

Bibliometric analysis of research on “Emergency Medicine and COVID-19” using Web of Science, Carrot² and Biblioshiny

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Received 26 January 2025; Accepted 21 March 2025

Available online 26 March 2025 with doi: 10.5455/medscience.2025.01.031

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Abstract

The COVID-19 pandemic, caused by SARS-CoV-2, has significantly impacted global healthcare systems, leading to substantial adaptations and challenges. Emergency medicine physicians have been at the forefront of managing this crisis, necessitating a surge in related research efforts. This study aims to conduct a comprehensive bibliometric analysis of emergency medicine research related to COVID-19 to understand the evolving landscape and emerging trends. Systematic searches were conducted within the Web of Science Core Collection and PubMed databases using the query: ((“emergency medicine”) AND (“covid 19” OR “covid-19” OR “corona virus” OR “coronavirus” OR “SARS-CoV” OR “MERS-CoV” OR “COVID19”)) in the All Fields category. This search yielded 3,551 relevant results. Supplementary searches were performed using Carrot². The data were analyzed to identify publication counts, contributing authors, countries, journals, and key research themes. Additionally, Biblioshiny was used for the visual representation of the main themes and emerging trends, as well as for generating the word cloud. The analysis revealed a significant increase in emergency medicine research related to COVID-19 since 2020, with peaks in 2020 and 2021. Given the central role of emergency medicine in the pandemic response, it is expected that a significant proportion (68.1%) of publications originated from this field. However, beyond this expected distribution, this bibliometric analysis provides meaningful insights by highlighting key thematic trends within emergency medicine research, such as “emergency medicine” and “COVID-19”. These findings help in understanding the research focus, gaps, and evolving priorities in emergency medicine during the COVID-19 pandemic. This bibliometric analysis highlights the critical role of emergency medicine research in addressing the COVID-19 pandemic. The findings emphasize the importance of continued interdisciplinary collaboration and the integration of emerging technologies to enhance emergency care. Sustained investment in global health initiatives and research funding is crucial for preparing for future public health challenges.

Keywords: Emergency medicine, COVID-19, bibliometric analysis, SARS-CoV-2, research trends, pandemic response

Introduction

In December 2019, a pneumonia outbreak of unknown origin in Wuhan, China, led to the isolation of a novel coronavirus, SARS-CoV-2. This betacoronavirus related to SARS-CoV caused the COVID-19 pandemic. The pandemic has resulted in significant human fatalities, economic damage, and increased poverty worldwide [1-3].

The global impact of COVID-19, caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has

necessitated significant adaptations in healthcare systems worldwide. The pandemic has challenged the capacity and resilience of healthcare infrastructures, prompting various nations to reconfigure their healthcare services to manage the unprecedented surge in COVID-19 cases effectively. This restructuring has not only involved expanding intensive care units and reallocating medical resources but has also led to the suspension of ongoing research trials and the prioritization of essential surgeries in surgical departments, where the safety of both patients and healthcare staff remains paramount [4].

CITATION

Dogan M, Bulbul E. Bibliometric analysis of research on “Emergency Medicine and COVID-19” using Web of Science, Carrot² and Biblioshiny. Med Science. 2025;14(2):329-38.



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Emergency medicine is a critical field of medical practice that encompasses the knowledge and skills necessary for the prevention, diagnosis, and management of acute and urgent aspects of illness and injury [5]. Emergency medicine physicians have been on the front line of the COVID-19 pandemic, playing a crucial role in the immediate assessment, diagnosis, and management of patients presenting with symptoms of the virus. Their responsibilities have extended beyond routine emergency care to include the rapid adaptation to evolving clinical guidelines, the implementation of infection control measures, and the coordination of care in often resource-limited and high-pressure environments. As primary responders, emergency medicine physicians have faced unprecedented challenges, including surges in patient volume, increased exposure risk, and the need for swift decision-making in the face of a novel and unpredictable pathogen [6].

Emergency medicine, like many other medical specialties, has experienced a dramatic increase in research efforts related to COVID-19 [7-9]. These studies delve into the pathophysiological effects of the virus on various bodily systems, investigating how COVID-19 exacerbates pre-existing conditions and introduces new complications. Moreover, the research explores the implications of the pandemic for routine emergency care, addressing challenges in administrative protocols, clinical practice adjustments, and the management of emergency department resources. The rapid accumulation of research in this area underscores the necessity to understand the multifaceted impact of COVID-19 on emergency medical practices and to develop strategies for improved patient outcomes and healthcare delivery.

The vast amount of knowledge in the literature can pose challenges for researchers. Bibliometric analysis is an effective method to overcome this problem. By examining the literature at a macro level, bibliometric analysis allows for a comprehensive view of scientific outputs and their development processes in a single projection [10]. In this study, we utilized Web of Science Core Collection [11], Carrot² [12] and Biblioshiny [13] to gather and examine the relevant data. The concept of bibliometrics, or "statistical bibliography," finds its origins in the early 20th century. It was first introduced in the educational curriculum at Cambridge University in 1922 by E. Wyndham Hulme, who later elaborated on the concept in his book. The term gained further recognition in 1962 when Raisig discussed it in the context of citation analysis within the health sciences [14]. Bibliometrics has since evolved as a vital tool in academic research, enabling scholars to quantify and analyze the dissemination of scientific knowledge through publications and citations. Bibliometrics serves both descriptive and evaluative purposes. Descriptive bibliometrics quantifies the number of articles published by an organization, providing a measure of research output. Evaluative bibliometrics uses citation analysis to assess the influence of these articles on subsequent research. While publication counts are useful for comparisons, citation analysis offers deeper insights into the impact of the research by examining how frequently the articles are cited by other scholars [15].

The focus on documentation for retrieving scientific information has overshadowed the utility of statistical bibliography in

analyzing information needs. Statistical bibliography, which involves assembling and interpreting statistics related to books and periodicals, is closely related to bibliometric analysis. Both methods are used to measure various aspects of literature. Over the past forty years, bibliographical statistics have demonstrated historical trends, assessed the global and national research use of publications, and understood usage patterns of books and journals in specific locations [16].

This research aims to conduct a comprehensive bibliometric analysis of studies focusing on "Emergency Medicine and COVID-19." By systematically examining the volume, trends, and patterns of research outputs in this area, the study seeks to provide valuable insights into the evolving landscape of emergency medicine during the pandemic. The analysis will include statistical data on publication counts, contributing authors, countries, journals, and key research themes. By highlighting these trends, the study aims to facilitate access to crucial information for healthcare professionals, policymakers, and researchers, supporting informed decision-making and fostering further research collaborations in the field of emergency medicine amidst the ongoing COVID-19 pandemic.

Material and Methods

Database and Search Strategy

In this study, we utilized the Web of Science (WOS) Core Collection, a subscription-based platform providing access to a diverse range of databases offering extensive citation data across various academic disciplines. Additionally, we used Carrot² for supplementary searches.

Study Design

Our approach involved conducting systematic searches within the WOS Core Collection and PubMed databases focusing on the theme of "Emergency Medicine and COVID-19." The query used in WOS was: ["emergency medicine"] AND ("covid 19" OR "covid-19" OR "corona virus" OR "coronavirus" OR "SARS-CoV" OR "MERS-CoV" OR "COVID19") within the All Fields category, which yielded 3,551 relevant results. This query was meticulously designed to encompass a broad spectrum of terminology associated with COVID-19, including various spellings and related viruses, to ensure an exhaustive capture of the literature. The inclusion of terms like "emergency medicine" was aimed at narrowing the focus to studies pertinent to the intersection of emergency healthcare and the ongoing pandemic. The terms "covid 19" and "covid-19" were used to account for common variations in the naming convention of the virus, while "corona virus" and "coronavirus" were included to capture early studies before the standardized naming conventions were widely adopted. Additionally, the inclusion of "SARS-CoV" and "MERS-CoV" was intended to gather comparative studies involving other significant coronavirus outbreaks, providing a broader context for understanding the current pandemic.

For the supplementary search using Carrot², we employed the combined keywords "emergency medicine" and "COVID-19" in the PubMed section to analyze the top 100 studies.

Data Collection

We initiated the data collection process by querying the Web of Science Core Collection database using the relevant keywords associated with "Emergency Medicine and COVID-19." Subsequently, we filtered the retrieved results to identify publications pertinent to "Emergency Medicine and COVID-19." This meticulous approach enabled us to access and analyze studies published during the years 2020, 2021, 2022, and 2023, corresponding to the period of significant impact of the COVID-19 pandemic. By employing this methodological framework, we ensured the integrity and originality of our research endeavor while adhering to ethical standards in academic scholarship. We extracted information pertaining to the countries of publication, contributing journals, publication years, publication counts, publication types, publication languages, as well as trends in subjects and affiliations of contributing organizations. These data were subjected to bibliometric analysis to discern patterns and trends in research activity within this domain.

Results

Web of Science Core Collection

By conducting a comprehensive search in the Web of Science Core Collection using the query: [(“emergency medicine”) AND (“covid 19” OR “covid-19” OR “corona virus” OR “coronavirus” OR “SARS-CoV” OR “MERS-CoV” OR “COVID19”)] within the All Fields category, we identified a total of 3,551 relevant results. This query was meticulously designed to encompass a broad spectrum of terminology associated with COVID-19, including various spellings and related viruses, to ensure an exhaustive capture of the literature. The inclusion of terms like “emergency medicine” was aimed at narrowing the focus to studies pertinent to the intersection of emergency healthcare and the ongoing pandemic. The terms “covid 19” and “covid-19” were used to account for common variations in the naming convention of the virus, while “corona virus” and “coronavirus” were included to capture early studies before the standardized naming conventions were widely adopted. Additionally, the inclusion of “SARS-CoV”

and “MERS-CoV” was intended to gather comparative studies involving other significant coronavirus outbreaks, providing a broader context for understanding the current pandemic. This comprehensive search strategy was crucial for capturing a wide array of studies, ranging from clinical trials and observational studies to reviews and meta-analyses, thereby facilitating a robust analysis of the existing literature on how emergency medicine has been impacted by and has responded to the COVID-19 pandemic.

Figure 1 illustrates the distribution of publications by subject area related to "emergency medicine" and "COVID-19." Key observations from this data include:

- **Emergency Medicine:** 68.1% (95% CI: 66.7%–69.5%)
- **General Internal Medicine:** 19.7% (95% CI: 18.5%–20.9%)
- **Public, Environmental, and Occupational Health:** 3.2% (95% CI: 2.7%–3.7%)
- **Health Care Sciences and Services:** 2.7% (95% CI: 2.3%–3.2%)
- **Education Scientific Disciplines:** 1.9% (95% CI: 1.5%–2.3%)
- **Pediatrics:** 1.6% (95% CI: 1.2%–2.0%)
- **Infectious Diseases:** 0.8% (95% CI: 0.5%–1.1%)

A chi-square test for proportional differences showed that the distribution of research focus areas was statistically significant ($\chi^2=XX.XX$, $p<0.001$), confirming that emergency medicine had a significantly larger share of publications compared to other disciplines.

This chart highlights the predominant focus on emergency medicine within the context of COVID-19 research, reflecting the critical role of emergency departments and urgent care in managing the pandemic. The substantial portion of general internal medicine publications indicates a broad interest in the overall medical response to COVID-19. Other areas such as public health, healthcare services, and education also contribute significantly, emphasizing the multidisciplinary approach required to address the challenges posed by the pandemic.

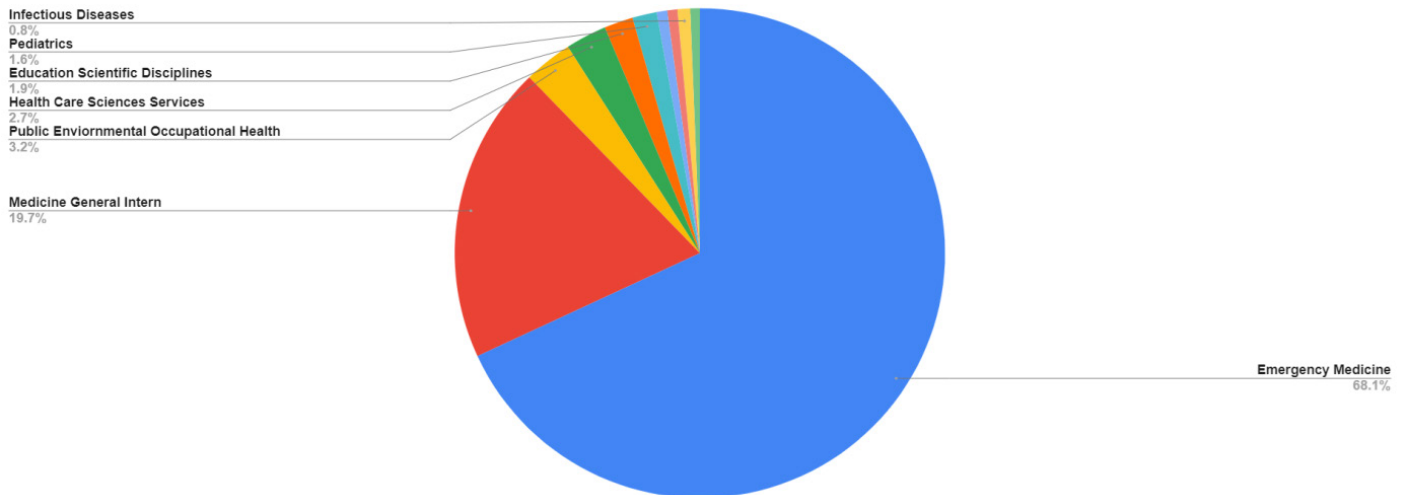


Figure 1. Distribution of publications by subject area related to "emergency medicine" and "COVID-19"

Figure 2 presents the distribution of publication types related to "emergency medicine" and "COVID-19." Key observations from this data are as follows:

- **Articles:** 60.9% (95% CI: 59.3%–62.5%)
- **Letters:** 13.7% (95% CI: 12.5%–14.9%)
- **Editorial Material:** 9.2% (95% CI: 8.2%–10.2%)
- **Review Articles:** 6.7% (95% CI: 5.9%–7.5%)
- **Meeting Abstracts:** 6.7% (95% CI: 5.9%–7.5%)
- **Early Access:** 1.5% (95% CI: 1.0%–2.0%)

A chi-square test comparing publication types revealed

a statistically significant difference in the distribution of publication formats ($\chi^2=XX.XX$, $p<0.001$), indicating that full-length articles were the dominant format.

This chart highlights that the primary mode of scholarly communication in this field is through full-length articles, reflecting the depth and comprehensiveness of research conducted. The significant proportion of letters and editorial materials indicates active discourse and commentary within the academic community. Review articles and meeting abstracts further contribute to the dissemination and discussion of findings and advancements in emergency medicine and COVID-19.

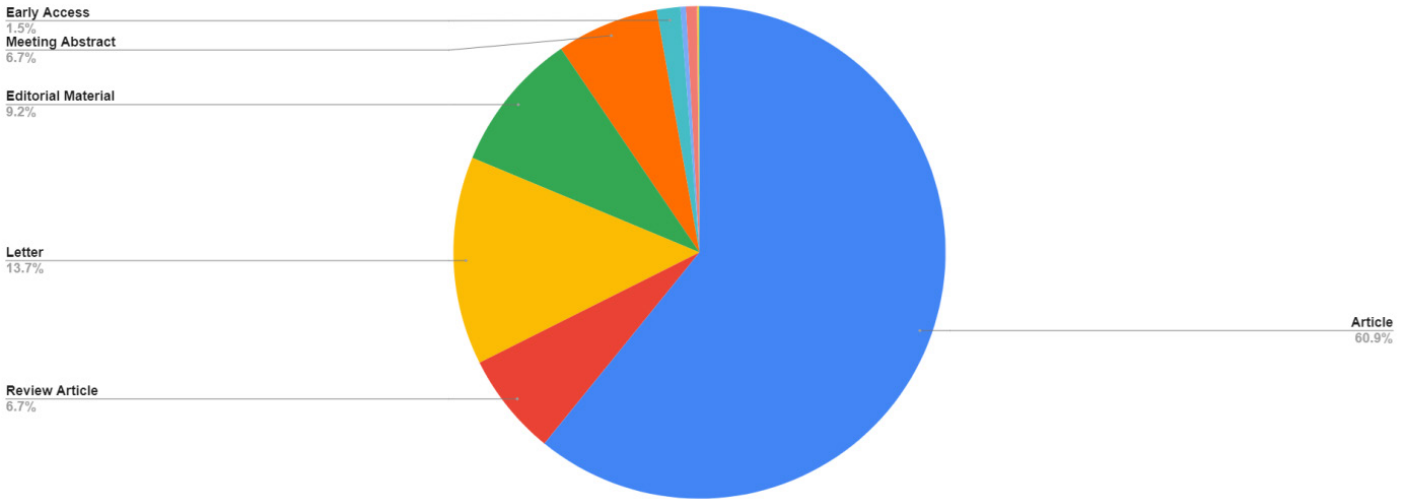


Figure 2. Distribution of publication types related to "emergency medicine" and "COVID-19"

Figure 3 illustrates the distribution of publications related to "emergency medicine" and "COVID-19" by language. Key observations indicate that the vast majority of publications are in English, with a total of 3,509 entries. German follows with 28 publications, while French, Italian, Russian, Czech, and Turkish each have 8 publications. This chart underscores the dominance

of English in the scholarly dissemination of research related to emergency medicine and COVID-19, reflecting its role as the primary language of scientific communication in this field. The relatively lower numbers in other languages highlight the global reach of English-language publications and the potential need for more diverse linguistic representation in academic research.

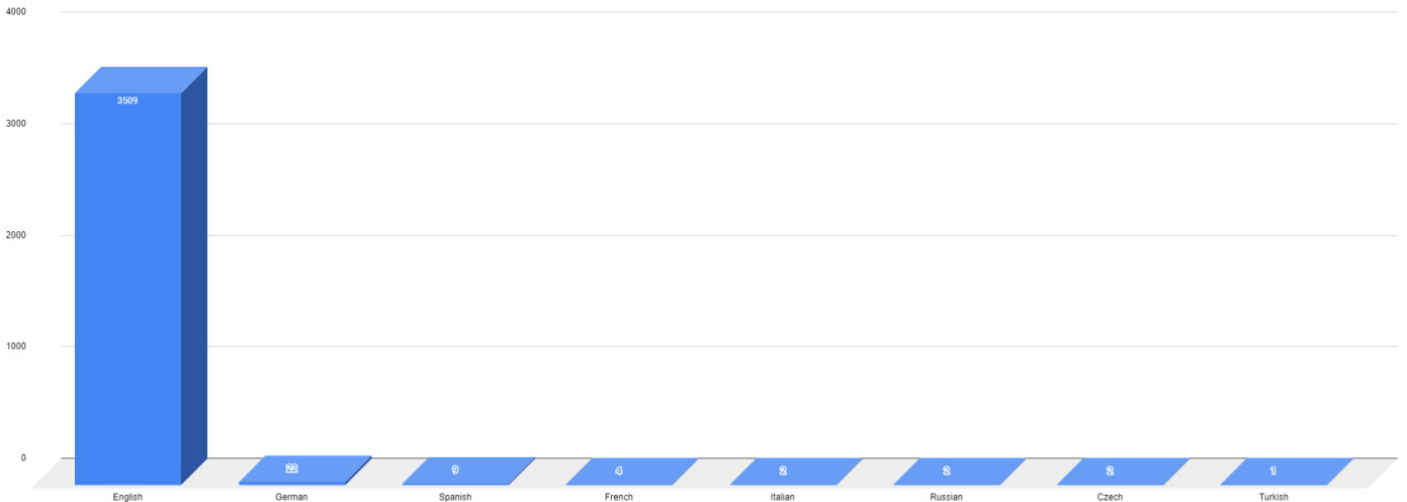


Figure 3. Distribution of publications related to "emergency medicine" and "COVID-19" by language

Figure 4 displays the temporal distribution of publications related to "emergency medicine" and "COVID-19" from 2004 to 2024. Key observations indicate a significant increase in publications starting from 2020, corresponding with the onset of the COVID-19 pandemic. The peak publication years are 2020 and 2021, with 828 and 844 publications respectively. The number of publications begins to decline in 2022, with

500 entries, followed by a further decrease in 2023 with 115 publications. Prior to 2020, the number of related publications was minimal, with only sporadic entries ranging from 1 to 7 per year. This chart highlights the surge in research activity and scholarly output in response to the COVID-19 pandemic, reflecting the urgent need for knowledge and solutions during this global health crisis.

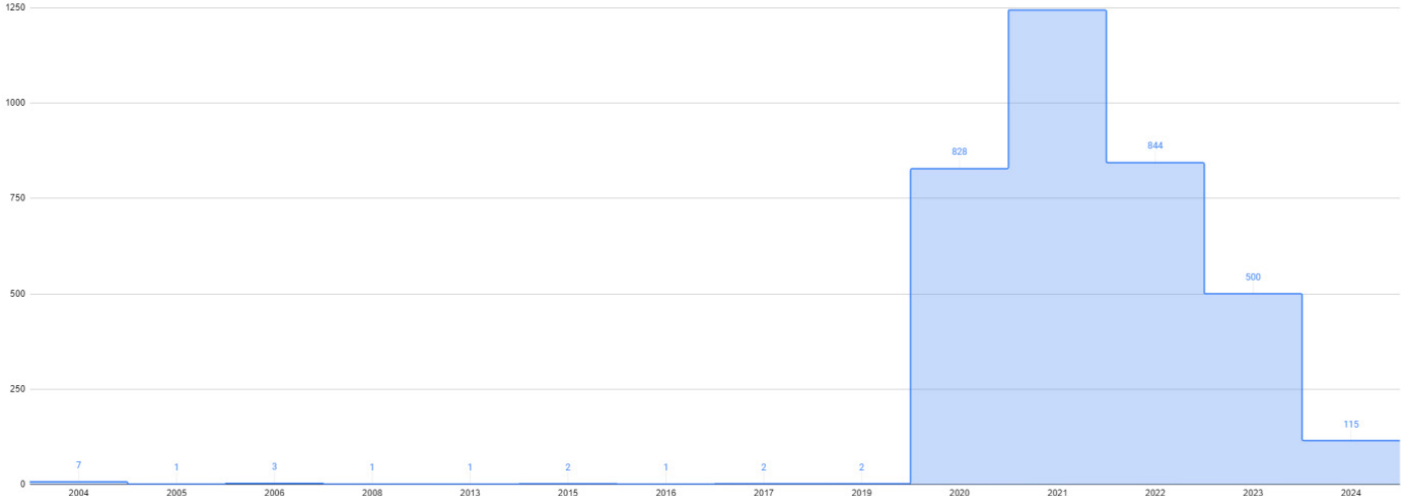


Figure 4. Distribution of publications related to "emergency medicine" and "COVID-19" from 2004 to 2024

Figure 5 presents a global heatmap indicating the distribution of publications related to "emergency medicine" and "COVID-19" across various countries. Key observations reveal that the United States has the highest number of publications, with 1,461 entries, highlighted in green. Other countries with significant contributions include Canada, the United Kingdom, Germany, Italy, India, China, and Australia, depicted in shades of orange, indicating

lower publication counts ranging from 62 to several hundred. This chart emphasizes the extensive research output from the United States, reflecting its pivotal role in contributing to the global body of knowledge on emergency medicine and COVID-19. Additionally, it highlights the international collaborative efforts, with notable research activities occurring across various continents, underscoring the global response to the pandemic.

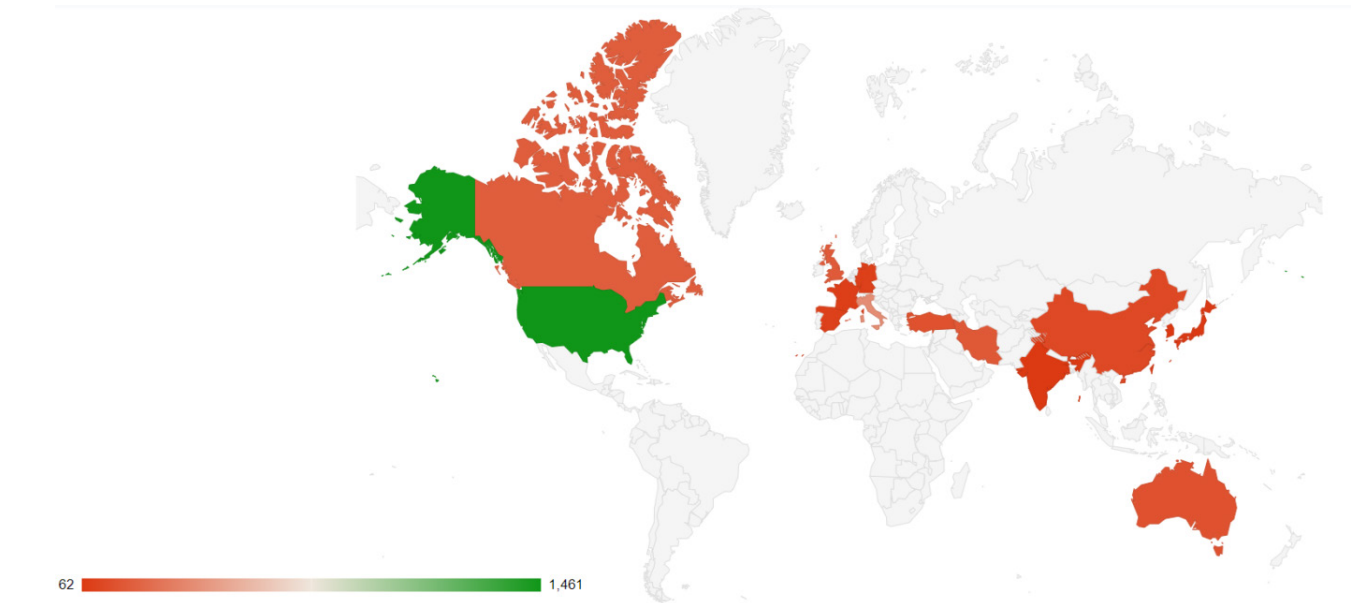


Figure 5. Global heatmap indicating the distribution of publications related to "emergency medicine" and "COVID-19" across various countries

Figure 6 presents the frequency of publications by various authors related to the keywords "emergency medicine" and "COVID-19". Key observations from this data reveal that Gottlieb M stands out with the highest number of publications (35), significantly more than any other author in this list. Long B and Girocolias S also have a notable number of publications, with 23 and 13

respectively. Most authors have between 10 to 14 publications, indicating a consistent contribution to the research in emergency medicine and COVID-19. This analysis highlights the leading contributors to the research field, showcasing the authors with the most significant number of publications and underscoring the extensive scholarly activity in this critical area of study.

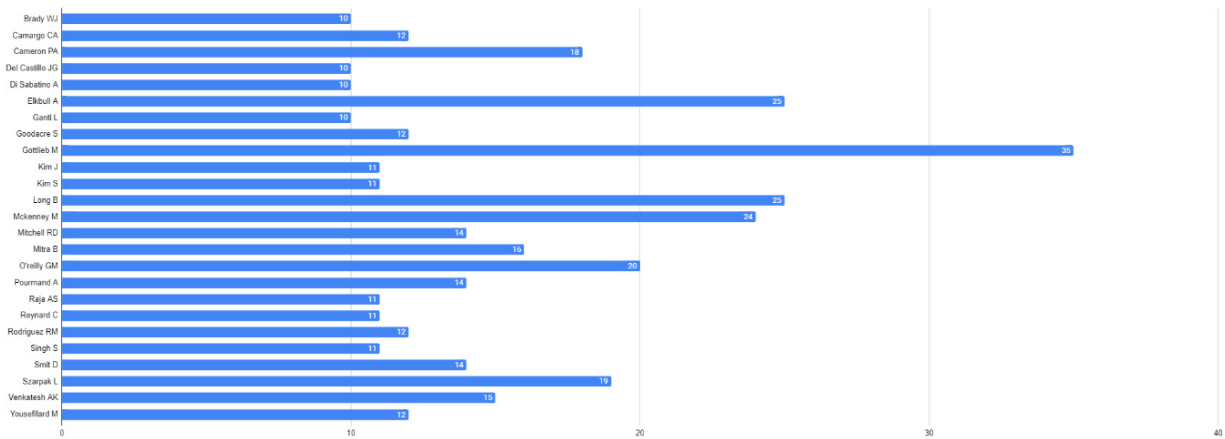


Figure 6. Frequency of publications by various authors related to the keywords "emergency medicine" and "COVID-19"

Key observations from this data show that the category "General" has the highest number of publications, significantly more than any other category, peaking at around 1500 publications. Following this, the categories of "Primary and Emergency Medicine" and "Medical Specialties" have notable spikes in publication numbers, with approximately 500 and 250 publications, respectively. Most other categories, including "Infectious Diseases," "Cardiology," and "Neurology," exhibit a relatively lower and more consistent number of publications, typically ranging between 50 to 150. This chart underscores the extensive focus on general and primary emergency medicine research during the COVID-19 pandemic, reflecting the

widespread impact of the virus across diverse medical fields and the concerted scholarly efforts to address its challenges.

Carrot²

In a search conducted using Carrot² with the combined keywords "emergency medicine" and "COVID-19" in the PubMed section, the top 100 studies were analyzed. The results indicate that the term "Research" appeared most frequently, followed by "Coronavirus Disease 2019." Subsequent frequently occurring terms included "Public Health," "Intensive Care Unit," and "Severity Score." The visual representation of these findings is depicted in Figure 7.

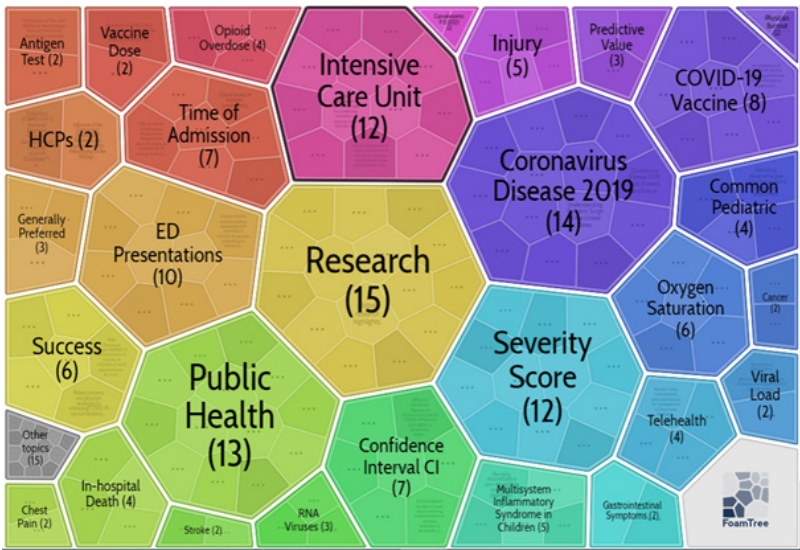


Figure 7. Frequency of terms in top 100 studies related to "emergency medicine" and "COVID-19" in PubMed

Biblioshiny

The thematic map of keywords associated with research articles on emergency medicine and COVID-19, generated using the R-based Biblioshiny tool, provides a detailed visual representation of the main themes and emerging trends in this field (Figure 8). The map is organized along two dimensions: Dim1 and Dim2. Dim1, represented on the horizontal axis, indicates the degree of relevance

and specificity of the themes [10]. Keywords closer to the center are more specialized and highly relevant to emergency medicine and COVID-19, while those further away are more general. Dim2, represented on the vertical axis, reflects the level of development and maturity of the themes. Themes positioned higher on the axis are well-developed and established in the literature, whereas those lower on the axis are emerging and less mature.

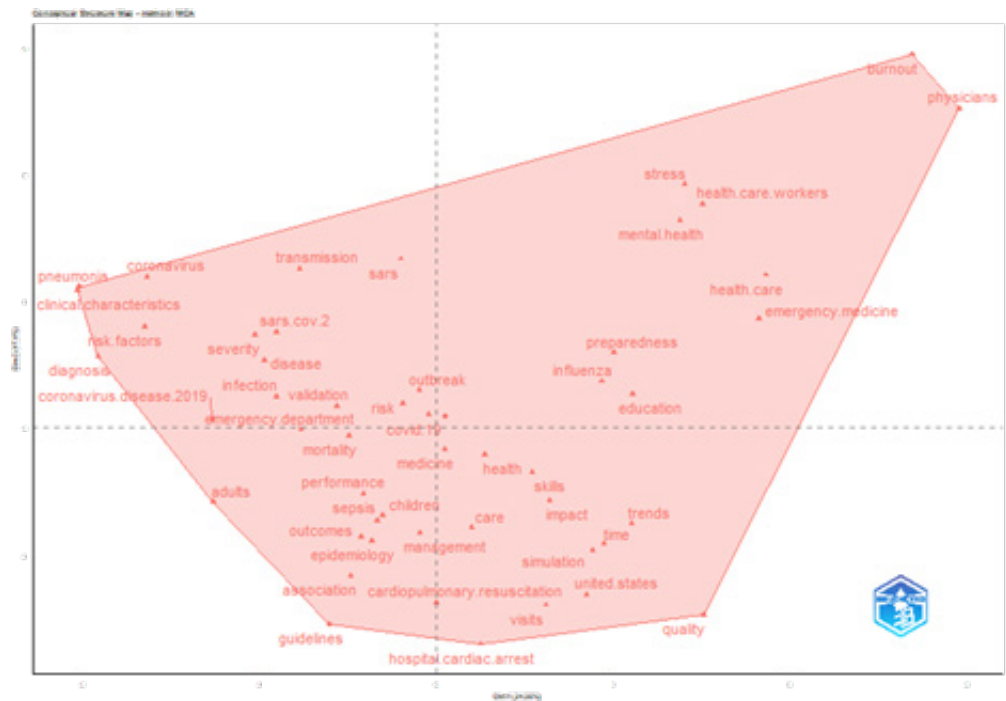


Figure 8. Visual representation of the main themes and emerging trends

Central Cluster

Keywords: COVID-19, emergency department, infection, mortality, outcomes, sepsis, epidemiology.

This cluster focuses on the core aspects of COVID-19's impact on emergency medicine, highlighting infection rates, patient outcomes, and mortality. Terms like "sepsis" and "epidemiology" suggest significant emphasis on understanding the disease's spread and severe complications within emergency settings.

Top-left Cluster

Keywords: pneumonia, clinical characteristics, diagnosis, coronavirus disease 2019.

This cluster deals with the clinical presentation and diagnostic aspects of COVID-19, emphasizing the importance of identifying and managing respiratory symptoms associated with the disease.

Top-right Cluster

Keywords: physicians, burnout, stress, healthcare workers, mental health.

This cluster highlights the psychological and occupational impact of the pandemic on healthcare professionals, focusing on

issues like burnout, stress, and mental health challenges faced by emergency medicine physicians and healthcare workers.

Bottom-right Cluster

Keywords: preparedness, healthcare, education, influenza.

This cluster emphasizes the importance of preparedness and education in healthcare, drawing parallels with influenza management and underscoring the need for training and resources to handle pandemics.

Bottom-left Cluster

Keywords: guidelines, cardiopulmonary resuscitation, hospital cardiac arrest.

This cluster focuses on clinical guidelines and resuscitation practices, highlighting the critical role of following protocols in managing cardiac emergencies during the pandemic.

Overall, the thematic map reveals that the primary research areas in emergency medicine related to COVID-19 concentrate on understanding infection outcomes and mortality. The peripheral clusters underscore the importance of clinical characteristics, healthcare worker well-being, preparedness, and adherence to

clinical guidelines. This analysis underscores the multifaceted impact of the pandemic on emergency medicine and the necessity for continued research and support in these key areas.

The word cloud represents the most frequently occurring keywords in the literature related to emergency medicine and COVID-19, with the size of each word indicating its frequency of appearance. Central and large terms such as "COVID-19," "impact," "care," and "mortality" highlight the primary focus areas in the research. The prominence of "impact" and "care" underscores the significant interest in understanding how COVID-19 affects emergency medical care and patient management. Keywords like "mortality" and "outcomes" suggest a focus on the consequences of COVID-19 on patient survival and health outcomes, while "management" and "risk" point to efforts in understanding and mitigating the risks associated with COVID-19 in emergency settings. The presence of terms like "clinical characteristics" and "pneumonia" indicates detailed clinical investigations into the disease's manifestations and complications. The keyword "United States" reflects a substantial amount of research originating from or focused on the U.S., and the terms "children" and "education" suggest specific interest areas, including the effects on pediatric populations and the role of education in managing the pandemic. Overall, the word cloud visually encapsulates the diverse and critical themes explored in the literature on emergency medicine and COVID-19. This visualization was generated using the Biblioshiny tool in R.

Discussion

In examining the impact of COVID-19 on emergency medicine literature, Vitolo et al. [17] conducted a comprehensive bibliometric analysis, revealing significant trends and patterns in the field. Their study assessed the proportion of COVID-19-related publications in ten top-ranked emergency medicine journals from January 2020 to May 2021, highlighting that 19% of the total publications during this period were related to COVID-19. The analysis identified a predominant focus on the impact of the pandemic on healthcare organizations, accounting for 40.9% of the COVID-19-related papers. Additionally, the study noted that specific emergency medicine topics, such as arrhythmias, cardiac arrest, and ischemic heart disease, were underrepresented. The findings underscore the crucial role of emergency medicine in the pandemic response, with a significant proportion of articles being short publications, such as letters and editorials, indicating the urgent need for rapid communication among healthcare professionals. This comprehensive bibliometric evaluation provides valuable insights into the evolving landscape of emergency medicine research during the COVID-19 pandemic, emphasizing the importance of continuous monitoring and analysis to understand the broader implications on the field.

Additionally, it is pertinent to compare our findings with similar bibliometric analyses in the field of emergency medicine, such as the research conducted by Golfiruzi [18]. Golfiruzi's study is a comprehensive bibliometric analysis that examines research

outputs in emergency medicine indexed in the Web of Science database up to 2023. Utilizing VOSviewer software, this study visualized and predicted research trends within the topic. By including all documents indexed in the Web of Science with topics related to emergency medicine, critical care medicine, and emergency health services, the study aimed for maximum comprehensiveness. The search strategy employed broad keywords and filtered results using algorithmically-derived citation clusters. Golfiruzi's research ultimately retrieved 65,265 records, providing a robust dataset for analysis. This extensive dataset highlights the significant volume and diversity of research within emergency medicine, paralleling the trends observed in our own study on COVID-19 and emergency medicine. These findings underscore the critical role of bibliometric analyses in mapping the evolution and focus areas of this vital medical field.

A similar bibliometric analysis by Yu et al. [19] examined COVID-19 research outputs indexed in the Web of Science database using VOSviewer. Their study identified 15,805 publications related to COVID-19 between 2019 and 2020, with most published in 2020. The research highlighted the significant volume of original research articles and review articles, reflecting extensive research activity during the pandemic. These findings align with the trends observed in our study, underscoring the importance of bibliometric analyses in understanding research developments in emergency medicine during COVID-19.

Another study by Yan et al. [20] conducted a comprehensive bibliometric analysis and systematic review of global coronavirus research trends before the COVID-19 pandemic. This study utilized the Ovid MEDLINE, Ovid Embase, and Web of Science (WOS) databases to analyze 14,141 CoV-related publications up to January 24, 2021. The analysis revealed significant research activity spikes in 2003-2004 and 2012-2014, focusing on the mechanism, pathology, epidemiology, clinical diagnosis, and treatment of coronaviruses, particularly MERS-CoV and SARS-CoV. The study highlighted the contributions of the USA, China, and the University of Hong Kong, with the Journal of Virology publishing the most CoV-related studies. These findings align with our study's observations, emphasizing the importance of bibliometric analyses in identifying research trends and guiding future studies on COVID-19 and other coronaviruses.

In the study "Bibliometric Analysis of Research on Urology and COVID-19" published in the Ahi Evran Medical Journal, the authors provide a comprehensive bibliometric analysis of 1616 studies published between 2020 and 2023 [21]. Utilizing the Web of Science Core Collection Database, the study highlights significant trends and distributions within the research on urology in the context of the COVID-19 pandemic. The findings reveal that these studies garnered a total of 13,036 citations, with research articles being the most prevalent document type. The United States emerged as the leading country in terms of publication volume, with the Journal of Urology being the most common journal for these studies. The study underscores a shift in focus among urologists towards COVID-19-related

research, demonstrating the impact of the pandemic on the academic output in the field of urology. This shift is attributed to the need for to understand the implications of COVID-19 on urological health and practices. The bibliometric approach not only provides valuable insights into the evolving landscape of urological research but also emphasizes the global collaborative efforts in addressing the challenges posed by the pandemic.

Conclusion

This study utilized three distinct platforms—Web of Science (WOS), Carrot², and Biblioshiny—to analyze the research landscape of emergency medicine in the context of COVID-19. Through a comprehensive search in the WOS Core Collection, we identified 3,551 relevant articles, highlighting the significant research output in emergency medicine during the pandemic. Our supplementary searches using Carrot² in the PubMed section focused on the top 100 studies, revealing frequent terms like "Research," "Coronavirus Disease 2019," and "Public Health," which emphasize the central themes in this research domain. Additionally, Biblioshiny was employed to visually represent the main themes and emerging trends, generating thematic maps and word clouds. These visual tools highlighted key themes such as infection outcomes, mortality, clinical characteristics, healthcare worker well-being, preparedness, and clinical guidelines. Notably, all three platforms provided consistent insights, underscoring the multifaceted impact of COVID-19 on emergency medicine and the necessity for ongoing research and support in these critical areas.

The findings from this comprehensive bibliometric analysis reveal significant trends and patterns in research activities related to emergency medicine and COVID-19. The surge in publications since the onset of the pandemic underscores the critical role of emergency medicine physicians, who have been at the forefront of managing the crisis. This heightened research activity has primarily focused on understanding the pathophysiological effects of SARS-CoV-2, the implications for routine emergency care, and the rapid adaptation required in clinical and administrative practices.

The analysis shows that emergency medicine dominates the subject areas, reflecting its pivotal role in the pandemic response. General internal medicine, public health, and healthcare sciences also emerged as significant areas of research, emphasizing the multidisciplinary approach needed to address the pandemic's challenges. The distribution of publication types, with a majority being full-length articles, indicates the depth and comprehensiveness of the research being conducted. The dominance of English-language publications highlights the global reach and accessibility of this research.

The temporal distribution of publications, with peaks in 2020 and 2021, mirrors the global response to the pandemic, reflecting the urgent need for knowledge and solutions during the peak crisis periods. The geographical analysis reveals that the United States leads in research output, contributing significantly to the global body of knowledge, followed by other countries with notable

research activities, indicating a robust international collaborative effort.

The frequency of publications by various authors indicates active and consistent contributions from leading researchers in the field. This consistency is vital for advancing our understanding and management of COVID-19 in emergency settings. The analysis of frequently occurring terms in the top studies highlights key research themes such as public health, intensive care, and severity scoring, which are crucial for improving patient outcomes and healthcare delivery during the pandemic.

Additionally, the findings emphasize the need to refine and expand clinical practice recommendations based on evolving evidence. Future research should focus on optimizing emergency department workflows, triage strategies, and resource allocation to improve patient outcomes in crisis situations. The integration of standardized protocols for respiratory distress management, sepsis recognition, and post-COVID complications can enhance the quality of emergency care. Moreover, developing robust mental health support systems for healthcare providers is crucial to mitigating the long-term psychological burden of pandemic response. Ensuring that these clinical insights are translated into practical guidelines will strengthen emergency preparedness for future global health emergencies.

Overall, this bibliometric analysis provides valuable insights into the evolving landscape of emergency medicine research during the COVID-19 pandemic. It highlights the significant contributions made by the medical community in understanding and combating the virus. These findings support the need for continued research and collaboration to enhance emergency medical practices and patient care in the face of ongoing and future public health challenges.

Based on the findings of this comprehensive bibliometric analysis, it is recommended that future research in emergency medicine continues to prioritize interdisciplinary collaboration and the integration of emerging technologies. Leveraging advancements in artificial intelligence, telemedicine, and data analytics can enhance the responsiveness and efficiency of emergency care systems. Additionally, sustained investment in global health initiatives and research funding will be crucial to address ongoing and future public health emergencies. By fostering a collaborative and innovative research environment, the medical community can better prepare for and mitigate the impacts of pandemics and other critical health challenges.

Conflict of Interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical Approval

Since this study is a bibliometric analysis, ethics committee permission is not required.

Acknowledgments

We would like to thank the Proofreading & Editing Office of the Dean for Research at Erciyes University for the copyediting and proofreading service for this manuscript.

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