

Bibliometric Mapping of WhatsApp-Based Health Research (2015–2025): Global Trends, Leading Countries, and Emerging Themes

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ABSTRACT

The use of WhatsApp (WA) in the health sector is increasingly widespread for communication, education, and intervention. Yet, systematic and updated bibliometric analyses of global trends remain limited, particularly those covering post-2023 developments and comparing contributions between high-income and developing countries. This study aims to systematically map and analyze the international landscape of WA-based health research published between 2015 and 2025. We employed a bibliometric research design with data sourced from the Scopus database, using the keywords "WhatsApp" AND "health". A total of 50 relevant articles were analyzed using descriptive statistics and VOSviewer software to visualize networks. The findings indicate that the use of WA as a health communication tool is firmly established. Publication trends indicate growth, with the COVID-19 pandemic serving as a significant catalyst that has driven the exploration of WA for remote healthcare services. The five most productive countries are India, Saudi Arabia (with five articles each), Brazil, Malaysia, and Indonesia (with four articles each). The most influential themes centered on the benefits of WA in clinical practice and the enhancement of supervision for community health workers. In conclusion, WA is proven to be a vital health communication tool, and the future direction of research is expected to increasingly focus on establishing its effectiveness, testing service models, and its broader, more systematic integration into the digital health ecosystem.

Keywords : Bibliometric; WhatsApp; Health Research

INTRODUCTION

The development of digital technology has brought significant changes in the way people communicate, interact, and obtain information. ⁽¹⁾ One of the most popular communication platforms globally is WhatsApp, an instant messaging application that enables the fast and efficient transmission of text, images, videos, and documents. ⁽²⁾ By 2025, WhatsApp's active users are expected to exceed two billion worldwide, making it one of the most influential communication media in the digital era. In the health context, ⁽³⁾ WhatsApp is increasingly being used by healthcare professionals, researchers, and the general public to support medical communication, health education, service coordination, and scientific research. ⁽⁴⁾ Its flexibility and accessibility make WhatsApp a potential tool for accelerating the dissemination of health information, particularly in developing countries with limited resources. ⁽⁵⁾

Despite the increasing use of WhatsApp in the health sector, scientific studies that systematically map the trends, directions, and contributions of research on this topic are still limited. Most studies are fragmented and focus on specific implementations, such as doctor-patient communication or health promotion. ⁽⁶⁾ A broader understanding of the development of WhatsApp research in the health sector is crucial for identifying knowledge gaps, opportunities for cross-national collaboration, and future research directions. ⁽⁷⁾ Furthermore, there has been no comprehensive analysis utilizing a bibliometric approach to explore the dynamics of scientific publications on WhatsApp in the context of health. ^(8,9) Therefore, a scientific mapping is needed to assess the extent to which WhatsApp plays a rapidly growing and relevant role in global health research. ⁽¹⁰⁾

Although several bibliometric analyses on the use of WhatsApp in health research have been previously published, particularly in journals such as JMIR mHealth and Heliyon, existing studies remain limited in terms of temporal scope, geographic focus, and thematic depth. Most earlier analyses only cover publications up to early 2023, do not reflect post-pandemic research developments, and have not examined differences in research contributions between high-income countries and developing regions—despite WhatsApp being predominantly used in Global South settings. ⁽¹¹⁾ Furthermore, previous work has not comprehensively explored the evolution of international collaboration networks, the shifting direction of health-related applications, or emerging research hotspots. Therefore, this study addresses these gaps by providing an updated analysis covering the period from 2015 to 2025, mapping global trends and leading contributors based on country development level, and identifying

emerging themes to anticipate future research directions in the use of WhatsApp for health communication and intervention.⁽¹²⁾

The objective of this study is to systematically map and analyze the global landscape of WhatsApp-based health research published between 2015 and 2025. Specifically, this study aims to: (1) identify publication trends and growth patterns over time; determine the most productive countries, institutions, authors, and journals contributing to this research area; examine international collaboration networks within the field; and explore research themes, clusters, and emerging topics to understand how the scholarly focus has evolved and where future research directions are likely to develop. Through this comprehensive bibliometric approach, the study seeks to provide an updated and evidence-based overview that supports researchers, policymakers, and practitioners in advancing the effective use of WhatsApp in health-related contexts.

MATERIAL AND METHOD

Research Design

This study employed a bibliometric research design to systematically analyze scientific publications related to the use of WhatsApp in health contexts. The bibliometric approach was chosen to quantitatively map publication trends, research productivity, collaboration patterns, and thematic developments within the field. The search strategy used the keywords "WhatsApp" AND "health" to retrieve relevant articles published between 2015 and 2025. This time frame was selected to capture the evolution of WhatsApp-based health research from early adoption through its expanded use during and after the COVID-19 pandemic.⁽¹³⁾ The retrieved data were then processed, cleaned, and analyzed using bibliometric software to generate descriptive indicators, co-authorship networks, keyword co-occurrence maps, and thematic clusters, allowing comprehensive visualization and interpretation of the research landscape. This bibliometric approach was chosen because it provides a comprehensive overview of the structure, development, and direction of research through the analysis of scientific publication metadata.⁽¹⁴⁾

Data Sources

The data source for this study is the Scopus database, one of the largest international scientific databases, globally recognized for its multidisciplinary coverage and data validity. Scopus was selected based on the consideration that this database provides comprehensive metadata, including title, abstract, keywords, author names, affiliations, year of publication, and number of citations.

Data Search Strategy

A structured search strategy was implemented to identify relevant scientific publications on WhatsApp-based health research. The search was conducted in a central scholarly database using the keywords "WhatsApp" AND "health" applied to the article title, abstract, and keywords fields to ensure comprehensive coverage. The search was restricted to the publication period January 2015 to November 2025 to capture the development, adoption, and evolution of WhatsApp as a health communication and intervention tool. Only peer-reviewed journal articles, conference papers, and reviews were included, while non-scholarly sources such as editorials, commentaries, letters, book chapters, and gray literature were excluded. The search results were exported in CSV format and subsequently screened for relevance and duplication before proceeding to the bibliometric analysis.

The inclusion criteria for this study included:

Research articles published in scientific journals indexed by Scopus, articles discussing the use of WhatsApp in the context of health, health education, or health communication, and articles with complete metadata (title, author, year, and keywords). The number

Exclusion criteria included:

Non-research articles (e.g., editorials, commentaries, or letters to the editor), publications irrelevant to the health context, data duplication or multiple publications, and data collection and processing. All metadata from articles meeting the inclusion criteria were downloaded in CSV (Comma-Separated Values) format via the Scopus export menu. The data was then imported into Microsoft Excel 2021 for initial filtering and variable grouping (title, author, year, country, affiliation, number of citations, and keywords). The data for this study were retrieved from the Scopus index, as Scopus is widely recognized as a significant international database for reputable scientific publications. The use of Scopus also aligns with current bibliometric standards, allowing for the identification of publications based on journal ranking in the SCImago Journal Rank (SJR), particularly those categorized within Q2, thereby ensuring the higher validity and reliability of the retrieved data. The initial search yielded 2,254 records within a ten-year range. Following the predefined eligibility criteria—specifically limiting the analysis to the active research period between 2015 and 2025—a total of 50 relevant articles were selected for inclusion.

These final documents form the basis of the bibliometric dataset used to map publication trends, research patterns, and thematic development within WhatsApp-based health research.

Data Analysis

Bibliometric analysis was conducted in two main stages: Descriptive Analysis, presenting the distribution of institutions, h-index, and top journals, and assessing the number of publications per year (2015–2025), and identifying countries, institutions, and authors with the highest productivity and calculating the number of citations and h-index to assess the impact of publications.

Network Analysis

This analysis was conducted using VOSviewer software (version 1.6.20) to visualize the relationship map between research elements. The analysis included a Co-Authorship analysis to map collaborations between authors or institutions. Co-occurrence analysis to identify relationships between keywords. Citation analysis to determine the most influential publications. Bibliographic coupling to examine reference similarities between articles. The analysis results were visualized as network maps showing the size, color, and interconnectedness of elements, thus depicting a knowledge map of WhatsApp research in the health sector.

Research Ethics

This research did not directly involve human subjects and, therefore, did not require ethics approval. However, all data used is sourced from scientific publications that are publicly available in the Scopus database and is used only for academic and research purposes.

RESULT

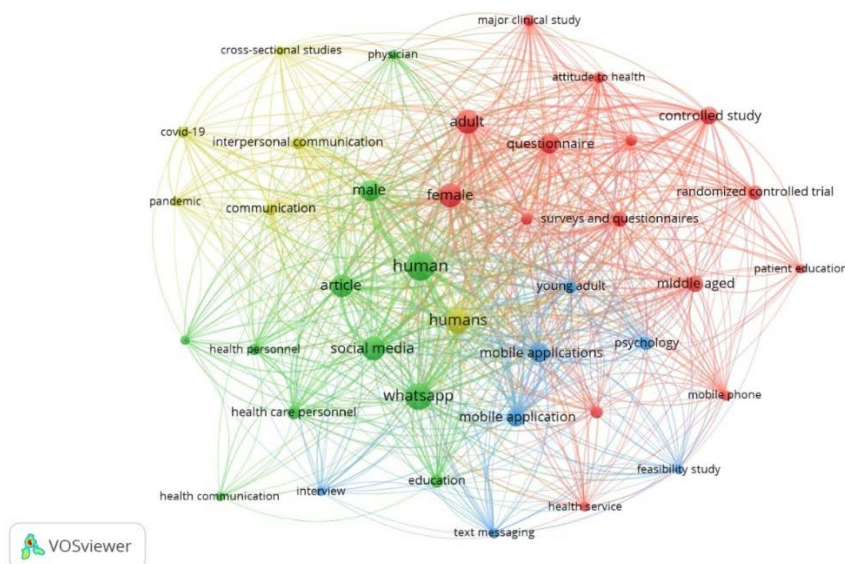


Figure 1. Network map showing the relationships between WhatsApp and Health topics

Cluster 1 (Green): Health Communication & Social Media

This cluster indicates that WhatsApp is widely used as a health communication tool between healthcare providers and patients. The main topics include health communication, interpersonal communication, and the use of WhatsApp and social media for educational purposes, with a significant increase during the COVID-19 pandemic. The focus is on information dissemination, counseling, and coordination of health services.

Cluster 2 (Blue): Digital Health & Mobile Applications

The blue cluster illustrates the use of WhatsApp in the context of mobile health (mHealth), including its integration with other health applications. Studies highlight aspects of feasibility, effectiveness, and user acceptance in education, monitoring, and digital health services. WhatsApp is positioned as a supportive tool for remote healthcare delivery.

Cluster 3 (Red): Clinical Studies & Behavioral Interventions

This cluster relates to the use of WhatsApp in evidence-based interventions, such as controlled studies and RCTs. Research evaluates changes in knowledge, attitudes, and health behaviors among adult populations. WhatsApp is used for patient education, medication reminders, and behavioral interventions.

Cluster 4 (Yellow): Healthcare Providers & Public Health Studies

The yellow cluster shows the use of WhatsApp by healthcare professionals for case discussions, service coordination, and professional communication. Many studies employ a cross-sectional design to assess perceptions, practices, and the role of WhatsApp in clinical services and public health.

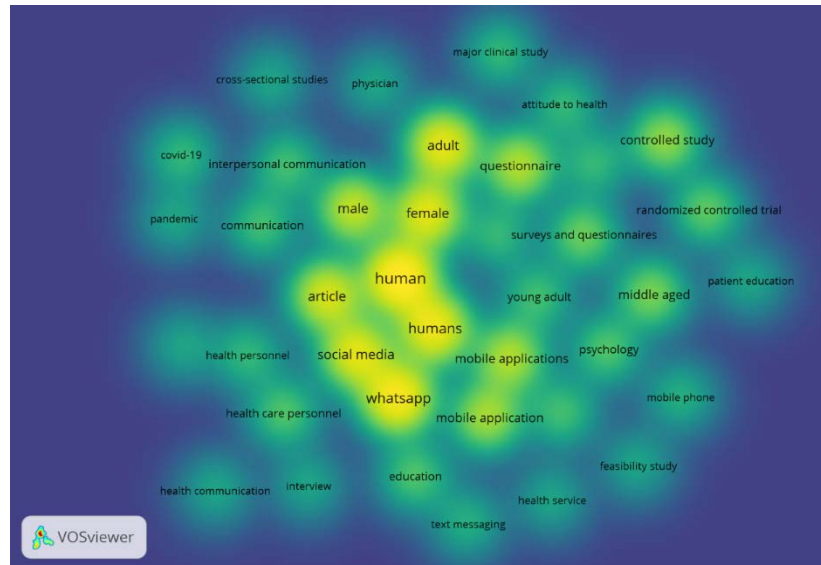


Figure 2. VOSViewer Density Visualization Results Based on the Words "WhatsApp" and "Health"

The density map shows that the most prominent keywords—*human*, *humans*, *WhatsApp*, *social media*, *adult*, *female*, and *male*—represent the core focus of WhatsApp-based health research from 2015 to 2025. The brightest areas indicate frequent themes, such as health communication, mobile applications, patient education, and clinical study designs, including controlled trials and RCTs. Meanwhile, the surrounding green-blue areas reflect supporting topics, including healthcare personnel, COVID-19, psychology, and remote health services. Overall, the map highlights WhatsApp as a central platform in digital health research, particularly for communication, education, and mobile-based health interventions.

Table 1: Annual Publication Output on WhatsApp in Health Research (2015–2025).

No	Authors	Title	Year	Vol	Issue	DOI	Author Keywords	Publisher	Afiliation	Country
1	Safo, K.S.; Opoku, D.; Bonney, R.A.; Serchim, C.K.; Mensah, K.A.	Potential effects of WhatsApp on maternal health services uptake during COVID-19: a cross- sectional study in Ghana ⁽¹⁵⁾	2025	25	1	10.1186/s 12913- 025- 12245-3	COVID-19; Maternal health services; Maternal referral; WhatsApp	BioMed Central Ltd	Kwame Nkrumah University of Science & Technology, Kumasi, Ghana; School of Public Health, Kwame Nkrumah University of Science & Technology, Kumasi, Ghana; Seventh-Day Adventist Hospital, Kwadaso, Ghana; Department of Health Care Management, Technische Universität Berlin, Berlin, Germany; Kwame Nkrumah University of Science & Technology, Kumasi, Ghana	Ghana
2	Tripathi, R.; Sengupta, P.; Karishiddimath, A.; Khatri, K.; Sharma, P.; Sriram, H.; Tk, S.; Mehrotra, S.	Engagement with digital platforms and perspectives on WhatsApp-based mental health self- help solution for older adults: a qualitative study from India ⁽¹⁶⁾	2025	5	1	10.1007/s 44192- 025- 00277-4	Engagement, WhatsApp, Mental Health	Springer Nature	National Institute of Mental Health and Neuro Sciences, Bengaluru, KA, India; IIIT Bangalore, Bengaluru, KA, India	India
3	Thakur, A.; Bhageerathy, R.; Prasanna, P.; Sekaran, V.C.; Kumar, S.	From Peer Support to Program Supervision: Qualitative Insights on WhatsApp as Informal Digital Infrastructure for Community Health Workers and Public Health Officers in an Indian High-Priority Aspirational District ⁽¹⁷⁾	2025	13	17	10.3390/h ealthcare1 3172223	aspirational district; community health workers (CHWs); digital equity; digital health; health communication; India; mHealth; program supervision; qualitative research; WhatsApp	Multidisciplina ry Digital Publishing Institute (MDPI)	Department of Health Information Management, Manipal College of Health Professions, Manipal, KA, India; Community Medicine, Kasturba Medical College, Mangalore, Mangalore, KA, India; Prasanna School of Public Health, Manipal, KA, India; Samarth, Chennai, TN, India	India

No	Authors	Title	Year	Vol	Issue	DOI	Author Keywords	Publisher	Afiliation	Country
4	Chisholm, B.S.; Wallace, M.L.; Blockman, M.; Orrell, C.	"WhatsApp is best!" Acceptability and feasibility of WhatsApp-based HIV microlearning for healthcare workers in remote South African clinics: A pragmatic, mixed-methods, cluster-randomised trial ⁽¹⁸⁾	2025	86		10.1016/j. nepr.2025 .104407	Continuing professional education; HIV; In- service; Microlearning; Primary care; Training; WhatsApp	Elsevier Ltd	Department of Medicine, Faculty of Health Sciences, University of Cape Town, Cape Town, Western Cape, South Africa; Department of Medicine, Faculty of Health Sciences, University of Cape Town, Cape Town, Western Cape, South Africa	South Africa
5	Wan, W.N.H.; Abg Abd Mohd Rizal, D.N.S.; Borhan, F.W.; Lestari, W.; Ismail, A.; Che Musa, M.F.; Ibrahim, M.S.; Yuan, J.C.-C.; Sukotjo, C.	Impact of WhatsApp on improving denture care knowledge and the awareness of the relationship between edentulism and general health ⁽¹⁹⁾	2025	133	6	10.1016/j. prosdent.2 024.11.00 4	WhatsApp, Awareness, Dentistry, General Health	Elsevier Inc.	Prosthodontics Department, International Islamic University Malaysia, Kulliyyah of Dentistry, Kuantan, Pahang, Malaysia; Department of Fundamental Dental and Medical Sciences, International Islamic University Malaysia, Kulliyyah of Dentistry, Kuantan, Pahang, Malaysia; Department of Paediatric Dentistry and Dental Public Health, International Islamic University Malaysia, Kulliyyah of Dentistry, Kuantan, Pahang, Malaysia; and Associate Dean for Clinical Affairs, University of Illinois at Chicago, Chicago, IL, United States; Department of Prosthodontics, School of Dental Medicine, Pittsburgh, PA, United States	Malaysia and the USA

No	Authors	Title	Year	Vol	Issue	DOI	Author Keywords	Publisher	Afiliation	Country
6	Anaje, C.; Okpala, C.; Malachy, D.E.; Enechukwu, N.; Ezejiofor, O.	Evaluating the efficacy of WhatsApp-based health education on sun protection practices in people with albinism: a 6-month follow-up study ⁽²⁰⁾	2025			10.1080/14635240.2025.2469501	Albinism; digital health intervention; skin cancer prevention; sun protection practices; WhatsApp health education	Routledge	Department of Medicine, Nnamdi Azikiwe University, Awka, Anambra, Nigeria; Faculty of Medicine, Nnamdi Azikiwe University, Awka, Anambra, Nigeria	Nigeria
7	Tofani, L.F.N.; Bigal, A.L.; Tureck, F.; Furtado, L.A.C.; Andreazza, R.; Chioro, A.	Use of WhatsApp® application in health management, work, and care in fighting the COVID-19 pandemic; Uso do aplicativo WhatsApp® na gestão, no trabalho e no cuidado à saúde no enfrentamento da pandemia de COVID-19; Uso de la aplicación WhatsApp® en gestión, trabajo y atención de salud en el combate a la pandemia COVID-19 ⁽²¹⁾	2025	30	1	10.1590/1413-81232025301.08082023EN	Comprehensive Health Care; COVID-19; Health Management; Medical Informatics; Qualitative Research	Associacao Brasileira de Pos - Graduacao em Saude Coletiva	Department of Preventive Medicine, Universidade Federal de São Paulo, São Paulo, SP, Brazil	Brazilia
8	Rossini, P.; Kalogeropoulos, A.	Don't talk to strangers? The role of network composition, WhatsApp groups, and partisanship in explaining beliefs in misinformation about	2025	22	1	10.1080/19331681.2023.2234902	COVID-19; disinformation; Misinformation; news use; social media; WhatsApp	Routledge	University of Glasgow, Glasgow, Scotland, United Kingdom; University of Oxford, Oxford, Oxfordshire, United Kingdom	UK

No	Authors	Title	Year	Vol	Issue	DOI	Author Keywords	Publisher	Afiliation	Country
		COVID-19 in Brazil ⁽²²⁾								
9	Baysal, H.Y.; Bilgin, S.; Baysal, A.; Özdemir, S.; Yaran, K.; Aşan, G.	The effect of education with the WhatsApp application on women's health beliefs, self-efficacy levels, and regular mammography behavior: a randomized controlled experimental trial ⁽²³⁾	2025	71	10	10.1590/1806-9282.20250861	Health belief model; Mammography; Nursing; Self efficacy; Telemedicine	Associacao Medica Brasileira	Department of Public Health Nursing, Atatürk Üniversitesi, Erzurum, Erzurum, Turkey; Erzurum Provincial Health Directorate, Erzurum, Erzurum, Turkey; Institute of Health Sciences, Atatürk Üniversitesi, Erzurum, Erzurum, Turkey	Turkey
10	Lidubwi, J.; Ndavula, J.	WhatsApp and participation in sexual and reproductive health for women with disabilities in Nairobi ⁽²⁴⁾	2025	25	6	10.1080/14680777.2025.2514059	human rights; Sexual and reproductive health; WhatsApp; women with disabilities	Routledge	School of Humanities and Social Sciences, Africa Nazarene University, Ongata Rongai, Kenya; School of Humanities and Social Sciences, Murang'a University of Technology, Murang'a, Kenya	Kenya

Table 2: Top 10 Contributing Countries and Their Publications.

No	Country	The number of publications
1	India	5
2	Saudi Arabia	5
3	Brazil	4
4	Malaysia	4
5	Indonesia	4
6	Turkey	3
7	USA	3
8	Iran	3
9	UK	3
10	Nigeria	2

The distribution of publications reveals that India and Saudi Arabia lead with the highest number of studies (5 each), indicating a strong research focus on WhatsApp-based health applications within these countries. Brazil, Malaysia, and Indonesia follow with four publications each, reflecting growing interest in digital health communication across diverse regions. Turkey, the USA, Iran, and the UK contribute three publications respectively, demonstrating steady involvement from both developing and developed nations. Meanwhile, Nigeria, with two publications, also appears as an active participant in this research area. Overall, the data suggest that WhatsApp-based health research is globally distributed, with notable contributions from Asia, the Middle East, the Americas, and Africa.

Table 3: Top 10 Authors by Publication Count

No	Author	The number of articles
1	Anaje, C.	Twice
2	Okpala, C.	Twice
3	Malachy, D.E.	Twice
4	Enechukwu, N.	Twice
5	Ezejiofor, O.	Twice

The author distribution indicates that five researchers—Anaje C.,^(20,25) Okpala C.,^(20,25) Malachy D.E.,^(20,25) Enechukwu N., and Ezejiofor O.^(20,25)—Each contributed two publications to the field, making them the most productive authors in this dataset. This pattern suggests a concentrated contribution from a small group of researchers who appear to be actively engaged in developing and advancing studies on WhatsApp-based health research. Their repeated involvement highlights their consistent interest and potential leadership in this field of research.

Table 4: Top 10 Most Productive Institutions/Organizations

No	Afiliation	Frequency
1	Kwame Nkrumah University of Science & Technology (KNUST), Ghana	4
2	Nnamdi Azikiwe University, Nigeria	4
3	International Islamic University Malaysia (IIUM)	3
4	Imam Abdulrahman Bin Faisal University, Saudi Arabia	3
5	Universitas Padjadjaran, Indonesia	3

No	Afiliation	Frequency
6	Jazan University, Saudi Arabia	3
7	Universidade Federal de Mato Grosso, Brazil	3
8	Ben-Gurion University of the Negev, Israel	3
9	University of Cape Town, South Africa	2
10	Yale University, United States	2

The affiliation analysis shows that Kwame Nkrumah University of Science & Technology (Ghana) and Nnamdi Azikiwe University (Nigeria) are the most productive institutions, each contributing four publications to the field of WhatsApp-based health research. Several other institutions—including the International Islamic University Malaysia, Imam Abdulrahman Bin Faisal University, Universitas Padjadjaran, Jazan University, Universidade Federal de Mato Grosso, and Ben-Gurion University of the Negev produced three publications, demonstrating strong engagement across Asia, the Middle East, Latin America, and Africa. Additionally, the University of Cape Town and Yale University contributed two publications, reflecting participation from globally recognized institutions. Overall, the data highlight that a diverse set of universities across multiple continents supports research on WhatsApp in health contexts.⁽²⁶⁾

Table 5: 10 Most Frequently Cited Articles (Most Influential Publications)

No	Article Title	Year	Citation
1	<i>The m-Health revolution: Exploring perceived benefits of WhatsApp use in clinical practice</i>	2017	85
2	<i>Enhancing the supervision of community health workers with WhatsApp mobile messaging</i>	2016	84
3	<i>Undergraduate nurses' reflections on WhatsApp use in improving primary health care education</i>	2015	72
4	<i>WhatsApp and other messaging apps in medicine: opportunities and risks</i>	2020	55
5	<i>Demographic factors influencing the impact of coronavirus-related misinformation on WhatsApp</i>	2021	40
6	<i>Dynamics of social corrections to peers sharing COVID-19 misinformation on WhatsApp in Brazil</i>	2022	30
7	<i>Research on the move: exploring WhatsApp as a tool for understanding migration, mobility, health, and gender in South Africa</i>	2021	19
8	<i>Impact of Twitter and WhatsApp on sleep quality among medical students in King Khalid University</i>	2018	18
9	<i>Effects of using WeChat/WhatsApp on physical and psychosocial health outcomes among oncology patients: A systematic review</i>	2023	17
10	<i>Matching Digital Intervention Affordances with Tasks: The Case of a Zoom and WhatsApp Mental Health Intervention for Seniors</i>	2023	12

The citation analysis reveals that the most influential studies in WhatsApp-based health research were published between 2015 and 2023, with the highest impact attributed to early works. The top three cited articles, published in 2017, 2016, and 2015, focus on clinical practice, supervision of community health workers, and nursing education, indicating a foundational interest in WhatsApp as a health communication tool. More recent articles address emerging issues, such as misinformation during the COVID-19 pandemic, digital interventions, sleep quality, and psychosocial outcomes, although they have fewer citations due to their relatively recent publication dates.⁽²⁷⁾ Overall, the citation trend reflects a shift from early explorations of WhatsApp in clinical and educational settings to broader themes involving public health, digital behavior, and patient well-being.⁽²⁸⁾

DISCUSSION

Research indicates that WhatsApp is utilized for health education during the COVID-19 era and for other health-related topics. It can also promote healthy living, vaccinations, and other health risks.⁽²⁹⁾ WhatsApp is part of everyday community communication, and health information is shared through WhatsApp groups.⁽³⁰⁾ The use of WhatsApp with internet text messaging helps the community develop health information.⁽³¹⁾

A keyword density map visualization generated through VOSviewer shows the distribution and thematic relationships of publications discussing the use of WhatsApp in a health context. Lighter colors on the map represent keywords with high frequency and strong connections between studies, while colors ranging from green to blue indicate less frequent but still relevant topics within the research network. The mapping results identified several keywords with the highest densities located at the center of the map, namely "human/humans," "WhatsApp," "social media," "mobile applications," as well as demographic keywords such as "adult," "male," and "female." These findings suggest that research related to WhatsApp in the health sector primarily focuses on the application's use as a medium for communication or health education among human populations, particularly the adult age group.

Additionally, keywords such as "communication," "interpersonal communication," "education," and "patient education" suggest that WhatsApp is widely utilized as a means of health communication between healthcare workers and service recipients. These keywords also reflect WhatsApp's role in facilitating interaction, sharing information, and supporting patient care and health promotion.⁽³²⁾ Methodologically, research related to WhatsApp appears to be dominated by cross-sectional study designs, the use of questionnaires, and surveys. However, the emergence of keywords such as "randomized controlled trial," "controlled study," and "feasibility study" indicates a shift toward research with a higher level of evidence. This indicates that WhatsApp is being evaluated not only as a communication tool but also as a digital health intervention (mobile health intervention), which requires proof of effectiveness.⁽³³⁾ Another emerging thematic trend related to the pandemic context is demonstrated by the keywords "COVID-19" and "pandemic." This suggests that the pandemic has been a key driver of the increase in research exploring WhatsApp as an alternative medium for remote healthcare services, public health education, and emergency communications.⁽³⁴⁾

Judging from the characteristics of the research subjects, the keywords "young adult" and "middle-aged" appearing on the periphery indicate that most studies target the productive age group as the primary user of WhatsApp in health interventions or activities. In contrast, research on other vulnerable groups, such as children or older people, is still relatively limited.⁽³⁵⁾ Overall, the results of this visualization analysis demonstrate that research on the use of WhatsApp in the healthcare sector remains primarily focused on health communication, education, and the application of mobile applications in the delivery of healthcare services.⁽³⁶⁾ However, the direction of research indicates progress in evaluating effectiveness, testing WhatsApp-based service models, and integrating them into broader digital health systems.

Methodologically, the analysis reveals a dual-pronged approach to investigating mobile health interventions. High co-occurrence of terms such as randomized controlled trial (RCT), controlled study, and major clinical study indicates a significant emphasis on high-quality, quantitative efficacy testing, positioning WA-based interventions within the framework of rigorous evidence generation. Simultaneously, the prominent presence of cross-sectional studies, surveys and questionnaires, and interviews suggests a complementary need for understanding baseline attitudes, acceptance, and qualitative user experiences. Furthermore, the inclusion of a feasibility study highlights a critical initial step in implementation science, where researchers first assess the practicality and scalability of new digital tools before investing in large-scale RCTs. This methodological landscape underscores the field's commitment to both establishing causal effectiveness and ensuring the practical applicability of digital health tools among target populations.

WhatsApp is a social media application designed to make it easier for users to communicate through various available features.^(37,38) Some of the features in the WhatsApp application include group chat, WhatsApp Web and Desktop, voice and video calls, end-to-end encryption, and the ability to send photos, videos, voice messages, and documents. Through these various features, WhatsApp can be used for more valuable activities, such as in the field of education.^(39,40) The ease of use of the WhatsApp application in providing education, especially for pregnant women, is beneficial in situations where access to health services is limited. The use of WhatsApp enables pregnant women to stay connected with doctors or midwives, making it easier for them to access relevant and necessary health information.⁽⁴¹⁾ Pregnancy health education through WhatsApp can increase pregnant women's knowledge about various topics, such as healthy eating patterns during pregnancy, safe physical exercise, pregnancy danger signs, childbirth preparation, and various other essential needs.⁽⁴²⁾ All of this information can be delivered through WhatsApp-based education available on digital devices, utilizing various forms of communication such as educational videos, reminder messages, and interactive text messages.

Furthermore, the language of educational media plays a crucial role in increasing public knowledge and expanding information sources. Therefore, utilizing WhatsApp as a medium for health education and outreach can be a practical innovation in expanding the knowledge of pregnant women and supporting efforts to improve

maternal health.⁽⁴³⁾ Therefore, WhatsApp has the potential to become one of the most adaptive and inclusive digital communication tools to support the transformation of global health systems, particularly in countries with limited resources. WhatsApp is an application that allows users to send instant messages (Instant Messenger) by relying on internet services. WhatsApp groups are a feature within the WhatsApp application and are widely used by teachers.⁽⁴⁴⁾ The many features of WhatsApp Groups make it easy to develop and share information and knowledge. The use of new technology, such as short messages, can be an alternative to facilitate communication in conveying health messages, thereby increasing public knowledge and awareness of healthy living habits. WhatsApp is a form of short message service that can be used as a reminder. According to research, WhatsApp has been effectively used to educate patients about medication adherence.

CONCLUSION AND RECOMMENDATIONS

The results of the bibliometric analysis indicate that WhatsApp has emerged as one of the fastest-growing research topics in the health sector over the 2015–2025 period. The study of the VOSviewer density map confirms that research concerning the use of WhatsApp (WA) in the health context is currently dominated by a focus on health communication and education. WA has proven to be a central platform for facilitating interpersonal interaction and disseminating information among the adult and productive population. Although the majority of early studies utilized descriptive designs such as cross-sectional studies and surveys, the findings also indicate a significant methodological evolution. The emergence of keywords such as "randomized controlled trial" and "feasibility study" suggests an increasing trend towards the rigorous evaluation of WA as an effective and measurable digital health intervention (mHealth). Thematically, the COVID-19 pandemic served as a significant catalyst, driving the exploration of WA as a crucial tool for remote healthcare services and crisis communication. In conclusion, WA is firmly established as a vital health communication tool, and the future direction of research is expected to increasingly focus on proving its effectiveness, testing service models, and its broader, more systematic integration into the digital health ecosystem.

Based on the findings and reviewer suggestions, future bibliometric research could be enhanced by expanding the data sources beyond Scopus to include Web of Science and other multidisciplinary databases, which may capture publications not indexed in Scopus and provide a more comprehensive view of global trends. Additionally, extending the temporal coverage beyond 2025 or conducting periodic trend analyses can help identify emerging research directions and shifts in thematic focus over time. Researchers are also encouraged to apply sub-field analyses, such as distinguishing studies by type of health intervention (e.g., digital health education, telemedicine, vaccination campaigns) or population groups (e.g., adolescents, the elderly, vulnerable populations), to provide more nuanced insights into how WhatsApp is being utilized across different health contexts. Finally, integrating bibliometric mapping with citation impact and collaboration networks can reveal influential authors, institutions, and countries, guiding strategic planning for future research and policy development in digital health communication.

CONFLICT OF INTEREST (COI) STATEMENTS

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