitioners, and policymakers.[32,33,34]

This study focuses on the bibliometric analysis of academic literature related to social media's role in digital health, covering research articles, conference papers, and reviews indexed in the major database Scopus.[35] The scope extends to identifying research trends, emerging topics, and influential contributors in the domain of social media-driven digital health interventions.[35] The study also examines the interdisciplinary connections between social media, health communication, artificial intelligence, and behavioral sciences. The bibliometric analysis spans the past two decades to capture the evolution of this research field, reflecting shifts in digital health adoption, technological advancements, and global health crises.

This bibliometric analysis is designed to evaluate the progression of publications related to the role of social media in digital health, as well as identify major contributors to this area. By studying citation patterns, ties between authors, and shared keywords, the researchers seek to highlight significant research trends and thematic groups in digital health literature. Besides, the analysis strives to spot new patterns and areas where there is still much to learn, helping with planning future steps in social media-driven digital health interventions. In addition, looking at the research methods and background theories in this field helps clarify the approaches used in digital health practices. Overall, these aims support a thorough analysis of discussions on social media and digital health, and provide directions for research, policy making, and practical usage in the healthcare field.

To conduct an in-depth bibliometric analysis, this study utilizes three cutting-edge bibliometric tools—Biblioshiny, VOSviewer, and CiteSpace—each offering certain analysis functionalities to explore the academic landscape of social media's contribution to digital health.[36,37] Biblioshiny, a web-based R package, provides a user-friendly interface for bibliometric analysis, allowing researchers to generate publication trends, co-citation network visualizations, and thematic developments map with ease.[38,39,40] VOSviewer, which is acclaimed for its excellence in the construction and visualization of bibliometric networks, is particularly well-suited to mapping co-authorship relationships, keyword co-occurrences, and citation relationships, revealing collaborative research structures and seminal studies.[41,42,43,44] Conversely, CiteSpace, a Java-based application, is particularly adept at tracking the intellectual evolution of a research field by detecting citation bursts, ascertaining emerging research fronts, and revealing essential knowledge structures.[45,46,47] The purpose of this study is to provide a comprehensive review through the combination of these three tools, studying earlier achievements and future directions in social media and digital health. The frame allows the study to support debate among academics, discuss new ideas, and suggest next steps for digital health.
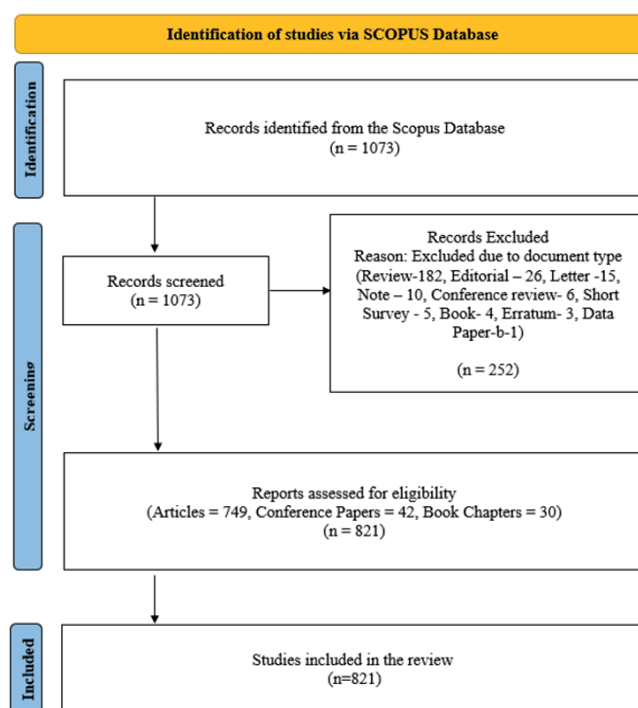
METHOD

Figure 1. PRISMA flow diagram used to identify, screen, and include papers in the bibliometric analysis

The bibliometric data for this study was sourced from Scopus, a widely recognized and comprehensive database of peer-reviewed scientific literature, ensuring the inclusion of high-quality research outputs. [48,49,50] The search strategy employed a targeted Boolean query: (TITLE-ABS-KEY ("Social Media") AND TITLE-ABS-KEY ("Digital Health")), retrieving relevant publications that explicitly discuss the intersection of social media and digital health. No language restrictions were imposed to maximize coverage, and the dataset comprised records from various document types, including peer-reviewed journal articles, book chapters, and conference papers. To maintain the integrity and relevance of the dataset, a rigorous screening process was conducted, eliminating duplicate entries and irrelevant document types such as reviews, editorials, books, notes, letters, data papers and short surveys. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework (figure 1) was employed to guide the inclusion and exclusion process. Initially, 1 073 records were retrieved from Scopus, but 252 records were excluded due to their classification as non-primary research outputs. The final dataset, comprising 821 records (749 journal articles, 42 conference papers, and 30 book chapters), was deemed suitable for bibliometric analysis. The refined dataset was stored in CSV and RIS formats for structured analysis using CiteSpace (version 6.2. R3 Advanced), VOSviewer, and Biblioshiny (Bibliometrix R package).

RESULTS
Main information of the investigation
The bibliometric analysis of social media in digital health covers the years 2012–2025, with 821 publications from 404 journals, books, and conference proceedings, registering a high growth rate of 35,91 % per annum. The research is relatively new, with an average document age of 2,86 years, and has attracted strong academic attention, as reflected in a mean of 12,16 citations per paper and 35,484 total citations. There are 3 752 Keywords Plus (ID) and 2 570 Author's Keywords (DE) in the database, reflecting the thematic richness of the field. Collaboration is the dominant characteristic, with 4,572 authors, but only 50 single-authored papers and a mean of 6,21 co-authors per paper, reflecting great teamwork in this research field. Additionally, 29,6 % of publications involve international collaborations, emphasizing its global significance. In terms of publication types, journal articles dominate (749), followed by book chapters (30) and conference papers (42), confirming that peer-reviewed journals are the primary platform for disseminating research in this evolving interdisciplinary field. The findings suggest that social media's impact on digital health is an expanding and globally relevant research area, with increasing collaboration and growing academic influence.

Most Relevant Authors
The most relevant authors, based on the number of published documents, are led by Myneni, S., who has contributed nine publications. Close behind are Dadaczynski, K. and Singh, T., each with eight documents. Lupton, D., Merchant, R.M., and Okan, O. have all made significant contributions with seven publications each. Donelle, L. follows with six documents, while Bucci, S., Caldwell, P.H.Y., and Carlson, B. each have five publications. These ten authors have played an essential role in shaping the discourse around social media and digital health, likely addressing topics such as online health communication, digital health literacy, and the impact of social media on public health. Their collective research provides valuable insights into how digital platforms influence health behaviors, access to health information, and healthcare delivery.

Annual Scientific Productions
Figure 2 illustrates the publication trend, which demonstrates exponential growth over the years, highlighting increasing academic interest in this domain. From 2012 to 2016, research activity was minimal, with only 1 to 9 articles published annually. However, from 2017 onward, there was a steady rise, with the number of publications doubling or significantly increasing each year. The sharpest increase occurred between 2020 and 2024, where the number of articles surged from 60 in 2020 to 212 in 2024, reflecting the growing importance of social media in digital health discussions, possibly influenced by global health crises like COVID-19. The year 2025, with 54 publications by February, suggests that research output will likely surpass previous records by the end of the year. This trend signifies a maturing research field, with increasing contributions from diverse researchers, institutions, and international collaborations, reinforcing the relevance of social media as a transformative force in digital healthcare.

Thematic clusters also reflect the expanding scope of digital health research. Cluster #7 (LGBTQ+ Patient Experience, 43 members, Silhouette 0,855) focuses on inclusive healthcare solutions, while Cluster #10 (Pregnancy and Mothering, 24 members, Silhouette 1,000) and Cluster #11 (Miscarriage Support, 21 members, Silhouette 0,878) highlight the use of digital health tools in maternal care and mental health support. Cluster #12 (Health Communication Research, 21 members, Silhouette 0,915) examines social media's role in health education and misinformation, with Fox S (29 citations) and Li Y (10 citations) among the leading contributors. Overall, this co-citation network provides a comprehensive view of the intellectual structure of digital health

research, revealing dominant themes, emerging fields, and key authors shaping the discourse.
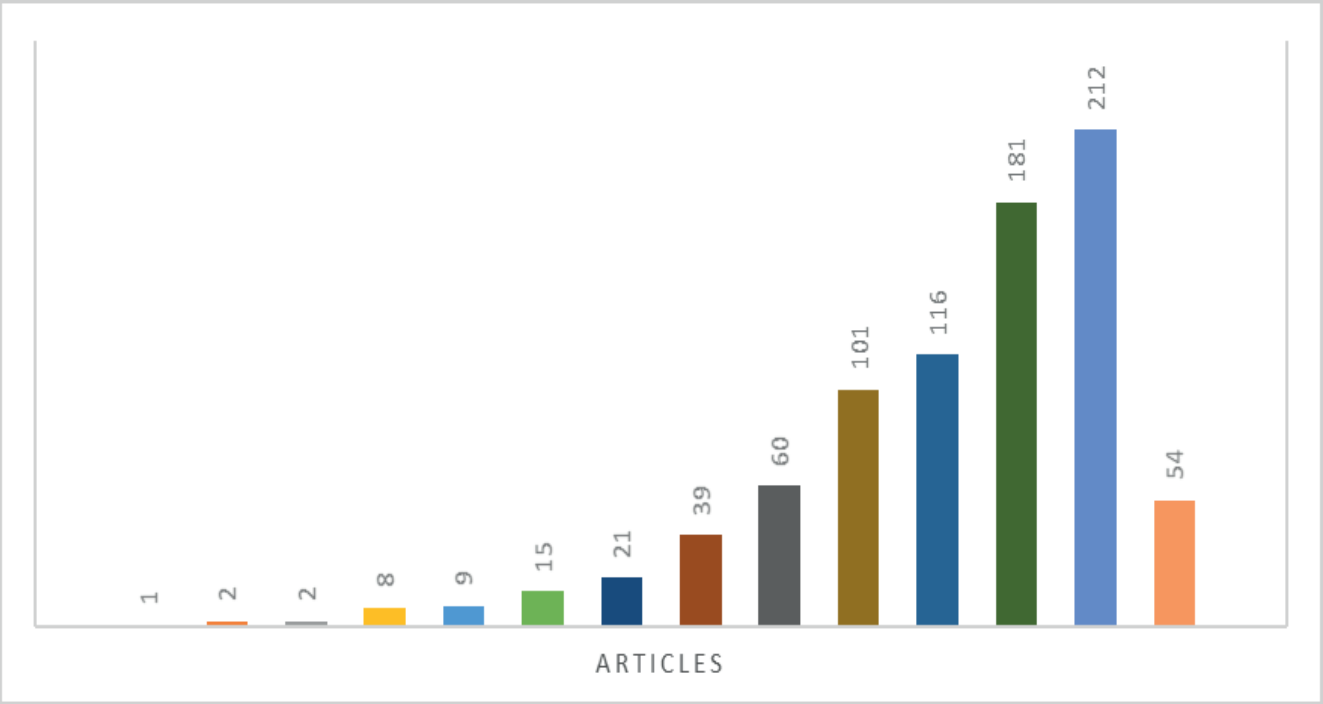

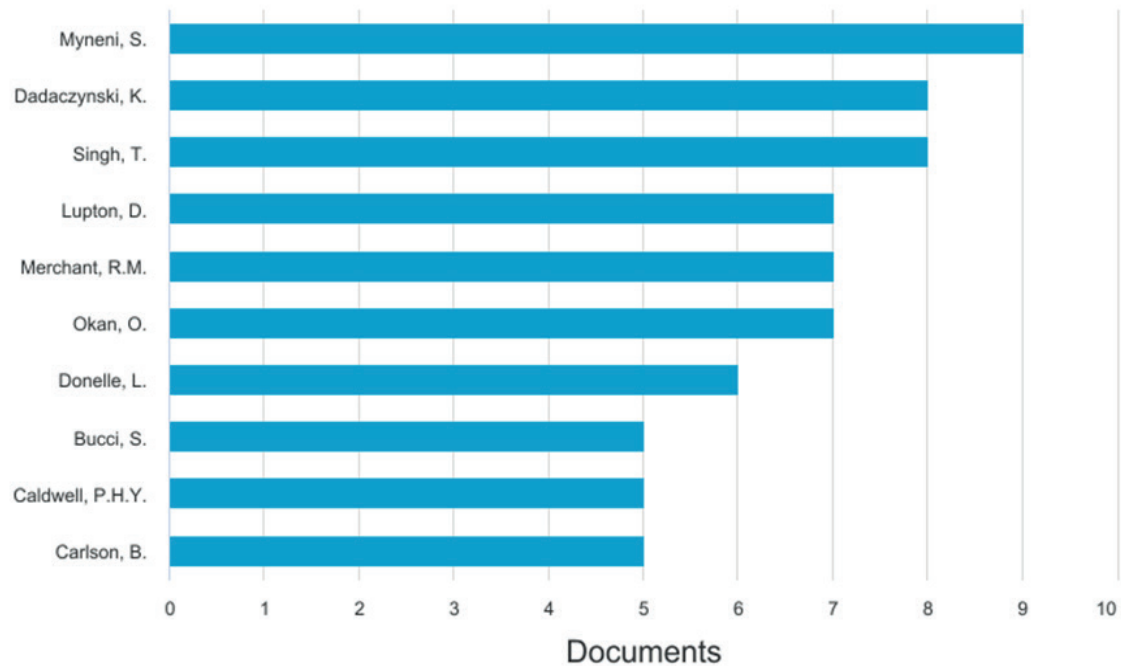**Figure 2.** The trajectory of publication growth from 2012 to 2025

Figure 3. Most relevant authors

Network visualization of co-citation of cited authors

Figure 4 presents a co-citation network visualization, which maps the relationship between cited authors based on how frequently they are cited together in digital health and social media research. The network consists of 14 major clusters, each representing a distinct thematic area within the field. The size of the nodes corresponds to the citation strength of an author, while the links between nodes indicate the frequency of co-citation, with stronger links signifying closer intellectual connections. The silhouette value of each cluster measures the cohesion of research themes, with values close to 1,0 indicating strong clustering quality. This network helps identify key researchers, influential studies, and major thematic areas shaping the field.

Among the largest clusters, Cluster #0 (Understanding Trust Determinants, 65 members, Silhouette 0,656) focuses on digital health literacy, patient trust in online health resources, and misinformation management.

It includes foundational scholars such as Bandura A (26 citations), Chen J (18 citations), and Creswell JW (16 citations), reflecting a strong influence of psychology, behavioral theories, and qualitative research methods in understanding trust determinants in digital health. Similarly, Cluster #1 (Digital Health Literacy, 54 members, Silhouette 0,819) highlights how individuals interact with digital health information, particularly during the COVID-19 pandemic. Key contributors such as Norman CD (42 citations) and Dadaczynski K (22 citations) indicate a research focus on health information-seeking behavior and digital health literacy measurement.

Cluster #2 (Crowdsourcing, 51 members, Silhouette 1,000) is one of the most highly cited and well-defined clusters, with Swan M (2012) as the most influential author (313 citations). This cluster explores how crowdsourcing, participatory medicine, and the quantified self-movement have shaped digital health research. Meanwhile, Cluster #3 (Scoping Review Protocol, 50 members, Silhouette 0,805) focuses on bibliometric analyses and systematic reviews, featuring influential researchers such as Wang X (13 citations) and Mesko B (12 citations), emphasizing the mapping of research trends, publication patterns, and knowledge dissemination in digital health.

Several other clusters highlight emerging and specialized research areas. Cluster #5 (Growing Field, 48 members, Silhouette 0,78) and Cluster #8 (Behavioral Medicine, 31 members, Silhouette 0,819) focus on digital mental health interventions, mHealth apps, and behavioral health management. Torous J (31 citations) and Michie S (30 citations) are leading scholars in these fields, contributing to the development of digital psychiatry and behavioral change models. Additionally, Cluster #6 (Digital Health Research Methods, 47 members, Silhouette 0,931) features Eysenbach G (77 citations), Braun V (61 citations), and Venkatesh V (10 citations), who have pioneered methodologies for evaluating digital health technologies, telehealth interventions, and AI-driven healthcare solutions.
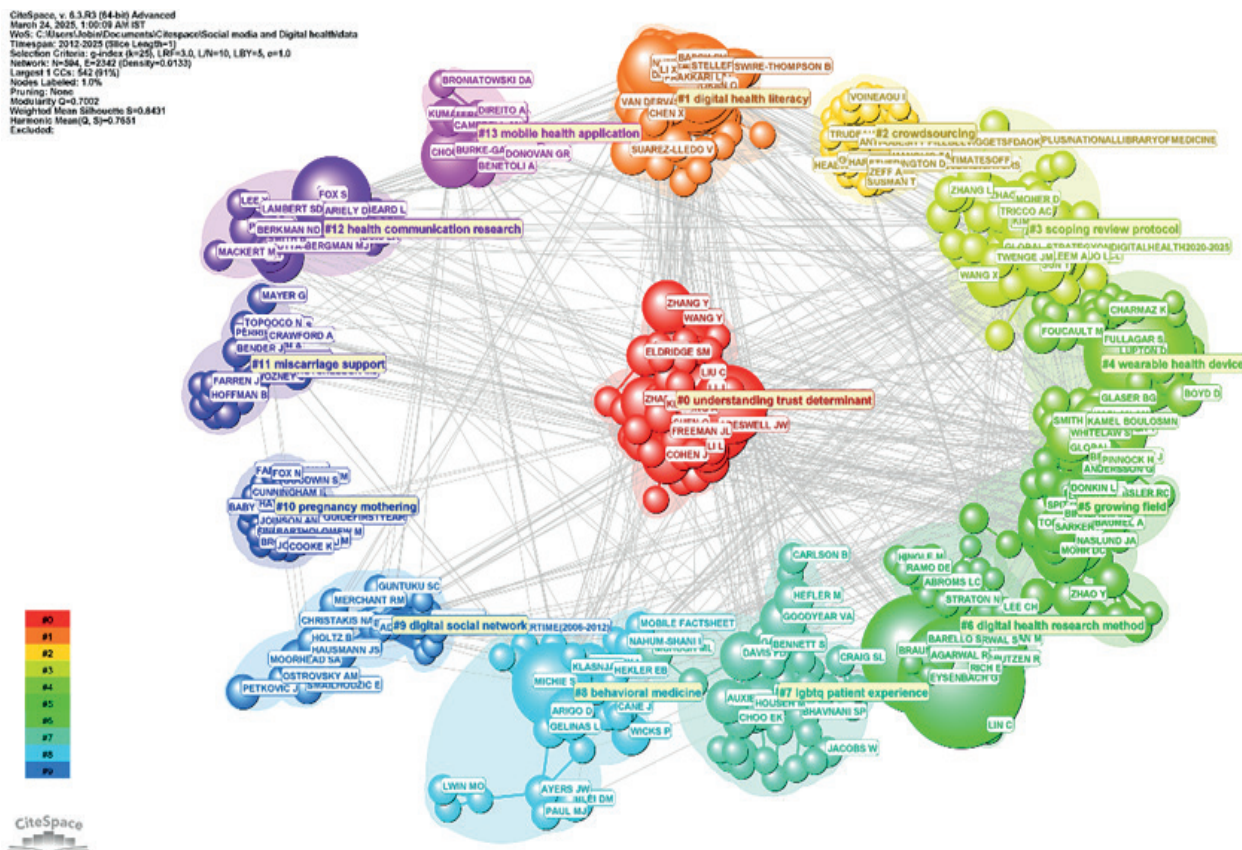

Figure 4. Network visualization of co-citation of cited authors

Most Relevant Sources

Table 1 presents the most relevant journals that publish social media's role in digital health research, led by the Journal of Medical Internet Research (JMIR) with 86 articles, demonstrating its dominance in the field. JMIR Formative Research (44 articles) and Digital Health (30 articles) are also key publication venues, demonstrating their focus on digital health innovations and online health communication. The International Journal of Environmental Research and Public Health (27 articles) and BMJ Open (26 articles) further demonstrate the interdisciplinary nature of this research, encompassing public health, policy, and environmental health perspectives. Journals such as Frontiers in Digital Health (22 articles) and Frontiers in Public Health (11

articles) emphasize the growing impact of digital interventions in healthcare and population health studies. The presence of JMIR Mental Health (11 articles) and JMIR Research Protocols (11 articles) suggests a strong focus on mental health interventions and research methodologies within the domain of social media-driven healthcare. Lastly, Social Science & Medicine (8 articles) highlights the sociological and behavioral dimensions of digital health, emphasizing the broader societal impacts of social media in healthcare. This distribution of articles across journals demonstrates a multidisciplinary approach, with contributions spanning medicine, public health, digital innovations, and social sciences, reinforcing the critical role of social media in contemporary healthcare research.

Table 1. Most relevant sources	
Sources	**Articles**
Journal of Medical Internet Research	86
JMIR Formative Research	44
Digital Health	30
International Journal of Environmental Research and Public Health	27
BMJ Open	26
Frontiers in Digital Health	22
Frontiers in Public Health	11
JMIR Mental Health	11
JMIR Research Protocols	11
Social Science and Medicine	8

Timezone network visualization of Co-citation of Cited Journals

Figure 5 presents a timezone network visualization of the co-citation of cited journals, identifying key academic journals frequently cited together in research on digital health and social media. The network consists of 8 clusters, each representing a distinct thematic area within the research field. The size of each node corresponds to the citation strength of a journal, while links between nodes indicate co-citation relationships, with stronger links signifying closer intellectual connections. The silhouette value of each cluster measures the consistency of the thematic grouping, with values close to 1,0 indicating strong clustering quality. The most cited journal in each cluster represents the primary academic source driving research in that area.

Among the largest clusters, Cluster #0 (Scoping Review Protocol, 142 members, Silhouette 0,716) is the most dominant, focusing on systematic literature reviews, bibliometric analysis, and research methodology in digital health. The most cited journals in this cluster include Journal of Medical Internet Research (203 citations), BMJ (83 citations), and The Lancet (82 citations), which are foundational sources for health informatics, clinical trials, and evidence-based medicine. Similarly, Cluster #1 (Behavioral Medicine, 97 members, Silhouette 0,83) explores the intersection of psychology, behavior change, and digital health interventions, with PLOS ONE (139 citations) and Journal of Medical Internet Research (81 citations) being the most influential sources in this category.

Cluster #2 (Content Analysis, 78 members, Silhouette 0,823) highlights research on digital health literacy, misinformation, and credibility of online health information. The dominance of JMIR Mental Health and Journal of Medical Internet Research in this cluster underscores the importance of digital interventions in shaping health behaviors. Meanwhile, Cluster #3 (Participatory Biocitizen, 74 members, Silhouette 0,963) focuses on crowdsourced health research and participatory medicine, with Nature (19 citations) and Telemedicine and e-Health (17 citations) serving as primary sources for studies on personalized medicine and digital citizen participation in health research.

Thematic clusters also highlight specialized areas within digital health research. Cluster #4 (Pregnancy and Mothering, 68 members, Silhouette 0,923) examines how digital tools and social media impact maternal health, self-care, and child health, with Psychological Bulletin emerging as the most frequently cited journal. Cluster #5 (Young Adult Cancer Survivor, 59 members, Silhouette 0,818) focuses on digital health interventions for cancer survivors, with Trials (27 citations) and Pediatrics (22 citations) as leading sources. Additionally, Cluster #6 (Health Information, 59 members, Silhouette 0,816) explores public health communication and digital literacy, with BMC Public Health (97 citations) as the most influential journal.

The smallest yet specialized cluster, Cluster #7 (Therapeutic Publics, 10 members, Silhouette 0,977), focuses on digital health communication and global public health influence, with Science (33 citations) and The Lancet (13 citations) as primary academic sources. This cluster represents an emerging area where digital health tools are evaluated in the context of public policy, misinformation, and media-driven health narratives. Overall,

this co-citation network reveals the intellectual structure of digital health research, emphasizing key journals driving scholarship, major research themes, and interdisciplinary connections shaping the field.
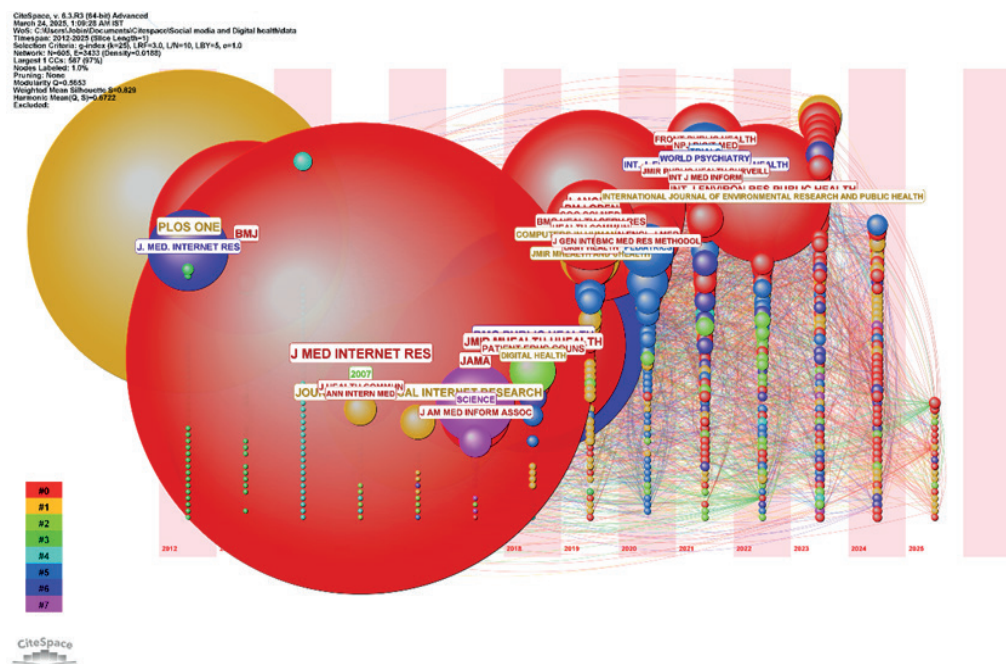

Figure 5. Timezone Network visualization of co-citation of cited journals

Countries Scientific Productions

Table 2 highlights the scientific output by country, showing that research in this domain is globally distributed, with developed nations leading the field. The United States is the top contributor, with 303 publications reflecting its strong academic infrastructure, significant funding for digital health research, and the widespread adoption of social media-driven healthcare initiatives. The United Kingdom (132 documents) and Australia (106 documents) also demonstrate high research activity, likely driven by government-supported digital health policies and academic institutions prioritizing health informatics and technology.

Other notable contributors include Canada (58 documents) and Germany (57 documents), emphasizing the growing interest in digital health solutions and social media interventions in these regions. China (45 documents) follows closely, reflecting its rapid advancements in AI-driven healthcare applications and digital public health initiatives. European countries such as Spain (31 documents), Switzerland (29 documents), and Italy (26 documents) also contribute significantly, highlighting the increasing recognition of digital platforms in healthcare communication, patient engagement, and public health monitoring. India (30 documents) is a key contributor from the Global South, showcasing its expanding digital health infrastructure and the role of social media in addressing healthcare accessibility challenges. Overall, the global spread of research output suggests an interdisciplinary and collaborative approach to understanding and leveraging social media in digital health, with increasing contributions from both developed and emerging economies.

Table 2. Countries Scientific Productions	
Country/Territory	**Documents**
United States	303
United Kingdom	132
Australia	106
Canada	58
Germany	57
China	45
Spain	31
India	30
Switzerland	29
Italy	26

Network Visualization of Bibliographic Coupling of Documents

Figure 6 presents a bibliographic coupling network of documents, generated using VOSviewer, with a minimum citation threshold of 20. Out of the 821 documents analyzed, 125 surpassed the threshold, and the network has 105 items in 12 clusters. Bibliographic coupling measures the similarity of documents based on their common references, allowing the mapping of thematic relationships within a research area. Each node's size represents the citation strength of a document, and connections between nodes represent the degree of bibliographic coupling. Larger nodes, such as Fitzpatrick (2017), Swan (2012), and Torous (2021), demonstrate that these publications are highly influential in their research areas.

The network consists of 12 clusters, each representing a unique thematic field within the broader research domain. Cluster 1 (Red) contains Fitzpatrick (2017), one of the most cited and central articles, illustrating its foundational contribution to subsequent research. Other dominant clusters, such as Cluster 3 (Blue), containing Torous (2021), and Cluster 8 (Brown), containing Swan (2012), represent specialized research domains that have emerged over time. Several connected nodes and cross-cluster citations signify thematic overlap, whereby different research domains draw upon the same references, constituting a multi-disciplinary discourse in digital health and social media research.

This bibliographic coupling analysis highlights key documents driving intellectual progress, revealing major research themes and influential studies. The strong connectivity within clusters suggests that research in this field is highly collaborative and interdisciplinary, with many studies building upon common sources. The existence of multiple smaller nodes signifies emerging research areas that are beginning to gain academic traction. This visualization is valuable for researchers as it helps identify key studies, track knowledge evolution, and explore research gaps within the field of digital health, social media, and public health interventions.
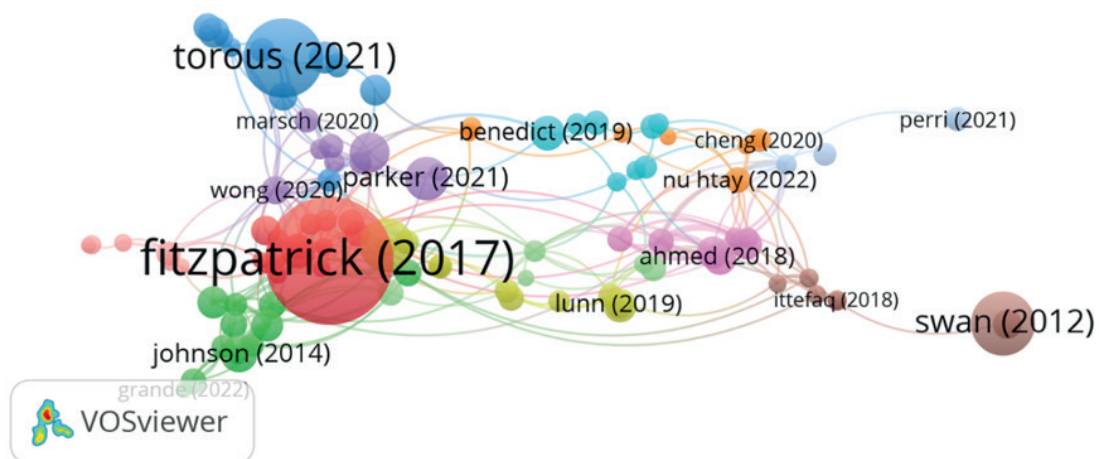

Figure 6. Network visualization of bibliographic coupling of documents

Co-occurrence of all keywords

The co-occurrence network visualized in figure 7 represents the interrelation of author keywords, highlighting key research topics and their connectivity within the field of social media and digital health. With a minimum occurrence threshold of 5, out of 2 570 keywords, 159 met the threshold, forming a network of 109 items categorized into 9 clusters. Each cluster, represented by different colors, signifies distinct thematic areas in the research landscape. The size of the nodes indicates keyword frequency, with larger nodes representing more frequently occurring terms, and links between nodes illustrate the strength of associations between concepts.

The most dominant keyword is "Digital Health" (390 occurrences), followed by "Social Media" (258 occurrences), "COVID-19" (100 occurrences), "Mental Health" (58 occurrences), and "mHealth" (51 occurrences). These central terms indicate that digital health technologies, social media platforms, and pandemic-related health research are core themes in this research domain. Other frequently occurring terms such as "Public Health," "Artificial Intelligence," "Telemedicine," and "Health Literacy" reflect growing interest in AI-driven healthcare solutions, mobile health applications, and the role of digital communication in health literacy and patient engagement. The presence of "Twitter" and "Facebook" within the network highlights the relevance of specific social media platforms in health-related studies, suggesting that researchers are actively investigating their impact on public health communication, misinformation, and behavioral health interventions.

The diversity of clusters suggests a multidisciplinary research approach, where various subfields intersect, such as digital health interventions, AI-driven analytics, telemedicine adoption, and public health policies.

The strong connectivity among clusters implies that research areas are not isolated but interlinked, promoting cross-disciplinary insights. The emergence of AI-related terms like "Machine Learning" and "Natural Language Processing" indicates the integration of advanced computational techniques in health research. As digital health continues to evolve, future research is likely to focus on personalized healthcare, AI-driven diagnostics, and ethical considerations in digital health technologies, making this co-occurrence network a valuable tool for understanding knowledge structures and research trends.
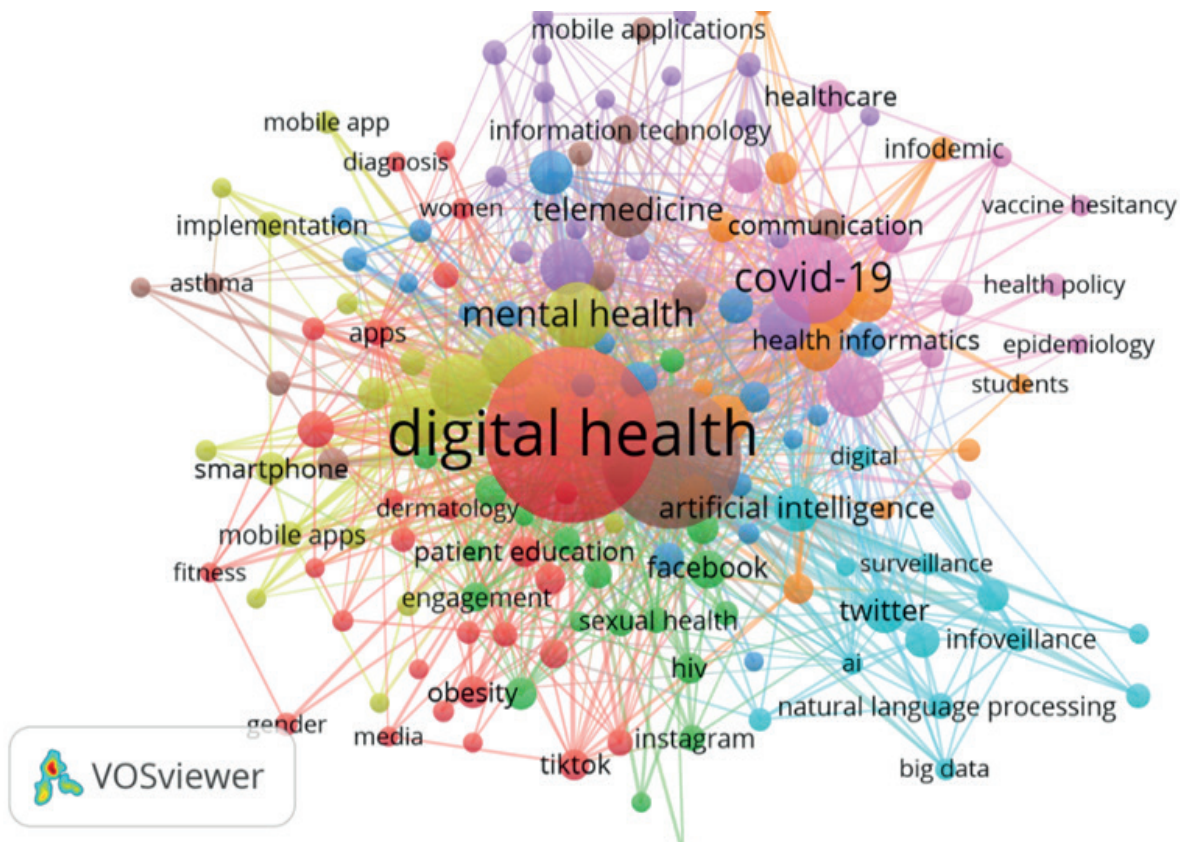

Figure 7. Co-occurrence of author keywords

Trend Topics

Figure 8 illustrates the evolution of key research topics from 2013 to 2025, highlighting the changing focus of academic discourse. The size of each bubble represents the frequency of term usage, with larger bubbles indicating higher research interest. Over time, "digital health," "social media," and "public health" have remained dominant themes, reflecting the integration of digital platforms into healthcare communication, patient engagement, and medical interventions. The peak in "COVID-19" research from 2020 to 2021 aligns with the global pandemic, which accelerated discussions on telemedicine, misinformation management, and public health strategies via digital platforms. Additionally, "mobile application" and "internet" have emerged as critical topics, highlighting the increasing reliance on mobile technology and online services for healthcare delivery. The presence of "procedures" and "human" suggests a growing interest in clinical applications of digital health solutions, particularly in diagnostics, treatment, and remote patient monitoring.

Several emerging themes indicate the broadening scope of digital health research. The appearance of "sexual and gender minority" and "confidentiality" underscores the increasing focus on health equity, inclusivity, and ethical challenges in digital healthcare. The prominence of "needs assessment" and "statistics and numerical data" reflects the data-driven nature of modern healthcare research, where analytics play a significant role in decision-making and policy formulation. Additionally, that "pediatrics" and "middle-aged" are popular topics reflects a shift towards age-specific health interventions, such that digital health solutions are designed for particular demographic groups. Future research is likely to continue investigating AI-driven health analytics, data privacy in digital healthcare, and the long-term implications of social media on patient behavior and public health awareness. These results provide a roadmap for future research, guiding the development of personalized, ethical, and technology-driven healthcare solutions.
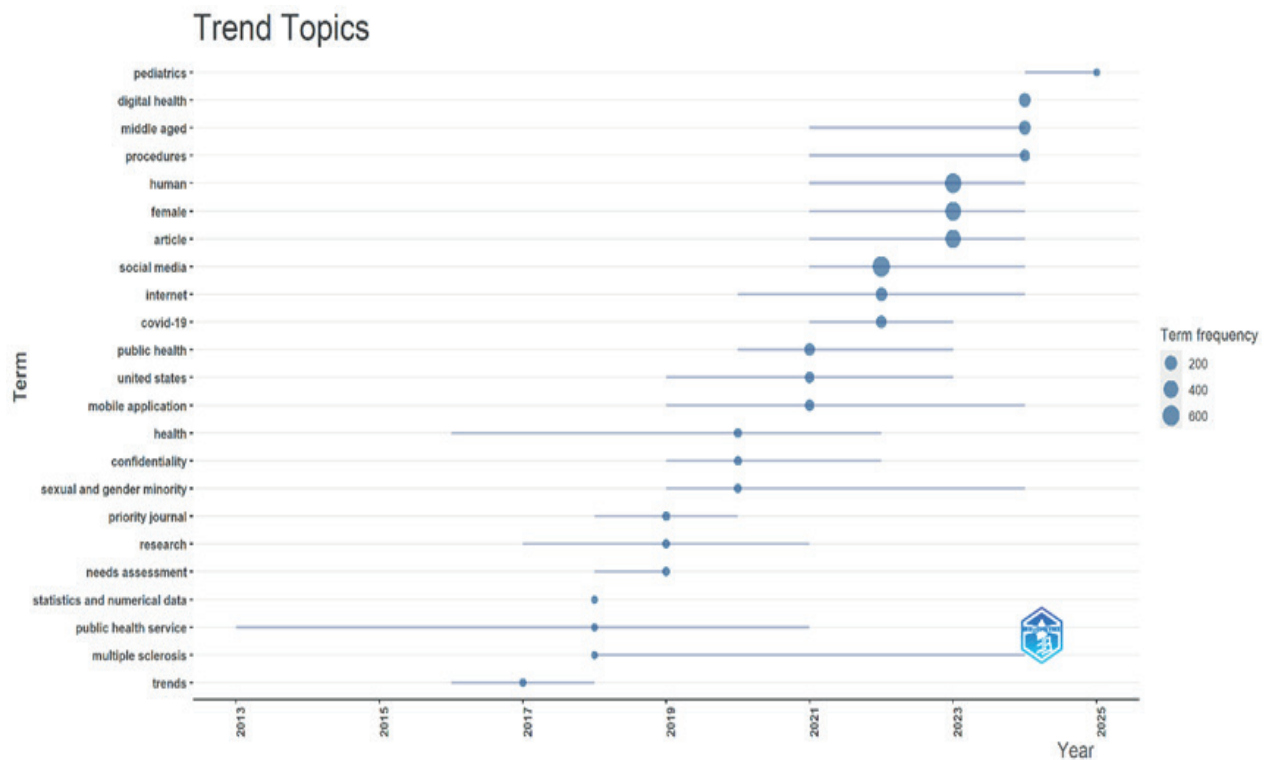
Figure 8. Visualization of trending topics in the realm of research
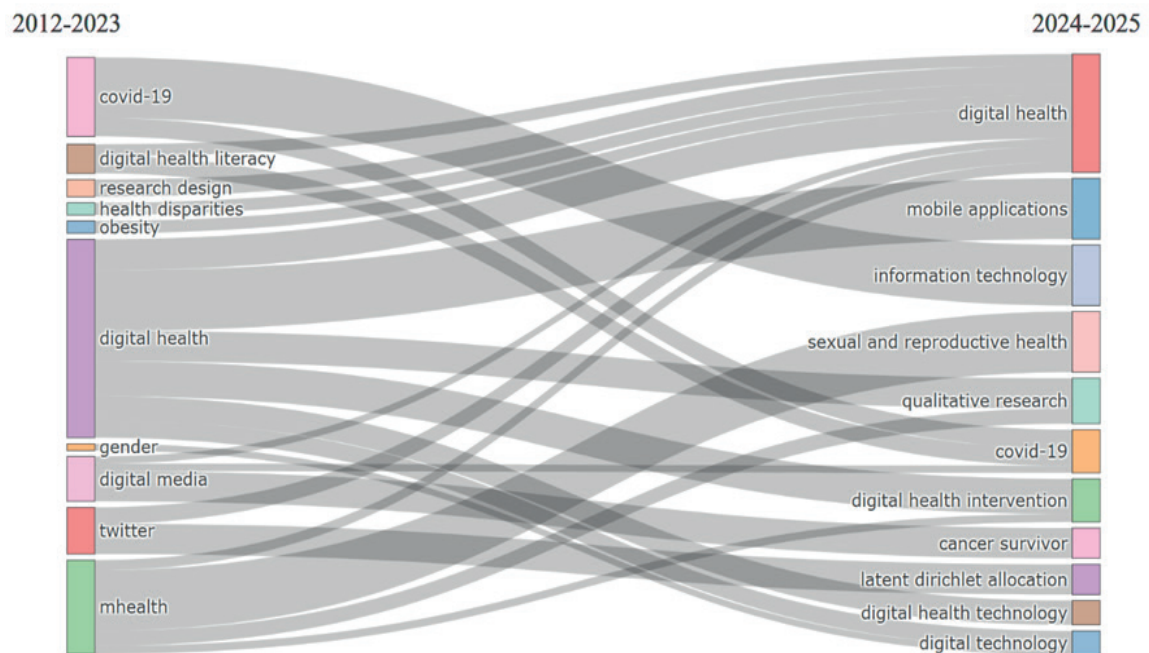
Thematic Evolution

Figure 9. Thematic evolution of research from 2012–2023 to 2024–2025

Figure 9 illustrates the thematic evolution of research from 2012–2023 to 2024–2025, showing shifts in focus and emerging trends. "Digital health" remains the dominant theme but evolves into digital health interventions, technology, and mobile applications, showing greater attention to the role of technology in healthcare delivery. COVID-19 research continues but with a shifting focus on long-term digital health applications rather than pandemic control. New emerging themes of "mobile applications," "information technology," and "sexual and reproductive health" reflect the expanding use of digital solutions to personalized medicine, gender-responsive interventions, and public health responses. The greater presence of "qualitative research" also indicates more

interest in patient experiences and human-centered healthcare approaches, while the presence of "Latent Dirichlet Allocation (LDA)" indicates more use of AI and machine learning in digital health research. The emergence of "cancer survivor" as a new theme indicates growing interest in the application of digital health to the management of chronic disease and survivorship care. The field of research as a whole is progressing from general digital health to more specific applications, highlighting the growing intersection of healthcare, technology, and social sciences in developing more targeted, inclusive, and data-driven health solutions.

Thematic Map

Figure 10 presents a thematic map analyzing the development and relevance of research themes. The x-axis (Relevance Degree or Centrality) represents the importance of themes in the research field, while the y-axis (Development Degree or Density) indicates the maturity and depth of research within each theme. The map categorizes topics into four quadrants: Basic Themes, Motor Themes, Niche Themes, and Emerging or Declining Themes. Basic themes, which fall in the lower-right quadrant, include "digital health," "social media," "mental health," "COVID-19," "public health," and "internet." These are fundamental and established topics that form the core of research in this field, with high relevance but with lower developmental complexity. That "mHealth," "mobile phone," and "mobile health" are found in proximity to these themes reflects the central role played by mobile-based health solutions in public health campaigns and digital interventions.

In the upper-right quadrant (Motor Themes), we find "digital health intervention," "HIV," "randomized controlled trial," "obesity," "pregnancy," and "diet." These are mature and relevant themes, suggesting they are drivers of digital health research. Their presence heralds a shift towards evidence-based digital health interventions, clinical trials, and personalized medicine applications. The focus on HIV and obesity in digital health interventions suggests ongoing research in the use of digital modalities for chronic disease management and behavioral changes in health. Similarly, the presence of "pregnancy" and "diet" suggests increased engagement of digital health in maternal health and nutrition-based interventions. This quadrant represents mature and influential research fields that will continue and evolve.

The upper-left quadrant (Niche Themes) includes "digital media," "diagnosis," "feminist new materialism," "physical activity," "pediatrics," "exercise," "apps," "self-management," and "women." These are highly developed themes with lower centrality, i.e., specialized research areas with focused applications. The emphasis on pediatrics, exercise, and self-management reflects developing interest in digital health applications in children's health and self-management care apps. The presence of "feminist new materialism" and "women" reflects increasing interest in gendered health interventions and sociocultural facets of digital health. In contrast, the lower-left quadrant (Emerging or Declining Themes) features "artificial intelligence," "machine learning," and "natural language processing." While these topics currently have lower relevance, they represent emerging fields with the potential to reshape digital health research through AI-driven diagnostics, automation, and data-driven healthcare models. As AI and machine learning technologies continue to advance, these themes may transition into more central roles in digital health research.
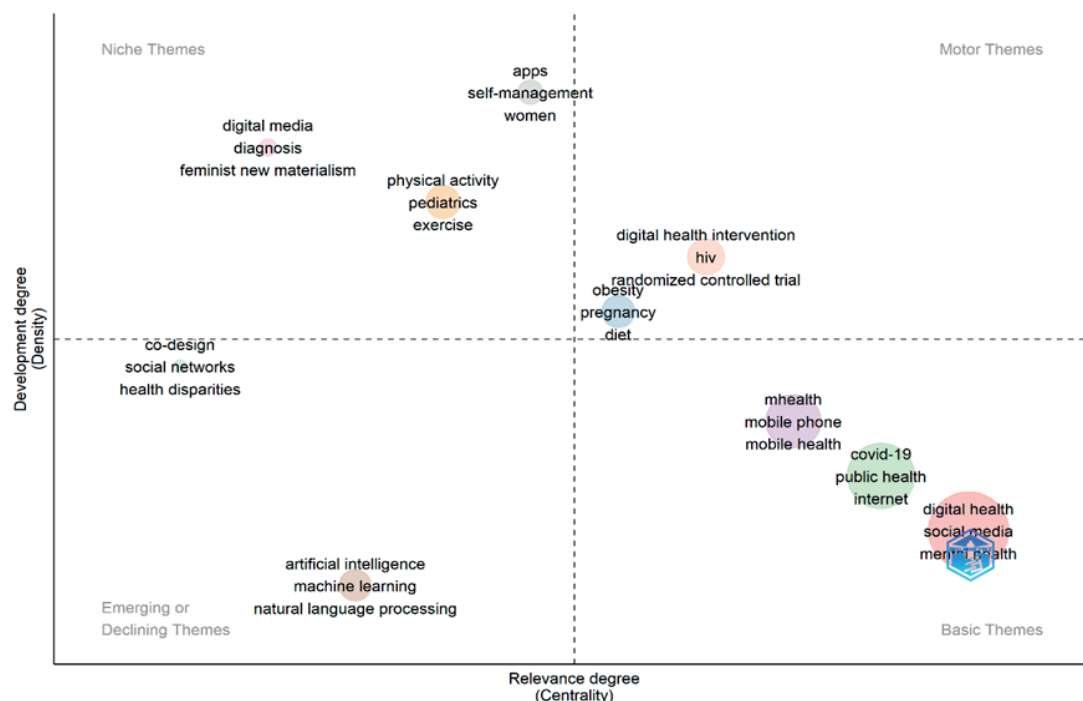

Figure 10. Thematic visualization of keywords

DISCUSSION

The bibliometric analysis of social media's role in digital health highlights the growing scholarly interest in this field, with a rapid increase in publications from 2012 to 2025. The annual scientific production has expanded significantly, particularly in response to global health crises such as COVID-19, reflecting the increasing reliance on digital health interventions and social media platforms for healthcare communication. The distribution of research across multiple journals, with the Journal of Medical Internet Research leading in publication volume, underscores the interdisciplinary nature of digital health research. The presence of multiple prolific authors further indicates that this field is driven by collaborative efforts spanning multiple institutions and countries, with the United States, the United Kingdom, and Australia emerging as dominant contributors. The extensive co-authorship and international collaboration percentages demonstrate that digital health research is a global endeavor, addressing diverse healthcare challenges through digital innovations.

Co-citation of cited authors and journals intellectually maps the field of digital health research, with key scholars and journals forming cohesive citation networks that frame scholarly discourse. The co-occurrence of keywords such as "digital health," "social media," "public health," and "artificial intelligence" illustrates research concentration in digital interventions, behavioral health, and the adoption of AI-driven technologies in healthcare. Bibliographic coupling analysis supports this theme, revealing how seminal papers are thematically linked by citations and hence establish research clusters. Thematic evolution analysis reveals a shift from generalized discussions of digital health literacy and social media engagement to specialized research topics such as mobile health apps, digital interventions in chronic disease management, and AI-driven healthcare solutions. The theme implies the discipline is moving towards more specific, evidence-based digital health technology applications.

The research trend mapping also highlights the shifting focus of digital health research. While initial research was concentrated on digital health adoption and social media use in health communication, more recent years have witnessed an increase in research topics related to digital health interventions, gender-inclusive healthcare, and AI-supported diagnostics. The thematic map also provides additional insights on how research topics are spread across foundational, motor, niche, and emerging themes. While digital health and social media are broad themes, motor themes such as digital health interventions and chronic disease management indicate the application of digital health research. Niche themes such as gender and pediatric health suggest specialized domains of research aimed at specific healthcare populations, while emerging themes such as AI and machine learning indicate the future trajectory of digital health research.

These findings provide a window into the changing scientific landscape of social media-based digital health research. The increased use of AI, mobile health applications, and personalized healthcare interventions is testament to the ongoing digitalization of healthcare. However, misinformation, privacy, and disparities in digital health literacy remain concerns requiring research attention. Future research should focus on ethical AI use in digital health, strategies to limit misinformation on social media, and policies promoting equitable access to digital health technologies for diverse populations. Such knowledge will guide the next generation of digital health research, resulting in novel, inclusive, and sustainable health solutions in a progressively digitalized world.

Research Gaps and Practical Implications

The bibliometric analysis reveals several research gaps that require further exploration. While digital health, social media, and public health remain dominant themes, emerging topics such as sexual and gender minority health, confidentiality, and age-specific digital interventions indicate gaps in inclusivity and ethical considerations within digital healthcare. The increasing use of AI and machine learning (LDA) in digital health research suggests a shift toward data-driven healthcare solutions, yet there is limited research on the ethical implications, algorithmic biases, and privacy concerns associated with these technologies. Additionally, while mobile applications and telemedicine have gained prominence, studies focusing on their long-term effectiveness, regulatory frameworks, and patient adherence remain scarce. The declining focus on misinformation management and infodemic research post-COVID-19 suggests a need for continued investigation into digital health literacy and social media's role in shaping public perceptions of healthcare. Moreover, while randomized controlled trials (RCTs) are prevalent in digital health interventions, research exploring real-world applications, cost-effectiveness, and scalability of these interventions is still limited.

From a practical standpoint, these insights have significant implications for policymakers, healthcare providers, and technology developers. The integration of AI and big data analytics in digital health requires the establishment of robust ethical frameworks, data privacy policies, and transparency measures to mitigate potential biases and inequities. The increasing relevance of digital health interventions in chronic disease management and maternal health suggests a need for personalized, evidence-based solutions that cater to diverse patient demographics. In addition, health organizations must prioritize developing digital literacy among both practitioners and patients to ensure the successful integration of mobile health apps and digital

therapeutics. As the role of social media platforms in healthcare communication increases, mechanisms must be created to debunk misinformation, promote credible health sources, and increase patient engagement. Future research must also prioritize cross-disciplinary research between health sciences, technology, and social sciences for the creation of more inclusive, data-driven, and human-centered digital health solutions to address the evolving needs of healthcare systems worldwide.

CONCLUSIONS

This bibliometric analysis reflects the growing contribution of social media to digital health, highlighting its use in health communication, patient engagement, and public health awareness, and also reveals challenges pertaining to misinformation, privacy, and disparities in digital health literacy. The study demonstrates an exponential increase in research output, with productive authors, journals, and nations contributing to this landscape. Co-occurrence of keywords and thematic mapping reveal a shift from general discussion of digital health to specific themes such as AI-driven healthcare, mobile health applications, and chronic disease management. However, research gaps exist, particularly in ethical AI adoption, misinformation management, and inclusive digital health interventions. To address the gaps, it is recommended that future studies prioritize the ethics of AI and machine learning adoption in digital health. It is also recommended that health policymakers develop digital literacy programs to facilitate the responsible use of social media for healthcare communication. Lastly, multisectoral collaboration among healthcare professionals, data scientists, and policymakers is required to develop evidence-based, inclusive, and equitable digital health solutions that are accessible and effective for all populations.

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FINANCING

CONFLICT OF INTEREST
The authors declare that there is no conflict of interest.

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