Bibliometric Analysis of Social Media for Healthcare

Thoh Ging Seng and Noorminshah A. Iahad

Faculty of Management, Universiti Teknologi Malaysia, 81310 Johor Bahru, Johor, Malaysia
Corresponding Author Email: thoh@graduate.utm.my

Abstract
The study aims to visually represent bibliometric information on social media in relation to health through bibliometric analysis. Consequently, the analysis covered various dimensions, including yearly publication patterns, major contributing authors, highly referenced papers, top contributed countries, active affiliations, notable journals, most frequent subject area. The approach utilized bibliometric analysis tools including VOSviewer, Biblioshiny, BiblioMagika, and OpenRefine. Data is sourced from the Scopus database, followed by an audit and cleansing process. This led to the incorporation of 1,258 publications, commenced in 2019, with 145 papers, experienced a more than double increase to 333 papers in 2024, and continued to grow thereafter, highlighting its ongoing relevance. The most cited article evaluated the role of social media on dental education and oral health focusing on the use of Instagram. US, UK and China are the top 3 most contributed countries. Furthermore, the analysis identified a need to bridge the gap between social media and related fields, such as peer communication among health practitioners for future studies.
Keywords: Social Media, Health, Bibliometric Analysis

Introduction
Social media has become an increasingly popular communication tool among healthcare providers which allows healthcare workers to access patient health information, review relevant medical information, and communicate with colleagues (Surani et. al., 2017). Social media platforms have been beneficial in expanding professional networks, generating learning opportunities, and enhancing interactions among peers, students, instructors, and preceptor (Chan et al., 2018). The research by Panahi et al. (2014) shed light on the increasing use of social media as communication tools by physicians in healthcare with the reasons included its effectiveness in communication, appeal to younger patients, mobility, enjoyment, and as a source of relevant health information. By understanding the uses, barriers, and predictors of social media use in health communication, stakeholders can leverage this powerful tool effectively to enhance healthcare delivery and patient outcomes (Huo et al., 2019). The use of social media in health communication has shown an upward

trend, with efforts made to protect patient privacy and ensure secure communication channels. Overall, the increasing number of social media users presents a significant opportunity for healthcare professionals to engage with patients and the public, offering a platform for health promotion, behavior change programs, and the dissemination of up-to-date health information (Howard, 2021).

Chaudhri et al. (2021) research illuminates the evolving landscape of social-mediated communication in the healthcare sector. Moreover, the research done in Dutch hospitals underscores the challenges communication professionals encounter in effectively utilizing social media, noting the prevalence of broadcasting approaches over engagement strategies in organizational practices. The implementation of secure messaging platforms has been linked to increased satisfaction among clinical staff regarding the timeliness and quality of communication within healthcare. A study conducted at Stanford Hospital by Chandra et al. (2023) demonstrated that secure messaging was perceived to enhance hospital communication by improving efficiency, workflow integration, and user experience satisfaction. Therefore, the integration of social media into professional communication practices has become a prevalent phenomenon, particularly in public hospitals in Malaysia. This shift is driven by the potential benefits it offers, including real-time information dissemination, knowledge sharing, and improved accessibility to medical resources (Smailhodzic et al., 2016).

As the use of social media continues to evolve, it is essential to bridge existing gaps in the literature by providing a comprehensive exploration of the use of social media for professional communication among health practitioners in public hospitals in Malaysia. This study employs the comprehensive SCOPUS database to analyze journal articles published in the realm of social media and health between January 2019 and January 2024.

Background Research
The bibliometric analysis of scientific literature on the combination of social media and health is an area of growing interest and importance. Several studies have utilized bibliometric analysis to explore various aspects of social media in relation to health, such as research trends, thematic evolution, and the impact of social media on public health development. For instance, Sweileh et al. (2017) conducted a bibliometric analysis of worldwide scientific literature in mobile health, highlighting the significance of bibliometric analysis in understanding the evolution of research in health-related technologies. Similarly, Zyoud et al. (2018) focused on global trends in research related to social media in psychology, emphasizing the use of bibliometric characteristics to map frequent terms in publications related to social media in the field of psychology. Furthermore, Dash et al. (2022) underscored the role of social media in public health development through a bibliometric approach, emphasizing the importance of bibliometric analysis in elucidating the significance of social media in public health.

These studies demonstrate the diverse applications of bibliometric analysis in understanding the landscape of social media and health research. They highlight the value of bibliometric analysis in identifying research trends, mapping frequent terms, and assessing the impact of social media on various aspects of health. As the field continues to evolve, bibliometric analysis serves as a valuable tool for comprehensively understanding the intersection of social

media and health, providing insights that can inform future research directions and public health policies.

Methodology

This study utilized bibliometric analysis as a tool to explore the structure and significance of the relationship between social media and health. Social media has emerged as a crucial tool in health communication, as evidenced by various studies (Moorhead et al., 2013) conducted a bibliometric study on the role of social media in public health development, highlighting its potential impact on future public health initiatives (Dash et al., 2022) carried out a systematic review focusing on leveraging social media to enhance the impact of health research, particularly through studies linking social media use with bibliometric outcomes (Bardus et al., 2020).

The data utilized in this study were extracted exclusively from the Scopus database, which, while being the largest database available for scientific literature, imposes certain limitations. Consequently, the findings of this research are representative solely of the publications indexed within the Scopus database. It is important to acknowledge that other significant sources of scientific publications exist, which may provide additional insights not captured in this study.

Data Source and Search Strategy

Bibliometric analysis was conducted using the Scopus database as of January 16, 2024. The search terms "social media" and "health" were employed to retrieve relevant journal articles published between 2019 and 2024. Additionally, the results were refined to focus specifically on the field of Health, aiming to identify recent research trends on social media within this domain, aligning with the study's focus.

Information Extraction

Figure 1 depicts the Flowchart for Bibliometric Analysis Dataset Preparation (Ahmi, 2024). In this study, documents with unidentified author names were excluded to ensure the accuracy of the analyzed data. All documents underwent bibliometric analysis. The biblioMagika® tool was employed to analyze and extract results presented in this paper. Furthermore, Microsoft Excel was utilized to refine certain results for clearer presentation.
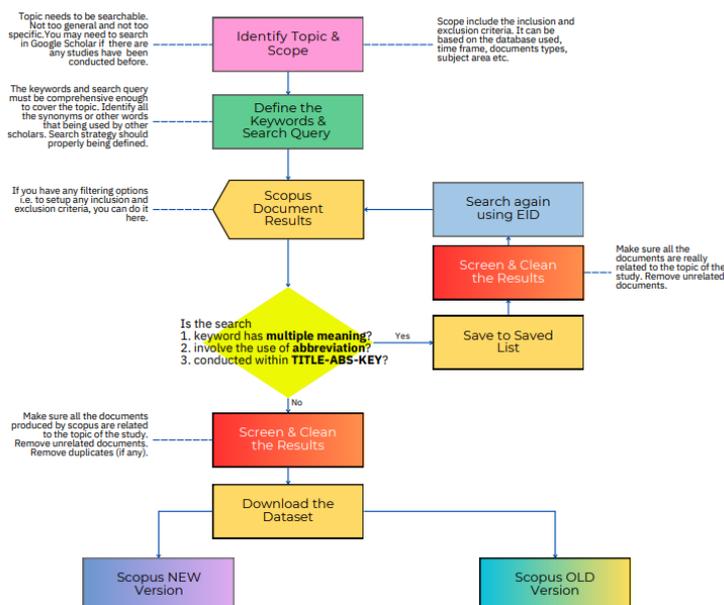
Figure 1. Flowchart for Bibliometric Analysis Dataset Preparation using biblioMagika® and biblioMagika®Split Ahmi (2024)

Analysis and Results

On January 17th, 2024, data extracted from Scopus databases underwent analysis. For this purpose, we utilized "biblioMagika®," a powerful tool capable of transforming Scopus data into meaningful metrics such as citation counts, h-index, g-index, and more. biblioMagika® streamlines the process of cleaning and harmonizing author, affiliation, and country data, ensuring accuracy and reliability before data is uploaded to VOSviewer.

This tool prides itself on its outstanding compatibility with the Scopus database, enabling the creation of vital citation metrics and providing thorough analysis across a range of parameters. Furthermore, biblioMagika® assists in pinpointing highly cited documents and evaluating author productivity, streamlining comparisons between publications with single and multiple authors. Moreover, biblioMagika® demonstrates excellence in handling author and affiliation data, detecting any missing information, automatically identifying institutions and countries, and seamlessly integrating with popular tools for data cleaning and visualization such as OpenRefine, VOSviewer, and Biblioshiny.

Descriptive Analysis

Table 1 presents the primary information concerning the selected articles retrieved from biblioMagika® in the realm of health and social media.

Table 1
Key Details Concerning the Chosen Articles on Health in Social Media

Basic Info.	
Start Year	2019
End Year	2024
Total Publications	1258
Number of Contributing Authors	5398
Number of Cited Papers	882
Total Citations	18,473
Citation per Paper	14.68
Citation per Cited Paper	20.94
Citation per Author	3.42
Citation sum within h-Core	11,051
Citable Year	6
h-index	59
g-index	110
Publication Years	2019 - 2024
Citation Years	5
Citation per Year	3694.60
Author per Paper	4.29
m-index	9.83

In 2019, Scopus indexed 145 papers. However, this figure saw a significant annual increase, with the highest number observed in 2023. Due to data extraction in the first half of 2024, complete information for 2024 is not available, as indicated in Table 2.

Table 2
Yearly Publication Pattern for Health in Social Media

Year	Total Publication	Total Citation
2019	145	0
2020	214	1
2021	266	373
2022	275	1417
2023	333	12811
Grand Total	1233	14602

A total of 5,398 authors participated in the creation of 1,258 journal articles extracted from the Scopus database. From this pool of contributing authors, we have identified the top 10 authors based on the number of publications. Notably, the two most prolific authors are "De Choudhury, M." and "Skogen, J.C.", as outlined in Table 3. Moreover, the data presented in Table 3 will be invaluable to researchers seeking to explore the productivity of scientific literature in the realm of health in social media. This information will help visualize new avenues and the scope of research in this field.

Table 3

Most Productive Authors for Health in Social Media

Author Name	Total Publications	Percentage (%)
De Choudhury, M.	10	0.79
Skogen, J.C.	7	0.56
Hjetland, G.J.	6	0.48
Molenaar, A.	6	0.48
Brailovskaia, J.	5	0.40
Brennan, L.	5	0.40
Chen, S.	5	0.40
Margraf, J.	5	0.40
Mesch, G.S.	5	0.40
Rosenberg, D.	5	0.40

The highly referenced papers are shown in Table 4. The article by Franco et al. (2024) stands as the most cited, examining the impact of social media on dental education and oral health, with a specific focus on Instagram. Following closely, the study by Zingg et al. (2023) discusses digital health technologies for managing peripartum depression among low-socioeconomic populations, incorporating insights from patients, providers, and social media platforms. Additionally, the research by Benrouba and Boudour (2023) is among the top cited articles, demonstrating emotional sentiment analysis of social media content for ensuring mental health safety.

Table 4
Highly Referenced Papers for Health in Social Media

Author	Article Title	Citations
Franco et al. (2024)	The Role of Social Media on Dental Education and Oral Health: A Focus on Instagram	1633
Zingg et al. (2023)	Digital health technologies for peripartum depression management among low-socioeconomic populations: perspectives from patients, providers, and social media channels	734
Benrouba & Boudour (2023)	Emotional sentiment analysis of social media content for mental health safety	557
Krishnan & Liu. (2023).	Tick Tock, 30 Seconds to Better Health: Role of Social Media on Cardiovascular Health Promotion	432
Handing et al. (2023)	Marketing yourself in social media as a global health organization: lessons to be learned	350
Kabeer et al. (2023)	Social Media Interaction-Based Mental Health Analysis with a Chat-Bot User Interface	299

Table 5 displays the leading countries contributing to total publications in the field, along with the percentage of their contributions. The top ten countries conducting research on health in the realm of social media are listed. It is apparent that the USA and UK lead the list, accounting for 49.77% of the selected articles, followed by China with a total of 10.02%.

Table 5
Most Productive Countries for Health in Social Media

No	Country	Total Publication	% of Publication
1.	United States	480	38.16%
2.	United Kingdom	146	11.61%
3.	China	126	10.02%
4.	Australia	91	7.23%
5.	Canada	71	5.64%
6.	India	65	5.17%
7.	Indonesia	37	2.94%
8.	Spain	32	2.54%
9	Saudi Arabia	31	2.46%
10.	Germany	30	2.38%

Table 6 depicts the engaged affiliations and the quantity of research papers they have published. The top 10 affiliations are presented in this table. It is notable that Harvard Medical School and Wuhan University emerge as the most productive affiliations for health in social media, each contributing to 19 documents.

Table 6

Most Relevant Affiliations for Health in Social Media

No	Affiliation	Total Publication
1.	Harvard Medical School	19
2.	Wuhan University	19
3.	Monash University	17
4.	University of Michigan, Ann Arbor	17
5.	University of Pennsylvania	16
6.	The University of Sydney	15
7.	University of Melbourne	15
8.	University of California, Los Angeles	15
9	University of Ottawa	15
10.	Stanford University	14

Table 7 showcases the top 8 sources. It's clear from the table that "ACM International Conference Proceeding Series" and "Frontiers in Psychology" lead with the highest number of publications.

Table 7
Most Productive Source Title for Health in Social Media

No	Source	h_index	g_index	m_index	TC	NP
1.	ACM International Conference Proceeding Series	5	8	0.83	100	7
2.	Frontiers in Psychology	5	7	1.00	96	6
3.	Lecture Notes in Networks and Systems	6	7	2.00	79	7
4.	Sustainability (Switzerland)	2	3	0.40	15	2
5.	Journal of Physics: Conference Series	1	1	0.167	1	1
6.	Nature	2	2	1.00	58	2
7.	International Journal of Scientific and Technology Research	0	0	0.00	0	0
8.	Journal of Educational and Social Research	1	1	0.250	1	1

TC = Total Citations: NP = Number of published articles.

Table 8
Most Frequent Subject Area for Health in Social Media

Subject Area	TP	%
Medicine	708	56.28%
Social Sciences	301	23.93%
Computer Science	265	21.07%
Psychology	125	9.94%
Engineering	95	7.55%
Nursing	93	7.39%
Health Professions	75	5.96%
Environmental Science	69	5.48%
Arts and Humanities	62	4.93%
Business, Management and Accounting	41	3.26%

Table 8 presents the analysis of keyword frequency and occurrences across subject areas. Notably, medicine, social science, computer science, psychology, engineering, nursing, and health professions emerge as the top seven subject areas.

Discussion

Discussion in General

The findings indicate that research on health within the realm of social media is still emerging, with a relatively small number of publications. A total of 1,258 journal articles were identified from the Scopus database in this area between 2019 and 2024. The majority of studies were focusing on the role of social media for health-related education, and mental health. For example, The Role of Social Media on Dental Education and Oral Health: A Focus on Instagram (Franco et al., 2024). Other authors Benrouba and Boudour (2023), Kabeer et al. (2023), Zsila and Eric (2023), and Starvaggi et al. (2023) outlined the Emotional sentiment analysis of social media content for mental health safety, Social Media Interaction-Based Mental Health Analysis with a Chat-Bot User Interface, Social media use and various factors affecting Indonesian mental health during the COVID-19: a pathway to remember, Pros & cons: impacts of social media on mental health, and Mental health misinformation on social media: Review and future directions.

State of Social Media Studies

The use of social media for communication within clinical teams, seeking clinical consultation, and making referrals underscores its ethical and legal implications in healthcare service delivery (Chan et. al., 2018). Privacy and confidentiality concerns emerge, with the potential for harm to patients and exposure of their identities through the sharing of cases (Balushi, 2020). Challenges such as maintaining patient confidentiality, ensuring information accuracy, and upholding professional standards in online interactions need to be addressed. Conversely, opportunities include enhanced communication among healthcare professionals, increased public engagement, and the dissemination of valuable health-related information (Farsi, 2021). Public hospitals are integrating social media platforms and artificial intelligence-based tools into their protocols to enhance reputation and improve patient satisfaction (Aguerrebere et al., 2022). In the context of Malaysia, there is a need for research that explores the state of social media studies, the awareness of social business, and the impact of social media on traditional media, particularly in relation to healthcare communication

practices (Daud & Othman, 2019; "Social Media Impact on Traditional Media: A Review on the Reason Behind the Closure of Utusan Malaysia", 2022).

Social Media Guidelines in Healthcare Communication

Social media holds the potential to improve patient information, public health research, and healthcare quality, prompting the need for healthcare organizations to establish codes of conduct for responsible social media use (Ventola, 2014; Galea et al., 2023). Surani et al. (2017) highlighted that a significant proportion of healthcare workers (40%) are unaware of their workplace policies, potentially leading to privacy breaches. Further studies are needed to evaluate the impact of these findings on patient care quality. Further studies can aim to delve into the key factors and areas that shape effective guidelines for the use of social media in healthcare communication practices, with a specific focus on improving patient care outcomes and ensuring ethical and compliant professional conduct (Farsi, 2021). Establishing clear guidelines and promoting the distinction between personal and professional online conduct are crucial steps in upholding professionalism in the digital age (Soubra, 2022). The research by Ahmead et al. (2022) investigated the effects of internet and social media use on the work performance of physicians and nurses in Palestine, which highlighted the importance of having clear policies and regulations regarding internet and social media use in healthcare settings to prevent complications and professional issues, emphasizing the need for guidelines set by administrative staff and policymakers. Debate surrounds the effectiveness of social media as a communication platform in healthcare, with studies demonstrating its potential to improve healthcare outcomes and facilitate policy debates (Wong et al., 2020; Al-Rumhi et al., 2023).

There are previous studies focused on the policy and guidelines development for overall healthcare communication. Kind et al. (2015) discusses social media policies at US medical schools, highlighting the importance of established policies that can serve as a blueprint for others to adopt and adapt. Robinson et al. (2018) conducted a Delphi study to develop guidelines for safe communication about suicide on social media, underscoring the importance of ethical considerations and responsible communication practices. Goldsweig et al. (2021) discuss the optimal use of social media in interventional cardiology, emphasizing aspects such as patient privacy, creating impactful content, and the evolving role of traditional journals in the era of social media. This reference underscores the importance of considering privacy concerns and content creation strategies when developing guidelines for professional communication on social media platforms. Zakkar et al. (2021) critically analyzed the social media policies in Ontario's healthcare system, highlighting how these policies impact healthcare professionals' use of social media for patient communication and understanding patient experiences. Kaushal et al. (2022) outlined the development of reporting guidelines for social media research. Etheredge and Fabian (2022) emphasized the ethical and legal challenges of digital interaction, providing comprehensive recommendations to guide practitioners.

Focus on Public Healthcare Practitioners

Despite this, we noticed the possibility of focusing on the social media for healthcare in the field of professional communication among health practitioners in public hospitals in which it had not previously been involved heavily. A critical gap exists in understanding the full scope of their challenges and opportunities, particularly in connecting health professions and

excluding patient involvement (Chan et al., 2018). Upholding online professionalism is essential for healthcare professionals to safeguard their reputation, protect patient confidentiality, and ensure the accuracy of information shared online. It is crucial to navigate the challenges effectively posed by social media in the healthcare sector, such as unauthorized disclosure of patient information can lead to ethical breaches and undermine patient trust, potentially resulting in severe penalties like the revocation of professional licenses (Balushi, 2020). The use of social media during the COVID-19 pandemic has been multifaceted, serving as a valuable tool for communication, education, and information sharing in healthcare (Wong et al., 2020). While its benefits are evident, it is crucial for healthcare professionals and organizations to critically evaluate the risks and benefits associated with social media use to ensure its effective and responsible application in the field. The increased use of social media has not only facilitated communication and information sharing but has also raised questions about the quality of care provided.

Recommendations

There are potential gaps for future research which emphasize the exploration of social media for professional communication in public hospitals among health practitioners to enhance healthcare outcomes, stakeholder engagement, and regulatory compliance. By bridging gaps in the literature and providing valuable insights into the challenges and opportunities of social media use in healthcare, future research sets the stage for the development of effective guidelines that align with national strategic objectives and policies, ultimately contributing to the advancement of healthcare communication practices.

The significance of developing comprehensive communication guidelines and policies for the use of social media platforms by health practitioners in public hospitals is multifaceted and aligns with key strategic objectives outlined in the Pelan Strategik Pendigitalan (PSP) KKM 2021 – 2025 and the National Policy for Quality In Healthcare: Bridging Silos, Accelerating Improvements 2022-2026 (2022). By establishing artifacts at the strategy level under the PSP, the development of communication guidelines and policies for social media use contributes to the overarching objective of leveraging digital technologies to enhance healthcare communication and service delivery. These guidelines enable health practitioners to effectively engage with stakeholders, disseminate knowledge, and uphold professional standards through the optimized use of technology communication channels.

The goal of engaging and communicating with stakeholders by optimizing the use of technology communication channels, as outlined in the National Policy for Quality In Healthcare, is facilitated by the implementation of comprehensive social media guidelines. These guidelines provide a framework for utilizing intra and inter-organizational communication platforms effectively, ensuring that information is disseminated efficiently and transparently to stakeholders.

The guidelines and policies on the appropriate use of social media for professional purposes, patient privacy considerations, disciplinary actions for violations, and best practices for professionalism and ethical conduct serve to establish clear rules and standards for responsible social media use in healthcare communication. By addressing issues such as privacy, confidentiality, content appropriateness, professional boundaries, and legal

considerations, these guidelines ensure compliance with regulatory requirements and promote ethical behavior among health practitioners.

Conclusions and Limitations

This study presents the outcomes of a bibliometric analysis conducted on a total of 1,258 journal articles focusing on health within the realm of social media, published between 2019 and 2024. The analysis was carried out using the biblioMagika® software. The findings indicate that research in this area commenced in 2019 and has been steadily increasing, particularly in 2023, with a nearly 130% rise compared to 2019, and this trend has continued accordingly. Interestingly, there was a slight decrease in the number of articles in 2022 compared to 2021. Moreover, the study identifies the USA, UK, and China as the top three countries contributing to research on health in the domain of social media. Additionally, the subject areas of medicine, social science, and computer science emerge as the top three fields within this context.

Despite its scientific contributions, this paper has limitations, as the data were extracted solely from the Scopus database, the largest database available for scientific literature. Consequently, the results are limited to the scope of the Scopus database, and other sources of data may exist for scientific publication. Given the significant annual increase in research on health in the realm of social media, it is recommended that this study be repeated in the near future to account for the dynamic nature of the results.

However, there are potential gaps for future research which emphasize the exploration of social media for professional communication in public hospitals among health practitioners to enhance healthcare outcomes, stakeholder engagement, and regulatory compliance. By bridging gaps in the literature and providing valuable insights into the challenges and opportunities of social media use in healthcare, future research sets the stage for the development of effective guidelines that align with national strategic objectives and policies, ultimately contributing to the advancement of healthcare communication practices.

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