JURNAL STUDI KOMUNIKASI

Volume 9 **Ed 2, July 2025** **Page 521 - 536**

A bibliometric study of digital health campaign strategies, effectiveness, and trends (2015-2023)

Febrian Gibran Juliansyah*), Rully Khairul Anwar

Faculty of Communication Science, Universitas Padjadjaran
Km21 Raya Sumedang, Jatinangor, Sumedang, Indonesia
Email: febrian22002@mail.unpad.ac.id, Phone: +62 22 842 88888

How to Cite This Article: Juliansyah, F.G & Anwar, R.K. (2025). A bibliometric study of digital health campaign strategies, effectiveness, and trends (2015-2023). *Jurnal Studi Komunikasi*, 9(2). doi: 10.25139/jsk.v9i2.9702
Received: 27-01-2025, Revision: 09-05-2025, Acceptance: 08-06-2025, Published: 31-07-2025

Abstract This study employed a bibliometric approach to analyse research trends in health communication campaigns in the digital era from 2015 to 2023. Focusing on specific search criteria, a dataset of 64 scholarly articles was extracted and analysed to understand the development of scientific publications in health communication campaigns. The bibliometric analysis provides insights into the citation trends and collaborations between authors and institutions on the discussed topics. This study incorporates thematic analysis to understand the context of digital communication content in health campaigns. Using Biblioshiny software and Google Spreadsheets, the bibliometric data is presented to offer a comprehensive overview of the research topic. This analysis identifies significant publication growth, highlighting influential authors, journals, countries, and maps core thematic areas such as the role of social media in health information dissemination. These findings offer data-driven perspectives for developing more effective digital communication strategies in the context of public health.

Keywords: bibliometrics; campaigns; digital; health communication

INTRODUCTION

Digital health communication has become a crucial element in the broad and rapid dissemination of health information to the public in the digital era. Various platforms, such as social media and health applications, provide significant opportunities to disseminate health messages interactively and personally (Baxto, 2024; Eid, 2024). The significant increase in the use of digital media over the past decade demonstrates its profound impact on public behaviour (Jena & Paltasingh, 2025; Yosep et al., 2024). Nevertheless, digital literacy and trust in information remain challenges that need to be addressed to enhance communication effectiveness (Mas'odi & Arma, 2024).

Personalisation and message relevance are key factors in the effectiveness of digital health communication efforts. Research indicates that messages tailored to specific audiences have a greater impact than generic messages (Kostkova, 2015; Tandilangi et al., 2024). This is supported by data showing that visual messages, such as infographics and videos, are more effective in conveying complex information (Afifi et al., 2024; Maghfiroh & Sukmawati, 2024). In this context, interactivity through technologies like artificial intelligence-based chatbots increases audience engagement (Palioura et al., 2024; Sari et al., 2024). Relevant, data-driven messages help strengthen trust in digital information sources (Ibrahim et al., 2024; Zuhdi et al., 2024).

*) Corresponding Author

ISSN: 2549-7294 (Print), 2549-7626 (Online)

Digital literacy is one of the important factors influencing the acceptance of digital health messages. Low levels of digital literacy can be a barrier to accessing health information, especially among vulnerable groups (Chaki & Ghosh, 2024; Huang et al., 2024). Efforts to improve digital literacy include the use of interactive technology-based educational programs (Dragović et al., 2024; Ueno et al., 2024). This approach allows audiences to better understand and utilise health information (Baxto, 2024; Eid, 2024). As a result, digital communication can be a more inclusive tool in increasing public health awareness and behaviour (Jena & Paltasingh, 2025; Yosep et al., 2024).

The success of digital health communication is also influenced by the element of trust in the information source. Credible and evidence-based information can increase public trust in digital health campaigns (Mas'odi & Arma, 2024). This is increasingly relevant in the context of the spread of misinformation that poses a threat to public health (Kant et al., 2024; Leung, 2024). Increased regulation and supervision of digital platforms are needed to ensure information credibility (Kostkova, 2015; Tandilangi et al., 2024). With this approach, digital communication can be more effective in conveying health messages (Afifi et al., 2024; Maghfiroh & Sukmawati, 2024).

Previous bibliometric analyses have made considerable strides in outlining the digital health communication field. For example, Yu et al. (2023) observed a significant rise in publications and a greater emphasis on interdisciplinary strategies involving technology, communication, and social sciences in their study up to 2023. Moreover, Kant et al. (2024) and Leung (2024) forecast that research in this area will continue to expand with technological progress. These studies also generally suggest a need for innovation in technology-based digital health campaign strategies to reach a wider audience (Ibrahim et al., 2024; Zuhdi et al., 2024). Although these studies provide a general overview of publication trends and volumes, a bibliometric analysis that specifically delves into the variety of digital health campaign strategies and their effectiveness within the 2015-2023 period, particularly identifying which approaches have been most prominent and impactful, still requires further exploration.

Stemming from this background, and to address the identified gap, this study aims to explore the most prominent and documented effective digital health campaign strategies during the 2015-2023 period through a bibliometric lens. A bibliometric study is uniquely suited to achieve this objective by systematically mapping the intellectual structure of the research field. By analysing publication trends, keyword co-occurrences (which can highlight prevalent campaign strategies and their components), citation networks (indicating impactful research), and collaboration patterns, this research can identify which digital health communication approaches have been extensively studied and are thus considered significant or have shown notable development over the past decade. This allows for an evidence-based overview of campaign strategies that have gained traction or have been of key importance. This approach includes an analysis of global publication trends. Specifically, the bibliometric analysis in this research will investigate the extent to which themes such as challenges and opportunities in utilising technology to convey health information (as reflected through keyword analysis and thematic clusters) and the importance of digital literacy and public trust (Afifi et al., 2024; Kostkova, 2015; Maghfiroh & Sukmawati, 2024; Tandilangi et al., 2024) are represented and interconnected within the published research corpus. The prominence and interrelation of these keywords and concepts in the analysis section will reveal their perceived importance in the discourse on successful digital health campaigns. With continued innovation, digital communication holds great potential to improve public health globally (Palioura et al., 2024; Sari et al., 2024). Through data and technology-based campaign strategies, the gap in access to information can be significantly reduced (Ibrahim et al., 2024; Zuhdi et al., 2024).

This study offers significant benefits by mapping the direction of future research development. Specifically, it identifies the most productive authors and their main contributions in this field, thereby making it easier for subsequent researchers to find important literature and potential collaborators. Furthermore, this research highlights the most relevant affiliations and journals, which can serve as valuable references for researchers in considering collaboration opportunities with other institutions and in selecting journals for publication. The study also analyses the productivity of countries in generating publications related to the topic of digital health campaign strategies and effectiveness, providing insights into the global research landscape. Finally, the keyword analysis conducted is expected to help future researchers

discover topic areas within health communication that have not been extensively studied, thereby encouraging new contributions to the development of this field.

METHODOLOGY

This study employed a bibliometric approach to analyse health communication in the digital era, focusing on campaign strategies and their effectiveness (Yang et al., 2022). Bibliometrics is a method used to analyse the development of scientific disciplines by examining their intellectual, social, and conceptual structures (Zupic & Čater, 2015). The analysis was conducted using data from scientific articles published between 2015 and 2023. This specific timeframe was chosen because it represents a critical period marked by the rapid evolution and widespread integration of digital technologies and social media platforms into health communication campaigns. This period allows for a comprehensive assessment of contemporary strategies and their documented effectiveness, reflecting significant shifts in how health information is disseminated and received.

Data for this study were sourced from the Scopus database (Taj et al., 2019). The data retrieval process involved an initial search using the keywords 'Health Communication', 'Digital', and 'Campaign'. These keywords were selected to capture the core concepts of the research: 'Health Communication' defines the broad field; 'Digital' specifies the context of the modern technological era, and 'Campaign' was chosen as it inherently encompasses planned strategies and is frequently evaluated for its effectiveness in achieving health-related objectives. While the article discusses broader terms like 'strategies' or 'effectiveness', the keyword 'Campaign' serves as a practical and targeted operational term to identify literature where these elements are most likely to be central.

The initial search yielded 107 documents. These documents were then filtered to include only 'Article' source types published within the 2015-2023 period. After this filtering and a subsequent screening process to ensure relevance and completeness for the analysis, the final dataset comprised 64 scientific articles. This dataset was exported in CSV (Comma Separated Values) format to facilitate further processing. The use of bibliometric analysis allows for the identification of prominent patterns and trends in digital health communication (Mheidly & Fares, 2020). This study also incorporates thematic analysis elements by examining keyword co-occurrence and thematic maps to understand the contextual landscape of digital communication content (de las Heras-Pedrosa et al., 2022).

Co-citation and co-word analysis methods were utilised to reveal relationships between studies and identify key research themes (Cobelli & Blasioli, 2023). The results of this analysis are expected to provide new insights for developing more effective digital communication strategies (Sweileh et al., 2017). Validation of the findings was performed by comparing them with relevant previous literature (Pan & Rong, 2021). Bibliometric analysis was complemented by network analysis to assess the impact of collaboration between authors and institutions (Pai & Alathur, 2021). Evaluation indicators included publication counts, keyword trends, and the geographic distribution of research (Tajudeen et al., 2022). These findings are integrated to create a research map that highlights developed topics and areas requiring further investigation (Chen & Zhang, 2022).

The extracted data, consisting of 64 scientific articles (See Figure 1), were imported into Biblioshiny, a web interface developed within the bibliometrix R-package (Aria & Cuccurullo, 2017; Zupic & Čater, 2015). For the bibliometric analysis, Google Sheets was used for initial data organization and preliminary analysis of aspects such as author productivity, information sources, citations, affiliations, and countries. Subsequently, the Biblioshiny software, which operates on the R system (R Core Team, 2021), was employed for advanced bibliometric analysis and visualization (Büyükkıdık, 2022). Biblioshiny is recognised as a primary tool in bibliometric and scientometric analysis due to its intuitive interface and comprehensive functions for analysis and graphing (Moral-Muñoz et al., 2020; Moreira et al., 2020; Silva et al., 2022). Using Biblioshiny, this study analyses scientific publications, focusing on impact, productivity, and collaboration patterns among countries, institutions, journals, and research areas. The data collection and selection process are summarised below at Table 1.

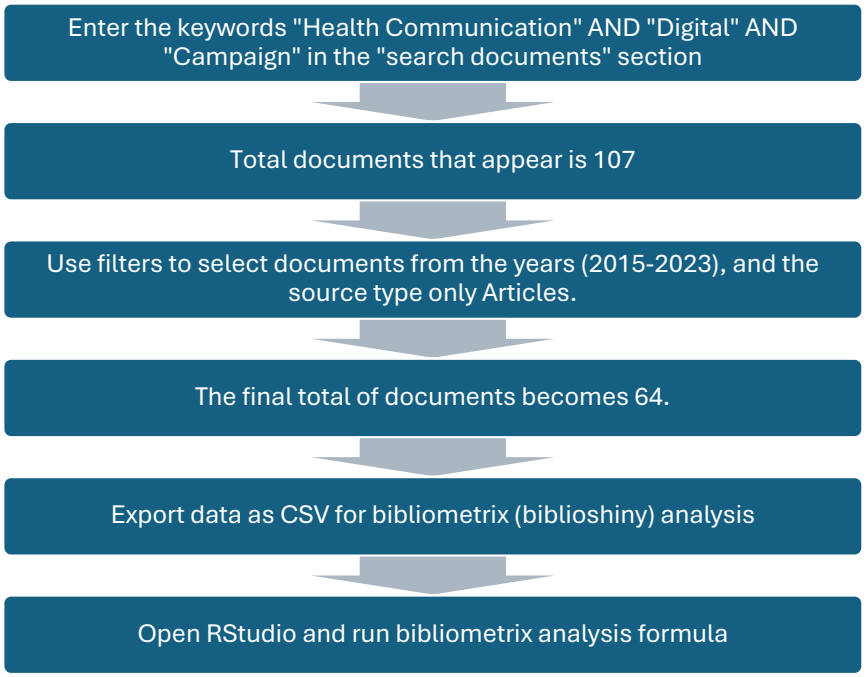

Figure 1. Research flow using *Biblioshiny*
Source: Researcher processing results, 2024.

Table 1. Data source set and selection

Category	Information
Research Database	Scopus
Time span	2015-2023
Language	English, Spanish, Portuguese
Keyword Search	"Health Communication" AND Digital AND Campaign
Document Type	"Article "
Data Extraction	Exported with complete records (citations, bibliography, abstract & keywords, and other information) in CSV format.
Number of Samples	64

Source: Researcher processing results, 2024.

To visualise the bibliographic data, this study utilised the Bibliometrix Biblioshiny software to generate clearer, more diverse, and representative visualisations of the digital health communication campaign landscape between 2015 and 2023. Biblioshiny was specifically used to visualise co-occurrence networks, leading countries by citations, WordClouds, and thematic maps.

The research procedures adhered to ethical standards, including proper data attribution and the use of licensed or open-source software for analysis (Cobelli & Blasioli, 2023; Yeung et al., 2022). This study aims to provide a robust theoretical basis for future research by identifying challenges and opportunities in digital health communication (Mheidly & Fares, 2020). A thorough analysis was conducted to ensure the results can be applied in the development of health policies and interventions (Dang et al., 2021). Through this approach, the study is expected to contribute significantly to the literature on the effectiveness of health communication in the digital era.

RESULTS AND DISCUSSION

This section presents the results and discussion of the bibliometric analysis conducted on health communication campaigns in the digital era from 2015 to 2023. This section begins with a general description of the dataset derived from Scopus. Following this overview, the discussion will explore several key dimensions of the research landscape. This includes publication trends such as annual scientific production and average citations per year, as well as an analysis of the historical roots of the research field using Reference Publication Year Spectroscopy (RPYS). The chapter will then examine the relational structure within this field through a Three-Field Plot connecting journals, authors, and keywords. Further analysis will focus on author-level

contributions, identifying the most relevant authors and their productivity over time, as well as institutional productivity and collaboration. The journal landscape will be assessed using Bradford's Law and by identifying the most influential journals. Subsequently, the geographical distribution of research will be analysed, highlighting the leading countries in terms of scientific output and citation impact. Finally, the chapter will delve into the main thematic areas and emerging topics through keyword analysis, utilising Wordclouds and thematic maps to provide a comprehensive understanding of the focus and evolution of this field.

The keywords searched from Scopus are 'Health Communication' AND Digital AND Campaign', and the period of scientific articles from 2015-2023 was used as the criteria for compiling this dataset. The following is the main information regarding this dataset that has been extracted and summarised in Table 2.

General description

Table 2 provides an overview of the dataset used in this study. The time span covered by this dataset is from 2015 to 2023, with a total of 64 documents analysed. The data sources come from 46 journals and books, indicating the diversity of information sources used. The average annual growth of these documents is 42.5%, with an average age of documents around 2.89 years. Each document received an average of 6,875 citations, and the total number of references used reached 2240. The number of authors involved in this study was 325, indicating extensive collaboration in this field. This dataset was obtained through information extraction from the Scopus database. Key information extracted during the extraction process forms an important basis for bibliometric analysis of health communication campaigns in the digital era. The dataset used has been carefully compiled, and the results are presented systematically in Table 2, providing a comprehensive overview that supports the objectives of the study.

Table 2. Key information about the dataset

Description	Information
Time span	2015:2023
Sources (Journals, Books, etc.)	46
Document	64
Annual Growth Rate %	42.5
Average Age of Documents	2.89
Average Citations per Document	6.875
Reference	2240
Writer	325
Documents With One Author	5
Multi-Author Document Writer	5.45
International Co-authorship	14.06
Document Type (Article)	64

Source: Researcher processing results, 2024.

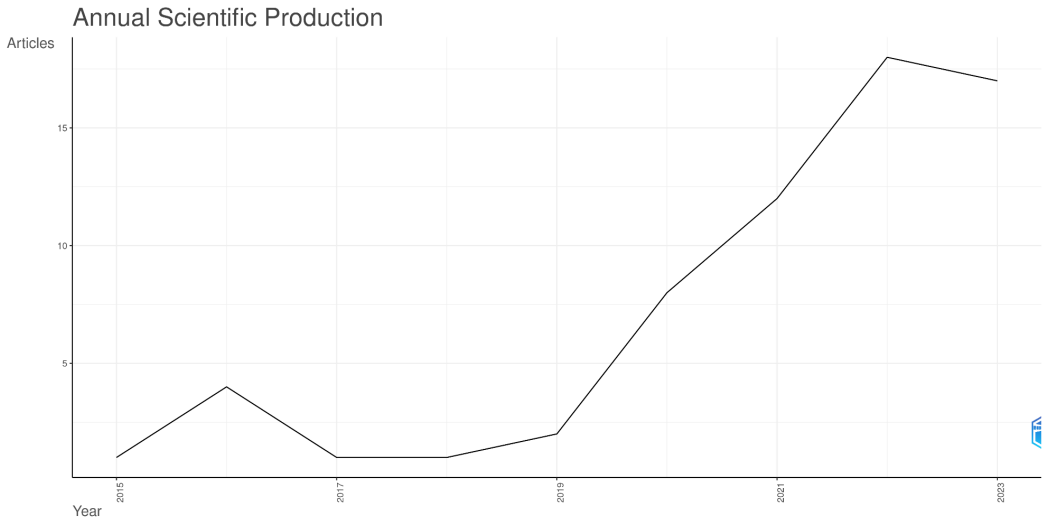

Figure 2. Annual scientific article production
Source: Researcher processing results, 2024

The figure 2 shows a graph of the annual production of scientific articles from year to year. At the beginning of the period shown, there is a fluctuation in the number of articles produced. It can be seen that in the early years, the number of articles produced decreases after initially increasing, indicating instability in the production of scientific articles. After the initial period of fluctuation, the graph shows a consistent upward trend in the number of articles produced. This increase starts from a low point and continues until it reaches a peak. This indicates an increase in productivity and an increase in the number of researchers or resources allocated to scientific research. At the end of the period shown, the graph shows a slight decrease after reaching a peak. However, the number of articles produced remains higher compared to the early period. This could indicate an adjustment or stabilisation in the production of scientific articles after a period of significant growth.

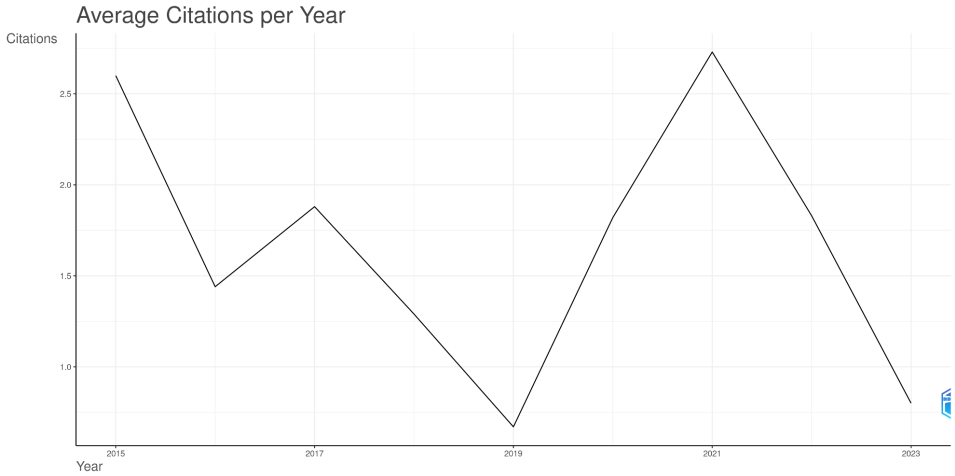

Figure 3. Average citations per year
Source: Researcher processing results, 2024.

Figure 3 shows the average number of citations per year for a study. At the beginning of the period shown, there is a sharp decline in the number of citations, indicating that there was a decline in interest or relevance for the study in the early years. After this decline, the graph shows a slight increase, which could be interpreted as a revival of interest or relevance for the study. Then, the graph shows a more significant decline until it reaches a low point. This could indicate that during this period, the study received less attention or was considered less relevant in the broader research context. However, after reaching a low point, the graph shows a sharp increase, which could be interpreted as a significant revival of interest or relevance for the study. At the end of the period shown, the graph shows another sharp decline. This could indicate that despite the initial increase in interest, the study eventually experienced a decline in citations. This decline could be due to a number of factors, such as the emergence of new, more relevant research or a change in research trends.

Next, an analysis was conducted on the references used in the publication of scientific articles based on the year of publication. RPYS (Reference Publication Year Spectroscopy) is a bibliometric method used to analyse the historical origins of a research field or researcher by examining cited references (CR), especially the year of publication referred to in a series of publications (Leydesdorff et al., 2016).

In Figure 4, it can be seen that the number of reference publications is relatively stable in the early years, with little fluctuation. However, starting from a certain point, there is a significant increase in the number of publications. This increase indicates an increase in interest or significant development in the field of spectroscopy caused by new discoveries, better technology, or improvements in spectroscopy applications. The sharp peaks in the graph indicate that there is a certain period where publications in this field reach their peak. After this peak, the number of publications seems to decrease, indicating that the trend or focus of research has shifted, or that the field has reached a certain level of maturity. This analysis can help researchers understand the dynamics of the development of spectroscopy and identify important periods in the history of research in this field.

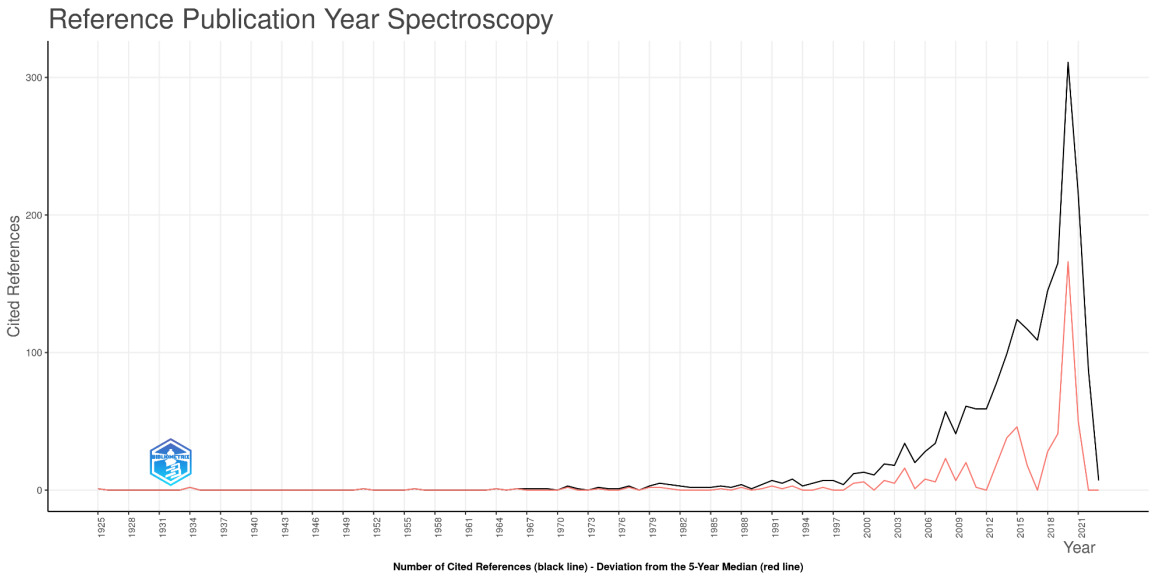

Figure 4. Reference Publication Year (RPYS)
Source: Researcher processing results, 2024.

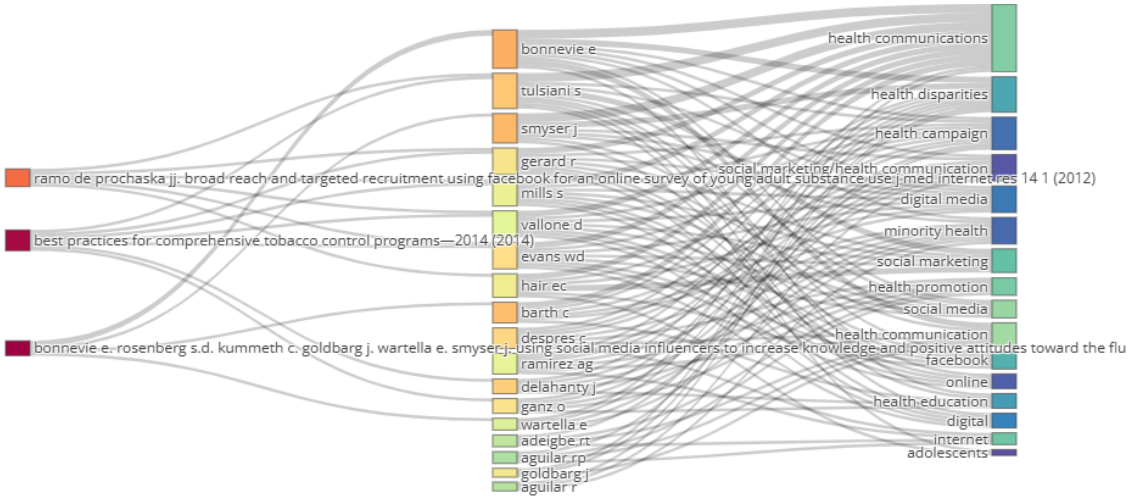

Figure 5. Three-Field Plot
Source: Researcher processing results, 2024.

In Figure 5, there is a Three-Field analysis that visualises the relationship between journals (left), authors (centre), and keywords (right). These three fields are connected by grey lines that link one field to another. The size of the box for each field represents the number of publications connected to that field (Srisusilawati, et al., 2021). On the left side, there is a list of topics or keywords that represent the main research fields or themes being analysed. Each of these topics is connected to an element in the middle that appears to represent the author or source of the research. This relationship shows how each topic is related to a particular author, providing an overview of the research focus of each author. In the middle, these elements are further connected to the right side, representing the results or impact of the research. This could be an application area, research results, or specific contributions resulting from the research conducted by the linked author. This relationship provides insight into how the research of a particular author contributes to broader results or impacts in the field.

Overall, the Three-Field Plot provides a comprehensive visualisation of the relationships between research topics, authors, and research results. It allows researchers to see patterns and trends in a particular field of study, as well as identify authors who have made significant contributions to specific topics. As such, this plot can be a useful tool for bibliometric analysis and knowledge mapping in a discipline.

Author analysis

Figure 6 shows a graph depicting the most relevant authors. On the vertical axis, there is a list of authors' names, while the horizontal axis shows the number of relevant documents produced by each author. From the graph, it can be seen that the author with the initials 'BOWLEY R' has the most documents, which is 6 documents. This shows that the contribution of this author is very significant in the context of the research being discussed. Other authors such as 'BARTCH C' and 'TULSIANI S' also have quite large contributions, each with 3 documents. Other authors, such as 'GANZ O' and 'GOLDBANG J' have a smaller number of documents, which is 2 documents. This shows that although their contributions exist, they are not as large as the previously mentioned authors. This graph provides a clear picture of which authors have the greatest influence on this research.

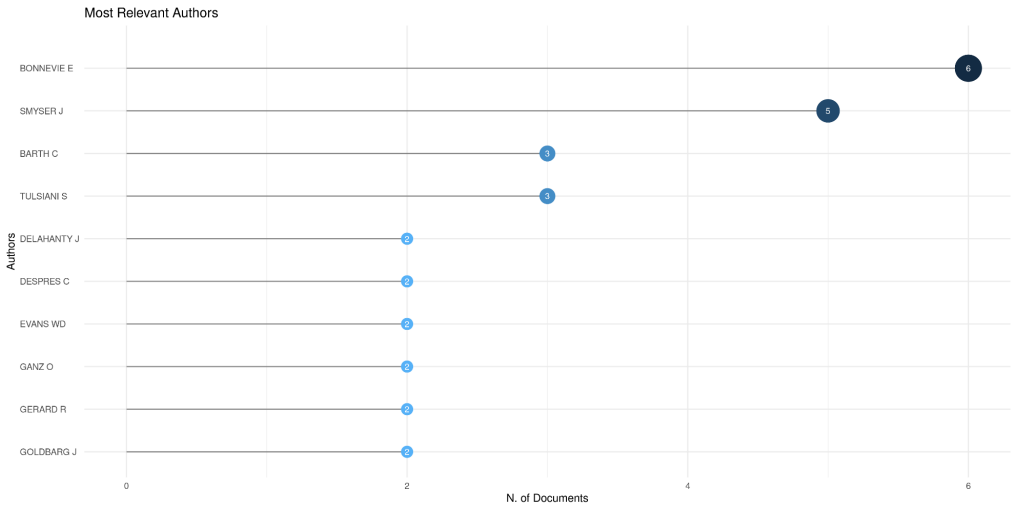

Figure 6. Most relevant authors
Source: Researcher processing results, 2024.

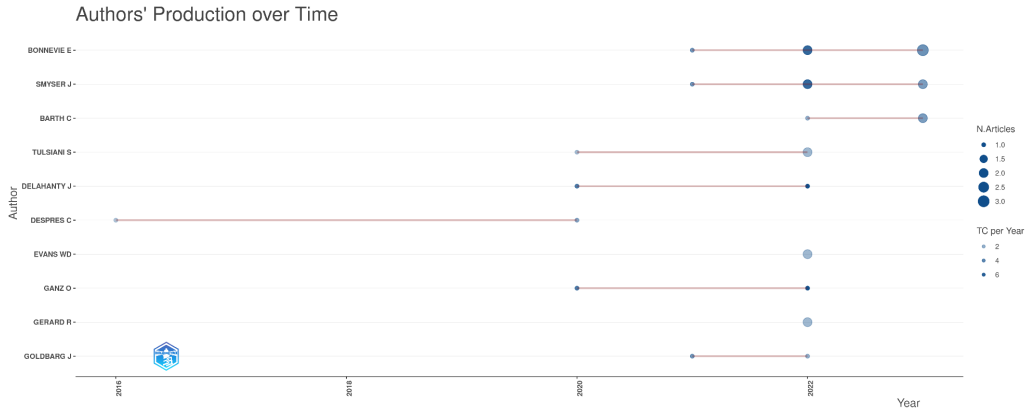

Figure 7. Author production over time
Source: Researcher processing results, 2024.

This graph shows author production over time, represented by a line graph with dots representing the number of publications. Each horizontal line represents an author, and the dots along the line represent the time and number of publications produced by that author. The size of the dots appears to indicate the volume or impact of the publications, with larger dots indicating more significant or numerous publications. From this graph, it can be seen that some authors have longer and more consistent periods of production than others. For example, the author labelled 'DESPRES C' shows consistent publication activity over a longer period of time, while other authors may have only been active for a shorter period of time. This could indicate differences in the productivity or research focus of each author.

In addition, this graph can also be used to identify trends in author production, such as an increase or decrease in the number of publications over time. For example, if an author shows

an increase in the size of dots over time, this could indicate an increase in the impact or volume of their publications. Conversely, a decrease in the size or frequency of dots could indicate a decrease in activity or impact. This analysis can be useful for understanding the dynamics of author production in a research or academic context.

Affiliate analysis

Figure 8 shows a graph of university production over time, represented by different coloured lines. Each line represents a different affiliation or institution, with the vertical axis showing the amount of production and the horizontal axis showing the year. From this graph, we can see that there is a significant increase in production from some universities over a certain period of time. At the beginning of the graph, most of the lines are at a lower position, indicating that university production in the early years was relatively low. However, as time goes by, some lines show a sharp increase, indicating a surge in production. This could be due to various factors such as increased research funding, international collaborations, or an increase in the number of academic publications.

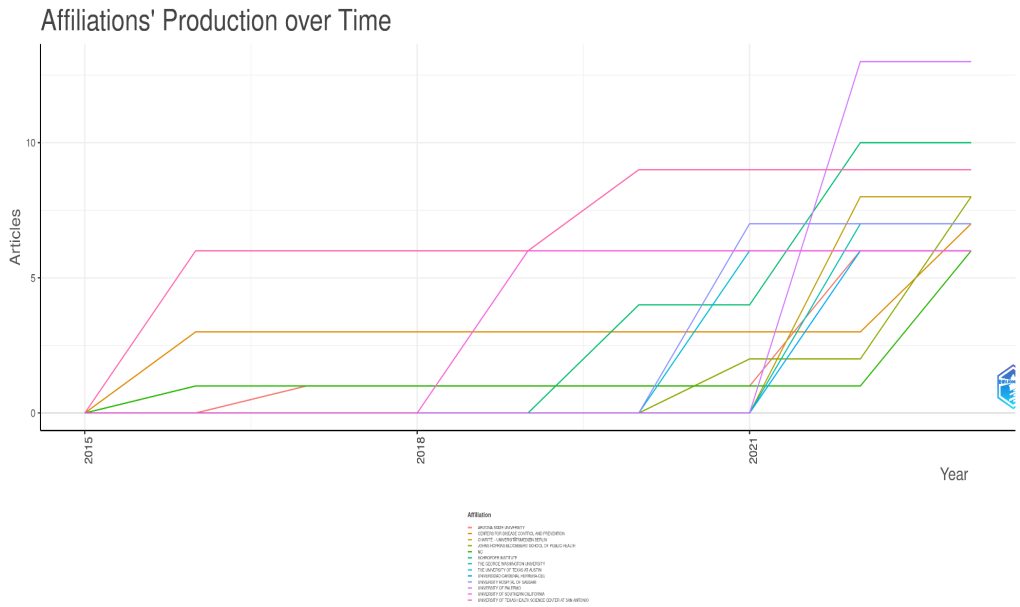

Figure 8. University production over time
Source: Researcher processing results, 2024.

At the end of the graph, we can see that some lines peak higher than others, indicating that some universities have higher levels of output than others. This could indicate differences in research capacity or academic focus between universities. Overall, this graph provides a picture of how university output has changed and evolved over time.

Figure 9 shows a graph depicting the most relevant universities based on the number of affiliations. On the vertical axis, there is a list of universities sorted by relevance, while the horizontal axis shows the number of affiliations each university has. Each dot on the graph represents one university, with the horizontal position indicating the number of affiliations. From this graph, it can be seen that the top universities have the highest number of affiliations compared to other universities. This indicates that these universities have a wider network of cooperation or collaboration or may be more active in research and publication activities involving affiliations with other institutions.

In addition, the distribution of the points on the graph shows that there are significant differences in the number of affiliations between the universities. Some universities have a much higher number of affiliations, while others have a lower number, indicating variations in the level of involvement or recognition in the academic community.

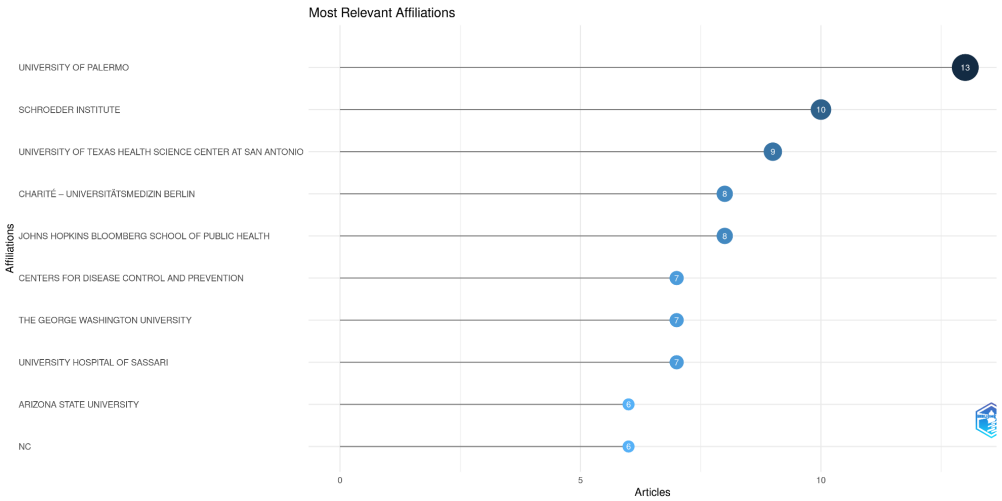

Figure 9. The most relevant universities
Source: Researcher processing results, 2024.

Journal analysis

Next, an analysis of the journals was conducted to segment journal publications related to the topic of digital health communication campaigns. Journal analysis using Bradford's law is useful for identifying the level of journal productivity, where in the analysed literature it can be seen which journals publish the most scientific articles and which journals have the highest scientific relevance. In addition, further analysis of these journals aims to separate the 'core' area, where most scientific articles are published, and the 'side' area (Venable et al., 2016). The results of the analysis using Bradford's law provide a deeper understanding of the structure of scientific literature by identifying key journals and revealing the level of focus at various levels (Figure 10 and Table 3).

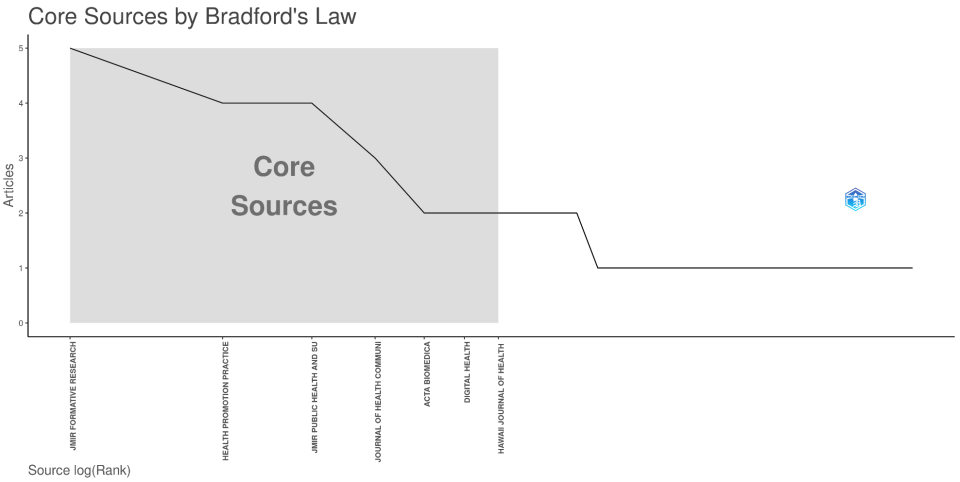

Figure 10. Clustering journals with Bradford's Law
Source: Researcher processing results, 2024.

The presented figure 10 and table 3 illustrate the clustering analysis of journals using Bradford's Law. The graph at the top shows the distribution of core sources based on Bradford's Law. The graph shows that there is a sharp decline at the beginning, which then stabilises, reflecting how a small number of journals contribute the majority of relevant articles in a research field. The shaded area indicates the most frequently cited core sources. The table below the graph provides more details on the clustering of journals based on Bradford's Law. The table divides the journals into three zones. Zone 1 consists of 7 journals contributing 22 articles, indicating that these journals are the most productive or most frequently cited. Zone 2 includes 18 journals producing 21 articles, and Zone 3 consists of 21 journals with the same number of articles, 21. This division shows a typical distribution where a small number of journals contribute the majority of articles, while more journals contribute fewer articles.

Table 3. *Clustering* journals with Bradford's Law

Zone	Ranking	Number of Journals	Number of Issues
Zone 1	1-7	7	22
Zone 2	8-25	18	21
Zone 3	26-46	21	21

Source: Researcher processing results, 2023.

This analysis is important to understand the distribution of literature in a particular field and can help researchers identify the most relevant and influential journals. By knowing which journals are included in the core zone, researchers can be more efficient in finding the most relevant and high-quality literature to support their research.

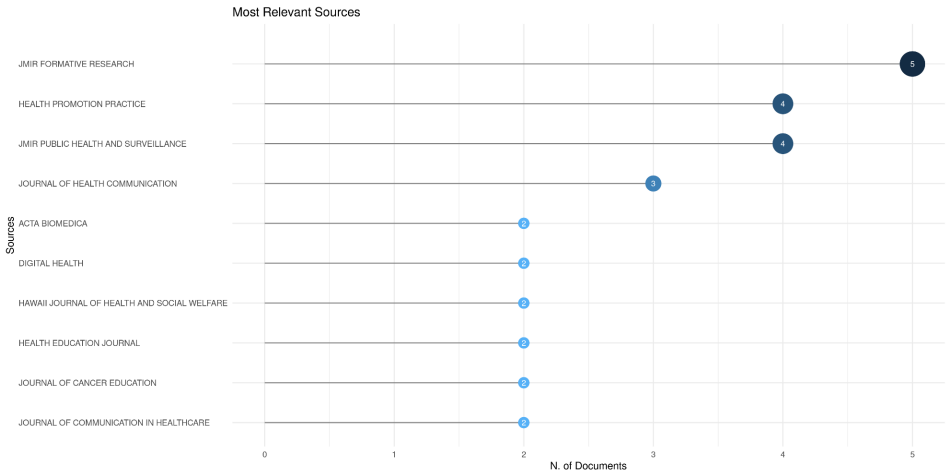

Figure 11. Most relevant journals
Source: Researcher processing results, 2024.

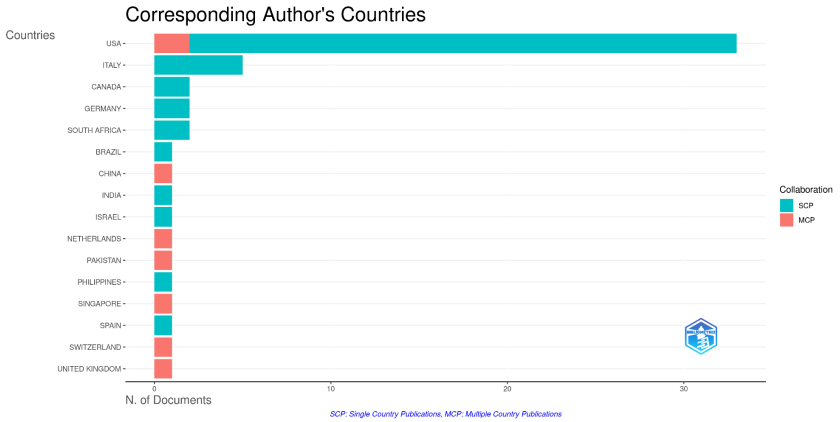

Figure 12. Author country correspondence
Source: Researcher processing results, 2024.

Figure 11 A graph depicting the most relevant journals. The vertical axis displays the names of the journals, while the horizontal axis shows the number of citations or the relevance of each journal. The dots on the graph indicate the level of relevance or number of citations of each journal, with the size and colour of the dots indicating the level of importance or frequency of citation. In this graph, it can be seen that the journal 'JMIR FORMATIVE RESEARCH' has the highest level of relevance with a citation value reaching 5. This indicates that the journal is considered very relevant or frequently cited in the context of the research being conducted. This journal has a significant contribution in the field being studied, so it CAN be a primary reference for researchers.

On the other hand, other journals such as 'HEALTH PROMOTION PRACTICE' and 'JMIR PUBLIC HEALTH AND SURVEILLANCE' also show a fairly high level of relevance, although not as high as 'JMIR FORMATIVE RESEARCH'. This shows that even though they are not the most dominant, these journals still have an important role in supporting research and providing valuable insights in relevant fields.

Country analysis

The analysis of countries involved in this topic aims to provide an understanding of the impact and significance of research originating from different demographic regions. Figure 12 is a bar graph depicting the correspondence of author countries based on the number of publications. The graph displays two categories, namely 'SINTA' and 'WoS', which refer to two different publication databases or indexes. Each bar represents the number of publications from a particular country, with the length of the bar indicating a greater number of publications. From this graph, it can be seen that the United States has the highest number of publications compared to other countries listed. This indicates that authors from the United States are more active or more involved in the publications listed in the databases shown. This could reflect the high level of academic or research participation of authors in the United States.

Other countries that have also made significant contributions include Italy, Canada, and several others, although in smaller numbers than the United States. These differences in the number of publications could be due to a variety of factors, including the number of active researchers, institutional support, or research focus in each country.

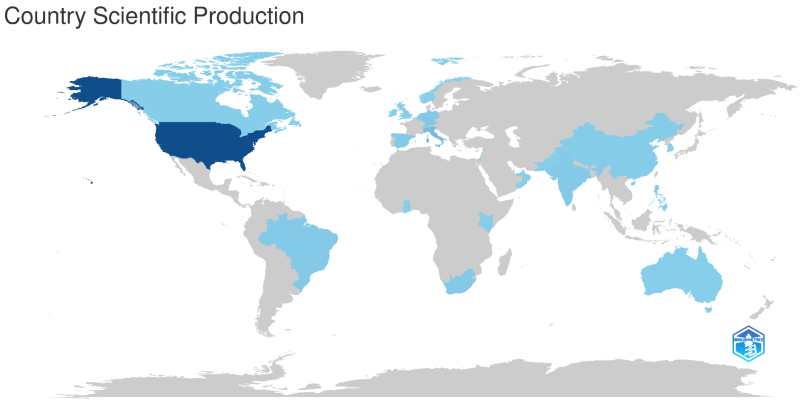

Figure 13. State scientific production
Source: Researcher processing results, 2024.

Table 4. Scientific production of countries

No.	Country	Article	Year Range	Number of Citations
1	United States of America	228	2015-2023	237
2	Italy	34	2016-2023	23
3	German	13	2022-2023	7
4	Brazil	8	2016-2023	0
5	India	8	2020-2023	1
6	Spanish	8	2022-2023	4
7	South Africa	7	2018-2023	2
8	China	5	2021-2023	27
9	Dutch	4	2022-2023	3
10	Philippines	4	2023	3

Source: Researcher processing results, 2024.

Figure 13 and Table 4 show the scientific production of various countries. The world map at the top shows the geographical distribution of scientific publications, with contributing countries marked in blue. Darker colours indicate a higher number of publications, while lighter colours indicate a lower number. From the map, it can be seen that the United States has a significant contribution to scientific production, followed by several other countries in Europe and Asia.

The table below the map provides more details on the number of scientific articles produced by each country, the year of publication, and the number of citations received. The United States tops the list with 228 articles published between 2015 and 2023, receiving 237

citations. This shows that in addition to producing a large number of articles, the work of the United States also receives significant recognition from the global scientific community. Other countries such as Italy, Germany, and Brazil also contribute to scientific output, although to a lesser extent than the United States. Italy, for example, published 34 articles with 23 citations, while Germany and Brazil published 13 and 8 articles, respectively. The year of publication also varies, indicating that some countries have recently increased their contribution to scientific research.

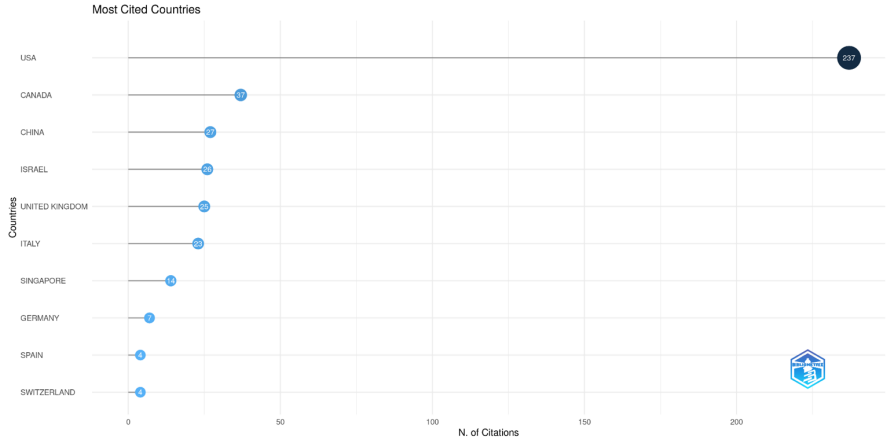

Figure 14. Countries with the most citations
Source: Researcher processing results, 2024.

Figure 14 shows a graph depicting the countries with the most citations. On the vertical axis, there is a list of countries, while the horizontal axis shows the number of citations received. From this graph, it can be seen that the country with the most citations is the United States, which has a much higher number of citations than other countries.

Other countries such as China, Canada, and Germany also have significant citations, although not as many as the United States. This shows that these countries also have a large contribution in the field of research or publications that are recognised internationally. The difference in the number of citations can be caused by various factors, including the number of publications, the quality of research, and international collaboration. This graph provides an overview of the dominance of the United States in terms of citations, which reflects the country's great influence and contribution in the academic world and research. In addition, this graph also shows the importance of collaboration and contributions from other countries in enriching the global scientific literature.

Keywords analysis

Figure 15 is a word cloud displaying various keywords related to the topic of health and social media. The most prominent words, such as 'human', 'social media', and 'medical information', indicate that the focus of this analysis is on the interaction between humans and medical information disseminated through social media platforms. This reflects how social media has become an important tool in disseminating health information to the public.

In addition, terms such as 'public health', 'covid-19', and 'vaccination' indicate that public health issues, particularly those related to the COVID-19 pandemic, are top of mind. This indicates that social media is widely used to raise awareness and provide information related to disease prevention and control. It also shows the important role of social media in public health campaigns and vaccination promotion. Other terms such as 'adolescent', 'male', 'female', and 'young adult' indicate that the analysis also considers the demographics of social media users engaging in health discussions. This suggests that health information shared through social media reaches a wide range of age groups and genders, highlighting the importance of an inclusive and diverse approach to health communication.

Figure 16 presents a thematic map illustrating the distribution of various topics or themes based on two primary axes: 'Data Science Topics' and 'Research Area', The map is segmented into four quadrants, each representing a distinct interplay between these axes, with each dot signifying a specific topic analysed by researchers. In the upper-left quadrant, we observe topics such as 'public finance' and 'health literacy', which demonstrate high relevance to 'Data Science

Topics' but comparatively lower relevance to the broader 'Research Area' as defined by traditional health communication studies. Theoretically, this configuration suggests several implications. It may indicate emerging interdisciplinary frontiers where data science methodologies are being applied to health-related concepts that are not yet fully integrated into, or recognised as mainstream within, established health communication theoretical frameworks. This could point to a potential lag in the adoption or adaptation of certain data-driven theoretical models by the core health communication field, or it might represent nascent areas where new theoretical intersections are just beginning to be explored, potentially leading to future paradigm shifts or the development of novel theories that bridge these domains. Conversely, the lower-right quadrant features topics like 'AI in healthcare' and 'machine learning', which exhibit high relevance to both 'Data Science Topics' and 'Research Area', From a theoretical standpoint, the strong presence of these topics signifies a more mature integration or a rapid advancement of themes where computational approaches are becoming central to health communication research. This suggests an evolution or extension of existing communication theories (e.g., theories of persuasion, message tailoring, health belief model) to actively incorporate digital, data-centric, and algorithmic perspectives. Furthermore, it may herald the emergence of new theoretical frameworks specifically designed to explain and predict the effectiveness of AI-driven health communication strategies and human-algorithm interactions in health contexts.

Figure 15. Wordcloud
Source: Researcher processing results, 2024.

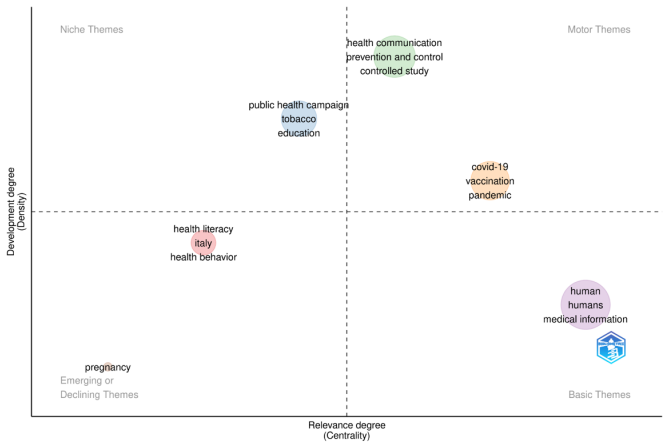

Figure 16. Thematic map
Source: Researcher processing results, 2024.

Therefore, this thematic map not only visualises the current research landscape but also offers crucial theoretical implications. It highlights areas where health communication theory

may need to expand to accommodate new data-driven methodologies and topics, and it underscores the theoretical maturation occurring at the intersection of data science and health communication, particularly concerning the role of advanced technologies in shaping campaign strategies and their effectiveness. This analysis can guide future theoretical development by identifying established, emerging, and potentially underexplored theoretical connections within the evolving field of digital health communication.

CONCLUSION

This bibliometric study comprehensively analyses the landscape of digital health communication campaign strategies and their documented effectiveness between 2015 and 2023, utilising 64 scientific articles from the Scopus database. Key findings indicate a significant increase in scientific production in this field, marked by high collaboration among researchers (325 authors) and an average annual document growth rate of 42.5%. The analysis reveals that the United States is the leading country in terms of publication and citation counts, while authors such as Bowley R. and journals like JMIR Formative Research emerge as the most relevant and influential contributors. Thematically, keyword analysis identifies 'social media', 'medical information', and 'public health' as primary focuses, with 'COVID-19' being a highly prominent theme, indicating the crucial role of digital platforms in health information dissemination, especially during crises. Further thematic mapping illustrates the interconnection and evolution of research topics. Overall, this research successfully maps the intellectual structure, publication trends, key contributors, influential sources, and dominant geographical and thematic areas within digital health communication campaign research. These results provide an essential foundation for future researchers to identify underexplored research gaps and to develop more effective digital health communication strategies moving forward.

REFERENCES

Afifi, S., Yaman, A., Bakti, I. G. M. Y., & Sumaedi, S. (2024). Health Communication and Social Media: Asian Perspective. *Global Knowledge, Memory and Communication*. https://doi.org/10.1108/GKMC-12-2023-0508

Aria, M., & Cuccurullo, C. (2017). Bibliometrix: An R-tool for Comprehensive Science Mapping Analysis. *Journal of Informetrics*, *11*(4), 959–975. https://doi.org/10.1016/J.JOI.2017.08.007

Baxto, W. (2024). Public Policy and Digital Transformation in Higher Education. In Cham (Ed.), *Digital Transformation in Higher Education Institutions* (pp. 59–85). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-52296-3_4

Büyükkıdık, S. (2022). A Bibliometric Analysis: A Tutorial for the Bibliometrix Package in R Using IRT Literature. *Eğitimde ve Psikolojide Ölçme ve Değerlendirme Dergisi*, *13*(3), 164–193. https://doi.org/10.21031/epod.1069307

Chaki, J., & Ghosh, D. (2024). Deep Learning in Leaf Disease Detection (2014–2024): A Visualization-Based Bibliometric Analysis. *IEEE Access*, *12*, 95291–95308. https://doi.org/10.1109/ACCESS.2024.3425897

Chen, D., & Zhang, R. (2022). Exploring Research Trends of Emerging Technologies in Health Metaverse: A Bibliometric Analysis. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3998068

Cobelli, N., & Blasioli, E. (2023). To Be or Not to Be Digital? A Bibliometric Analysis of Adoption of eHealth Services. *The TQM Journal*, *35*(9), 299–331. https://doi.org/10.1108/TQM-02-2023-0065

Dang, Q., Luo, Z., Ouyang, C., & Wang, L. (2021). First Systematic Review on Health Communication Using the CiteSpace Software in China: Exploring Its Research Hotspots and Frontiers. *International Journal of Environmental Research and Public Health*, *18*(24), 13008. https://doi.org/10.3390/ijerph182413008

de las Heras-Pedrosa, C., Jambrino-Maldonado, C., Rando-Cueto, D., & Iglesias-Sánchez, P. P. (2022). COVID-19 Study on Scientific Articles in Health Communication: A Science Mapping Analysis in Web of Science. *International Journal of Environmental Research and Public Health*, *19*(3), 1705. https://doi.org/10.3390/ijerph19031705

Dragović, A., Zrnić, N., Dragović, B., & Dulebenets, M. A. (2024). A Comprehensive Review of Maritime Bibliometric Studies (2014–2024). *Ocean Engineering*, *311*, 118917. https://doi.org/10.1016/j.oceaneng.2024.118917

Eid, N. M. (2024). *Exploring the Effectiveness of Supporting Dietary Weight Loss Interventions with Health Coaching and Telemonitoring: An Integrative Nutrition Approach*. https://doi.org/10.20944/preprints202411.0194.v1

Huang, Y., Qi, Y., Liu, C., Jing, F., Li, C., Wang, M., Zhu, C., Gui, P., Ge, Z., & Han, X. (2024). *A Decade of Progress in Artificial Intelligence for Fundus Image-Based Diabetic Retinopathy Screening (2014–2024): A Bibliometric Analysis*. https://doi.org/10.1101/2024.11.02.24316635

Ibrahim, M., Mahmoud, M. A., Al-Sharafi, M. A., Hassan, A., Iahad, N. A., & Saraswathy Shamini Gunasekaran. (2024). Smart Home Technology Research Landscape: A Bibliometric Analysis of Scientific Publications (2014–2024). In Cham (Ed.), *Current and Future Trends on Intelligent Technology Adoption: Volume 2* (pp. 97–115). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-61463-7_6

Jena, B., & Paltasingh, T. (2025). Digital Literacy among Older Adults: A Systematic Review in Indian Context. *Educational Gerontology*, *51*(4), 371–386. https://doi.org/10.1080/03601277.2024.2397428

Kant, K., Hushain, J., Agarwal, P., Gupta, V. L., Parihar, S., & Madan, S. K. (2024). *Impact of Sustainable Techno-Marketing Strategies on MSME's Growth: A Bibliometric Analysis of Past Decade (2014-2024)*. 66–79. https://doi.org/10.2991/978-94-6463-544-7_6

Kostkova, P. (2015). Grand Challenges in Digital Health. *Frontiers in Public Health*, *3*. https://doi.org/10.3389/FPUBH.2015.00134

Leung, A. (2024). *Health for All: Evaluating the Impact of Equity-Centered Approaches on US Healthcare Delivery, A Review of Literature*. University of San Francisco.

Leydesdorff, L., Bornmann, L., Comins, J., Marx, W., & Thor, A. (2016). Referenced Publication Year Spectroscopy (RPYS) and Algorithmic Historiography: The Bibliometric Reconstruction of András Schubert's Œuvre. *Festschrift for Andras Schubert*, 79–96. https://doi.org/10.48550/arXiv.1604.04705

Maghfiroh, N. H., & Sukmawati, B. (2024). Bibliometric Analysis: Mental Health Problems in a Decade. *West Science Social and Humanities Studies*, *2*(05), 706–715. https://doi.org/10.58812/wsshs.v2i05.780

Mas'odi, M., & Arma, I. P. (2024). Characters and Non-Digital Media: Case Study Trends in English Language Learning in Secondary Schools. *Assyfa Journal of Multidisciplinary Education*, *1*(2), 95–103. https://doi.org/10.61650/ajme.v1i2.352

Mheidly, N., & Fares, J. (2020). Health Communication in Low Income Countries: A 60-Year Bibliometric and Thematic Analysis. *Journal of Education and Health Promotion*, *9*(1), 163. https://doi.org/10.4103/jehp.jehp_384_20

Moral-Muñoz, J. A., Herrera-Viedma, E., Santisteban-Espejo, A., & Cobo, M. J. (2020). Software Tools for Conducting Bibliometric Analysis in Science: An Up-to-date Review. *Profesional de La Informacion*, *29*(1). https://doi.org/10.3145/EPI.2020.ENE.03

Moreira, P. S. da C., Guimarães, A. J. R., & Tsunoda, D. F. (2020). Qual Ferramenta Bibliométrica Escolher? um estudo comparativo entre softwares. *P2P E INOVAÇÃO*, *6*, 140–158. https://doi.org/10.21721/P2P.2020V6N2.P140-158

Pai, R. R., & Alathur, S. (2021). Bibliometric Analysis and Methodological Review of Mobile Health Services and Applications in India. *International Journal of Medical Informatics*, *145*. https://doi.org/10.1016/J.IJMEDINF.2020.104330

Palioura, M., Rapti, S., & Sapounidis, T. (2024). Educational Robotics Integration into Storytelling Activities to Promote Kindergarteners' Communication, Collaboration, Creativity, and Critical Thinking. A Scoping Review: 2014-2024. *Proceedings - 2024 9th South-East Europe Design Automation, Computer Engineering, Computer Networks and Social Media Conference, SEEDA-CECNSM 2024*, 134–139. https://doi.org/10.1109/SEEDA-CECNSM63478.2024.00032

Pan, S., & Rong, L. Q. (2021). Mobile Applications in Clinical and Perioperative Care for Anesthesia: Narrative Review. *Journal of Medical Internet Research*, *23*(9). https://doi.org/10.2196/25115

R Core Team, R. (2021). *R: A Language and Environment for Statistical Computing*.

Sari, N., Mediawati, A. S., & Yudianto, K. (2024). Use of the Technology Acceptance Model for Electronic Medical Records in Nursing Documentation: Scooping Review. *Indonesian Journal of Global Health Research*, *6*(4), 1953–1962. https://doi.org/10.37287/ijghr.v6i4.3373

Silva, M. do S. T., Oliveira, V. M. de, & Correia, S. É. N. (2022). Scientific mapping in Scopus with Biblioshiny: A bibliometric analysis of organizational tensions. *Contextus – Revista Contemporânea de Economia e Gestão*, *20*, 54–71. https://doi.org/10.19094/CONTEXTUS.2022.72151

Sweileh, W. M., Al-Jabi, S. W., AbuTaha, A. S., Zyoud, S. H., Anayah, F. M. A., & Sawalha, A. F. (2017). Bibliometric Analysis of Worldwide Scientific Literature in Mobile - health: 2006-2016. *BMC Medical Informatics and Decision Making*, *17*(1). https://doi.org/10.1186/S12911-017-0476-7

Taj, F., Klein, M. C. A., & Van Halteren, A. (2019). Digital Health Behavior Change Technology: Bibliometric and Scoping Review of Two Decades of Research. *JMIR MHealth and UHealth*, *7*(12). https://doi.org/10.2196/13311

Tajudeen, F. P., Bahar, N., Maw Pin, T., & Saedon, N. I. (2022). Mobile Technologies and Healthy Ageing: A Bibliometric Analysis on Publication Trends and Knowledge Structure of mHealth Research for Older Adults. *International Journal of Human-Computer Interaction*, *38*(2), 118–130. https://doi.org/10.1080/10447318.2021.1926115

Tandilangi, T. P., Rekawati, E., & Eriska, W. (2024). Improving Functional Status of Older Adults Through Health Literacy Media: A Systematic Review. *Jurnal Berita Ilmu Keperawatan*, *17*(2), 218–226. https://doi.org/10.23917/BIK.V17I2.5063

Ueno, A., Curtis, L., Wood, R., Al-Emran, M., & Yu, C. (2024). A Review of the Metaverse in Higher Education: Opportunities, Challenges and Future Research Agenda. *Studies in Computational Intelligence*, *1161*, 1–16. https://doi.org/10.1007/978-3-031-61463-7_1

Venable, G. T., Shepherd, B. A., Loftis, C. M., McClatchy, S. G., Roberts, M. L., Fillinger, M. E., Tansey, J. B., & Klimo, P. (2016). Bradford's Law: Identification of The Core Journals for Neurosurgery and Its Subspecialties. *Journal of Neurosurgery*, *124*(2), 569–579. https://doi.org/10.3171/2015.3.JNS15149

Yang, K., Hu, Y., & Qi, H. (2022). Digital Health Literacy: Bibliometric Analysis. *Journal of Medical Internet Research*, *24*(7). https://doi.org/10.2196/35816

Yeung, A. W. K., Kulnik, S. T., Parvanov, E. D., Fassl, A., Eibensteiner, F., Völkl-Kernstock, S., Kletecka-Pulker, M., Crutzen, R., Gutenberg, J., Höppchen, I., Niebauer, J., Smeddinck, J. D., Willschke, H., & Atanasov, A. G. (2022). Research on Digital Technology Use in Cardiology: Bibliometric Analysis. *Journal of Medical Internet Research*, *24*(5). https://doi.org/10.2196/36086

Yosep, I., Hikmat, R., Mardhiyah, A., & Hernawaty, T. (2024). A Scoping Review of Digital-Based Intervention for Reducing Risk of Suicide Among Adults. *Journal of Multidisciplinary Healthcare*, *17*, 3545–3556. https://doi.org/10.2147/JMDH.S472264

Yu, X., Ramli, S. H., Norowi, N. M., Surip, S. S., Li, Z., You, D., Chu, Q., Song, N., Ding, X., & Yang, X. (2023). Thematic Review on Mobile Health Applications in Design Perspective Publications from 2018-2023: Analysis of Trends for Future Studies. *International Journal of Business and Technology Management*, *5*(3), 692–709. https://doi.org/10.55057/ijbtm.2023.5.3.60

Zuhdi, D. A., Sulistyanto, A., & Harahap, H. S. (2024). Dynamics of Gender-based Violence in Scopus Indexed Publication 2014-2024: A Bibliometric Analysis. *Bricolage : Jurnal Magister Ilmu Komunikasi*, *10*(1), 053. https://doi.org/10.30813/BRICOLAGE.V10I1.5115

Zupic, I., & Čater, T. (2015). Bibliometric Methods in Management and Organization. *Organizational Research Methods*, *18*(3), 429–472. https://doi.org/10.1177/1094428114562629