

Mapping the Scientific Landscape of Mobile Health (mHealth): A Bibliometric Analysis of Global Research Trends

Mi'rojul Azkiyyah¹

ABSTRACT

This study aims to analyze scientific developments and trends in the field of mobile health (mHealth) through a bibliometric approach. A total of 105 articles selected obtained from the Scopus database between 2020 and 2025 were analyzed using VOSviewer software. The analysis focuses on identifying publication trends, frequently appearing keywords, the most productive authors and institutions, and scientific collaboration patterns. The visualization results show that mHealth research is growing rapidly with several main thematic clusters, such as digital health applications, chronic disease monitoring, telemedicine, and the use of wearable devices. Visualization of keyword networks and author collaborations reveals a close relationship between technological aspects and mobile-based healthcare practices. These findings provide a comprehensive picture of the mHealth research landscape and can be an important reference for developing more targeted and collaborative research strategies in the future.

Keywords: Mobile Health, mHealth, bibliometrics, CSR

1 Introduction

mHealth (mobile health) has become a key element in the digital transformation of global healthcare. In the last two decades, mHealth has been seen as a major innovation to expand access to healthcare, especially in remote areas, through mobile technologies, smartphones, and wearable devices [1], [2]. Stakeholders see it as a potential solution to global healthcare system challenges. As the adoption of these technologies increases, scientific publications on mHealth/eHealth have also shown significant growth, driven by the benefits of wireless technology and the expansion of mobile phone use globally [3]. However, challenges such as user adoption, privacy, effectiveness, and ease of use remain the main focus of research [4]. In this context, bibliometric analysis is an important tool to understand the mHealth research landscape. This approach identifies research trends, leading authors and institutions, and global collaboration patterns. The analysis also highlights research gaps, including the need to explore technology acceptance across demographic and cultural groups. In addition, bibliometric analysis emphasizes the importance of the Asian context in mHealth studies [5], as well as the role of remote monitoring in healthcare transformation [6]. This study shows that bibliometrics not only maps trends, but also encourages more effective collaboration between academic and healthcare institutions for the development of adaptive and inclusive mHealth applications.

2 Literature Review

mHealth, or mobile health, is practice service health that utilizes mobile devices such as mobile phone smart phones, tablets, and wearable devices. WHO defines mHealth as use technology communication move, start from feature base like calls and SMS up to applications, GPS, and Bluetooth,

¹Universitas Muhammadiyah Malang

for support services and information health [7]. As progress progresses technology, mHealth has become component key system digital health. According to Akhtar et al. (2020), mHealth is used in a way wide in prediction, prevention, management disease, diagnostics, and empowerment patient [8]. Application This allow monitoring condition in real-time, clinical data collection, and provision service efficient health, especially in areas with access limited.

Trends bibliometrics show improvement exponential mHealth publications since early 2000s, accelerated by smartphone adoption and the COVID-19 pandemic. Cao et al. (2021) found that the United States become contributor main, with shift focus study from policy health going to development technology [9]and applications social. Alanzi et al. (2024) emphasized surge publication during pandemic and the dominance of developed countries in contributions and citations academic [10]. In addition, He et al. (2024) identified five clusters main mHealth research, including technology, education patients, mental health, and management independent, especially in context education medical [11]. However, Shen et al. (2018) noted that collaboration international in mHealth research is still limited and the topic spread across various subfield like involvement patient, supervision health, and data privacy [12]. Although its growth fast, still there is gap geographical and thematic in development global mHealth research.

3 Research Methods

This study applies a bibliometric approach using Scopus data and VOSviewer to analyze citation networks and keyword co-occurrence in mHealth research. From 304 journal articles (2020–2025), 105 were analyzed based on publications, citations, and key topic identification. Data were collected using Publish or Perish and analyzed in VOSviewer, with visualizations in network, overlay, or density forms. The results reveal trends in publications, academic influence, collaborations, and key topic clusters in mHealth.

4 Results and Discussion

mHealth Article Publication Trends The publication of mHealth articles shows a significant downward trend from 2020 to 2023, from 65 to 45 articles. Although it increased to 62 articles in 2024, the number dropped again drastically to 26 in 2025, because the data was collected in March 2025 so it could still increase. This decline is due to several factors: the peak of attention occurred during the COVID-19 pandemic, while post-pandemic research focus shifted to topics such as AI, precision medicine, and big data; many mHealth studies are still exploratory and have not shown long-term impacts; and issues of ethics, data privacy, and digital technology regulation hinder further publication.



Gambar 1. Trends in Publication of mHealth Articles

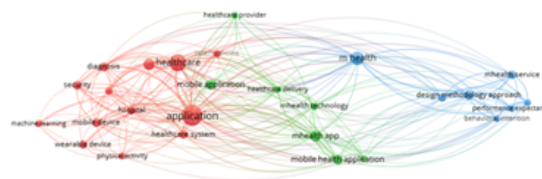
Number of Citations

Based on Table 1, the publication with the most citations is [13] with 263 citations, followed by [3] with 142 citations, and [14] with 115 citations. The article [13] entitled “Factors influencing the adoption of mHealth services in a developing country: A patient-centric study” defines mHealth as medical and public health practices supported by mobile devices such as mobile phones, sensors, PDAs, and wireless networks for decision-making and emergency care. Studies related to mHealth have been

widely conducted in countries such as the United States, India, China, Australia, Germany, England, Indonesia, Bangladesh, Malaysia, and Saudi Arabia, indicating global attention to access to health services and nutrition education. However, although this topic is widely discussed, the publication trend has begun to decline and there are still few studies that map research developments comprehensively. Therefore, this study is important to provide a bibliographic overview of the direction, focus, and scientific collaboration in the field of mHealth, especially related to nutrition and well-being.

Table 1. Top 5 Scopus Journal Citations

No.	Year	Author	Title	Journal	Cites
1	2020	[13]	Factors influencing the adoption of mHealth services in a developing country: A patient-centric study	International Journal of Information Management	263
2	2020	[3]	Understanding the determinants of mHealth apps adoption in Bangladesh: A SEM-Neural network approach	Technology in Society	142
3	2020	[14]	Enhancing Medical Smartphone Networks via Blockchain-Based Trust Management against Insider Attacks	IEEE Transactions on Engineering Management	115
4	2021	[4]	An extension of technology acceptance model for mHealth user adoption	Technology in Society	75
5	2023	[27]	Determinants of mHealth success: An empirical investigation of the user perspective	International Journal of Information Management	71



Gambar 2. mHealth Blockchain Network Visualization

mHealth Blockchain Network

Based on Figure 3, mHealth topics are very diverse, with a focus on applications, artificial intelligence, mHealth technologies, mHealth services, and mobile health applications. This diversity shows the broad and growing scope of mHealth. mHealth refers to medical services and information based on mobile devices such as smartphones, tablets, and wearable devices, which support health monitoring, disease management, digital interventions, and patient-health worker communication [15]. During the COVID-19 pandemic, mHealth played an important role in providing real-time and personalized remote

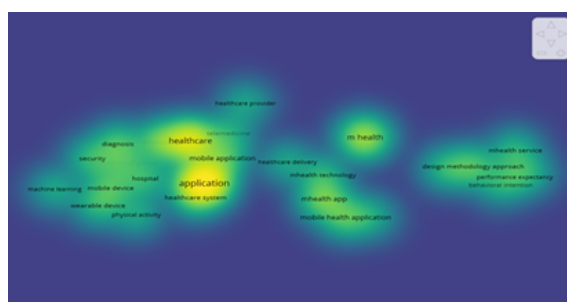
health services [16], [17], as well as encouraging patient engagement through medication reminders, digital education, and symptom tracking [18].

Artificial Intelligence (AI) in mHealth supports real-time, personalized disease diagnosis and management by analyzing data from smartphone and wearable sensors for early detection of chronic diseases and tailored interventions [19]. This technology enhances the effectiveness of mHealth applications through personalized recommendations and clinical decision-making support, although it still faces challenges related to privacy, algorithm transparency, and user engagement [20]. mHealth integrates mobile and wearable devices with digital systems for real-time data-driven healthcare services, supporting early diagnosis, and encouraging patient engagement [21]. Its success depends on patient-centered design, user acceptance, and protection of personal data [20], [22].

mHealth applications on smartphones, tablets, and wearables enable health monitoring, medication management, and real-time communication between patients and providers. These applications are effective in managing conditions such as diabetes, asthma, and depression, and supporting healthy behaviors such as diet and physical activity [23]. In addition to improving education and access to healthcare, challenges such as data privacy, battery efficiency, and connectivity remain major concerns [24]. Based on Figure 3 and Table 2, the VOSviewer visualization produces three clusters with 27 themes related to mHealth, indicating that its use is driven by smartphone penetration, internet access, and the need for fast and affordable remote health services, especially since the COVID-19 pandemic. Supporting technologies such as AI and wearables strengthen the role of mHealth in health monitoring and increase patient engagement in personal health management.

Tabel 2. Cluster Network Visualization Results

Cluster	Theme
1	Application, Artificial Intelligence, Diagnosis, Healthcare, Healthcare System, Hospital, Innovation, Machine Learning, Mobile Device, Physical Activity, Security, Telemedicine, Wearable
2	Healthcare Delivery, Healthcare Provider, MHealth App, MHealth Apps, MHealth Technology, Mobile Application, Mobile Health Application
3	Behavioral Intention, Design Methodology Approach, M Health, MHealth Service, Performance Expectancy, Practical Implication, Social Influence



Gambar 3. Visualization mHealth Density

Figure 4 shows the density of terms in the mHealth literature through color gradation, where bright yellow indicates the most frequently discussed themes, such as Application, Artificial Intelligence, MHealth Technology, MHealth Service, and Mobile Health Application. These themes can be important references for further research. This bibliometric study aims to analyze the dynamics of mHealth literature, including publication trends and key topics. Scopus data shows a decline in the number of publications in recent years, indicating a shift in focus or challenges in the adoption of this technology. Literature mapping is important to identify research directions and opportunities that are still open. mHealth has been shown to play a role in expanding access and improving the quality of health services, especially during the COVID-19 pandemic [25], [26]. This technology enables remote health

monitoring, chronic disease management, and real-time information delivery via mobile devices. However, challenges such as application design, user engagement, and access gaps still need to be addressed, especially in marginalized communities [5].

5 Conclusion

Analysis bibliometrics This show that mHealth is a continuous field growing and interesting attention wide globally. Increase publication reflect relevance theoretical and application in increase access, efficiency and quality service health. Topics like monitoring health based on mobile applications, management disease chronic, and telemedicine becomes center attention. Research upcoming expected can expand coverage this, including exploration cross- country and culture as well as the impact to system global health. In general, theoretically, mHealth strengthens role mobile technology in empowerment patients and monitoring real-time health. In practical, mHealth supports taking decision medical data -based and potential create system better health responsive, efficient and inclusive globally.

References

1. MA Al-Faraj, T. Alanzi, and H. Alhodaib, "Use of mobile phones and social media by healthcare professionals in the ER hospital departments in Dammam, Saudi Arabia: Benefits and risks," in *Proceedings - 2020 19th Distributed Computing and Applications for Business Engineering and Science, DCABES 2020*, Himt, College of Public Health, Imam Abdulrahman Bin Faisal University, Saudi Arabia: Institute of Electrical and Electronics Engineers Inc., 2020, pp. 328–331. doi : 10.1109/DCABES50732.2020.00090.
2. AI Alzahrani, H. Al-Samarraie, A. Eldenfria, JE Doodoo, and N. Alalwan, "Users' intention to continue using mHealth services: A DEMATEL approach during the COVID-19 pandemic," *Technol Soc*, vol. 68, 2022, doi: 10.1016/j.techsoc.2022.101862.
3. MZ Alam, W. Hu, MA Kaium, MR Hoque, and MMD Alam, "Understanding the determinants of mHealth apps adoption in Bangladesh: A SEM-Neural network approach," *Technol Soc*, vol. 61, 2020, doi: 10.1016/j.techsoc.2020.101255.
4. M. Rajak and K. Shaw, "An extension of technology acceptance model for mHealth user adoption," *Technol Soc*, vol. 67, 2021, doi: 10.1016/j.techsoc.2021.101800.
5. P. Galetsi, K. Katsaliaki, and S. Kumar, "Assessing Technological Innovation of Mobile Health Apps for Medical Care Providers," *IEEE Trans Eng Manag*, vol. 70, no. 8, pp. 2809–2826, 2023, doi: 10.1109/TEM.2022.3142619.
6. N. Kyung, J. Chan, S. Lim, and B. Lee, "Contextual Targeting in mHealth Apps: Harnessing Weather Information and Message Framing to Increase Physical Activity," *Information Systems Research*, vol. 35, no. 3, pp. 1034–1051, 2024, doi: 10.1287/isre.2020.0119.
7. JC Auza-Santiv  n, JA Car  as D  az, OA Vedia Cruz, SM Robles-Nina, C. S  nchez Escalante, and B. Apaza Huanca, "mHealth in health systems: barriers to implementation," *Health Leadership and Quality of Life*, vol. 1, 2022, doi: 10.56294/hl20227.
8. E. Oppong, RE Hinson, O. Adeola, O. Muritala, and JP Kosiba, "The effect of mobile health service quality on user satisfaction and continuous usage," *Total Quality Management and Business Excellence*, vol. 32, no. 1–2, pp. 177–198, 2021, doi: 10.1080/14783363.2018.1541734.
9. J. Cao, Y. Lim, S. Sengoku, X. Guo, and K. Kodama, "Exploring the shift in international trends in mobile health research from 2000 to 2020: Bibliometric analysis," *JMIR mHealth Uhealth*, vol. 9, no. 9, p. e31097, Sep. 2021, doi : 10.2196/31097.
10. T. Alanzi, S. Ur Rehman, M.A. Khan, and RSH Istepanian, "The evolution and mapping trends of mobile health (m-Health): a bibliometric analysis (1997–2023)," *Mhealth*, vol. 10, no. 0, Jul. 2024, doi : 10.21037/MHEALTH-23-20/COIF
11. Y. He, Z. Xie, J. Li, Z. Meng, D. Xue, and C. Hao, "Global Trends in mHealth and Medical Education Research: Bibliometrics and Knowledge Graph Analysis.," *JMIR Med Educ*, vol. 10, no. 1, p. e52461, Jun. 2024, doi : 10.2196/52461.
12. L. Shen, B. Xiong, W. Li, F. Lan, R. Evans, and W. Zhang, "Visualizing Collaboration Characteristics and Topic Burst on International Mobile Health Research: Bibliometric Analysis.," *JMIR Mhealth Uhealth*, vol. 6, no. 6, p. e135, Jun. 2018, doi : 10.2196/mhealth.9581.

13. MZ Alam, MR Hoque, W. Hu, and Z. Barua, "Factors influencing the adoption of mHealth services in a developing country: A patient-centric study," *Int J Inf Manage*, vol. 50, pp. 128–143, Feb. 2020, doi : 10.1016/J.IJINFOMGT.2019.04.016.
14. W. Meng, W. Li, and L. Zhu, "Enhancing Medical Smartphone Networks via Blockchain-Based Trust Management against Insider Attacks," *IEEE Trans Eng Manag*, vol. 67, no. 4, pp. 1377–1386, 2020, doi : 10.1109/TEM.2019.2921736.
15. MAZ Chudhery, S. Safdar, J. Huo, H.-U. Rehman, and R. Rafique, "Proposing and Empirically Investigating a Mobile-Based Outpatient Healthcare Service Delivery Framework Using Stimulus-Organism-Response Theory," *IEEE Trans Eng Manag*, vol. 70, no. 8, pp. 2668–2681, 2023, doi : 10.1109/TEM.2021.3081571.
16. LJ Lu and SH Hsu, "Utilizing a Gamified Mobile APP to Promote Post-COVID Nurses in Managing Their Self-Health," in *Proceedings of the International Conference on Electronic Business (ICEB)*, LEY, CS-I, and YB, Eds., National Chung Cheng University, Chiayi, Taiwan: International Consortium for Electronic Business, 2023, pp. 705–712. [On line]. Available: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85181400324&partnerID=40&md5=e2e28b0ed92a4cbf0a28e18bb4691840>
17. WM To and PKC Lee, "mHealth and COVID-19: A Bibliometric Study," *Healthcare* 2023, Vol. 11, Page 1163, vol. 11, no. 8, p. 1163, Apr. 2023, doi : 10.3390/HEALTHCARE11081163.
18. S. Pingat, H. Kaur Khanuja, A. Gavande, and C. Mahagaonkar, "Real Time Health Monitoring and Oxygen Distribution System for COVID-19 patients using IoT," in *2021 IEEE 2nd International Conference on Technology, Engineering, Management for Societal Impact using Marketing, Entrepreneurship and Talent, TEMSMET 2021*, Marathwada Mitra Mandal College of Engineering Pune, Department of Computer Engineering, India: Institute of Electrical and Electronics Engineers Inc., 2021. doi : 10.1109/TEMSMET53515.2021.9768769.
19. P. Bhatt, J. Liu, Y. Gong, J. Wang, and Y. Guo, "Emerging Artificial Intelligence–Empowered mHealth: Scoping Review," *JMIR Mhealth Uhealth*, vol. 10, no. 6, p. e35053, Jun. 2022, doi : 10.2196/35053.
20. A. Deniz-Garcia et al., "Quality, Usability, and Effectiveness of mHealth Apps and the Role of Artificial Intelligence: Current Scenarios and Challenges," *J Med Internet Res*, vol. 25, p. e44030, 2023, doi : 10.2196/44030.
21. C. Bruce et al., "Evaluating patient-centered mobile health technologies: Definitions, methodologies, and outcomes," *JMIR Mhealth Uhealth*, vol. 8, no. 11, Nov. 2020, doi : 10.2196/17577,.
22. W. Hong, "Advances and Opportunities of Mobile Health in the Postpandemic Era: Smartphoneization of Wearable Devices and Wearable Deviceization of Smartphones," *JMIR Mhealth Uhealth* 2024; 12:e 48803 <https://mhealth.jmir.org/2024/1/e48803>, vol. 12, no. 1, p. e48803, Jan. 2024, doi : 10.2196/48803.
23. I.M. Pires, G. Marques, N.M. Garcia, F. Flórez-revuelta, V. Ponciano, and S. Oniani, "A Research on the Classification and Applicability of the Mobile Health Applications," *J Pers Med*, vol. 10, no. 1, p. 11, 2020, doi : 10.3390/JPM10010011.
24. Y. Wang, T. Wu, and Z. Chen, "Active Usage of Mobile Health Applications: Cross-sectional Study," *J Med Internet Res*, vol. 23, no. 12, p. e25330, Dec. 2021, doi : 10.2196/25330.
25. W. Tumuhimbise et al., "Enhancing the implementation and integration of mHealth interventions in resource-limited settings: a scoping review," *Implementation Science* 2024 19:1, vol. 19, no. 1, pp. 1–17, Oct. 2024, doi : 10.1186/S13012-024-01400-9.
26. P. Amiri, H. Nadri, and K. Bahaadinbeigy, "Facilitators and barriers of mHealth interventions during the Covid-19 pandemic: systematic review," *BMC Health Serv Res*, vol. 23, no. 1, p. 1176, Dec. 2023, doi : 10.1186/S12913-023-10171-W.
27. S. Birkmeyer, B.W. Wirtz, and P.F. Langer, "Determinants of mHealth success: An empirical investigation of the user perspective," *Int J Inf Manage*, vol. 59, p. 102351, Aug. 2021, doi : 10.1016/J.IJINFOMGT.2021.102351.

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