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Review Article

COVID-19 Across Disciplines: Mapping Multidisciplinary Research Through Bibliometric Data Analysis

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Abstract: Wuhan, China, saw an outbreak of severe atypical respiratory infections in December 2019. This rapidly spread from Wuhan to other locations. The COVID-19 crisis has prompted scientists and public health officials throughout the globe to promptly advance our knowledge of this lethal condition, clarify its treatment and control, and expedite the development of novel therapeutics. The COVID-19 epidemic has resulted in a large increase in publications. Specialty periodicals are swamped with applications from writers who were unknowingly given essential writing time. Until 2025, researchers continue to focus on the long-term effects of post-COVID-19 on numerous elements of life. Thus, this study evaluates COVID-19 research conducted by worldwide specialists across several areas. There was a total of 384,319 research articles published across five key fields: social sciences, humanities, formal sciences, natural sciences, and professions. ENDNOTE software was utilized to analyze the numerous terminologies related to COVID-19 and their respective publication years. The results show that the Professions category has the most articles, totaling 121,990, means 71% of all publications are on professions, far outweighing any other topic. This indicates how quickly and intensely specialists focus on their topics. The Social Sciences make up 15%, followed by Formal Sciences at 7% and Natural Sciences at 5%. While the Humanities account for just 2%, are critical for contextualizing the pandemic within broader humanistic and cultural frameworks. Also, the sciences are divided into their sub-sections for further evaluation.

Keywords: COVID-19, Bibliometric Analysis, Medicine, Natural Sciences, Professions, Social Sciences

1. Introduction

In December 2019, an epidemic of acute atypical respiratory infection occurred in Wuhan, China. This spread rapidly from Wuhan to adjacent areas. A novel coronavirus was rapidly recognized as the etiological culprit (Yuki et al., 2020). As of 20 May 2020, the virus has spread globally, infecting 4,806,299 individuals and resulting in 318,599 fatalities (Ciotti et al., 2020). Thus, the COVID-19 crisis has prompted scientists and public health authorities worldwide to rapidly improve our comprehension of this devastating disease, clarifying its management and control, and accelerating the development of novel treatments (da Silva et al., 2022). COVID-19 has disrupted everyday life and slowed the global economy. The outbreak has affected thousands of people, resulting in disease and death (Haleem et al., 2020). Therefore, in this regard interdisciplinary research in public health is contemporary and relevant and it is required to improve public health care (Moradian et al., 2020). During the COVID-19 epidemic, almost all research initiatives focused on the virus because of its global emergency status, impacting health, the economy, society, and the environment. Figure 1 shows the incorporation of many scientific disciplines in COVID-19 pandemic research, including: medical sciences (Agampodi et al., 2024; Parhiz et al., 2024; Zhu et al., 2024), engineering and technology (de Araujo et al., 2024; Gheisari et al., 2024; Lv et al., 2024), social sciences (Batool et al., 2025; Dymond et al., 2024; Yang et al., 2024), economics and business (Chetty et al., 2024; Faramarzi et al., 2024; Lee et al., 2024), environmental sciences (Mahmood et al., 2024; Olawade et al., 2024; Young et al., 2024), political and legal sciences (Becher et al., 2024; Devine et al., 2024; Klenk & Gurol, 2024). It depicts how COVID-19 has affected almost every facet of society. This is why experts are currently undertaking research on it. The medical, social, environmental, economic, political, and technological areas are working together to better understand and confront the difficulties presented by the pandemic. Continuous investigations allow us to learn from the crisis and plan for the future by investigating its effects on health, mental well-being, the economy, the environment, and technological innovation. The COVID-19 problem has resulted in a substantial increase in publications. Specialty journals are overloaded with submissions from writers who have been inadvertently afforded essential writing time, while publications on COVID have overwhelmed researchers (Harper et al., 2020). The pandemic has posed an unprecedented threat to global society and scientific inquiry. Governmental and commercial incentives have been implemented to rapidly allocate resources to study areas directly related to the COVID-19 crisis (Riccaboni & Verginer, 2022). Post-acute and long-term care institutions were significantly affected and swiftly became epicentres of the coronavirus outbreak and its response. Aligned with this rapid change in intentions, the field of academic publication experienced a revolution. The time it took to gather data and publish it has shortened, particularly in COVID-19 research (Sloane & Zimmerman, 2021; Strobl & Roth, 2021). Thus, the extensive results of extraordinary data sharing have enabled an unparalleled level of international scientific cooperation. Sohrabi et al. (2021) underlined the primary alterations in publishing throughout the pandemic outbreaks and stated that numerous conventional journals have implemented strategies to improve the peer review process, including recruiting a cohort of accelerated review scientists and allowing for prolonged or flexible revision periods, while maintaining the utmost standards of rigor and reproducibility. A considerable number of academics have used non-peer-reviewed preprint services to expedite the distribution of knowledge. The availability of scientific and technical knowledge and resources has reached unprecedented levels, facilitating rapid worldwide study on COVID-19 (Weiner et al., 2020). Long COVID, also known as post-COVID syndrome, affects a significant portion of the population worldwide (Hou et al., 2025). Until 2025, researchers continued to concentrate on the long-term consequences of post-COVID-19 on several aspects of life as illustrated in Figure 2. It indicates numerous areas where COVID-19 research is still underway, even in 2025, due to the pandemic's profound and long-term consequences on

many aspects of society. It depicts significant themes that scientists and specialists from many sectors continue to research, such as health, education, the economy, the environment, and technology. The most inspected current COVID-19 studies are: Long COVID and immune system response (Anderer, 2025; Gupta et al., 2025; Pathak & Agrawal, 2025), Development of better vaccines and antiviral drugs (Dashtban et al., 2024; Couzin-Frankel & Vogel, 2022; Robinson et al., 2021), Economic recovery and inflation (Fornaro & Romei, 2025; Gharehgozli & Lee, 2022; Jałtuszyk, 2022), Learning loss during lockdowns (Engzell et al., 2021; Major et al., 2021; Bonal & González, 2020), New teaching methods and hybrid models (Ratten, 2023; Pokhrel & Chhetri, 2021; Tarkar, 2020), AI models for predicting outbreaks (Bai et al., 2020; Mohamadou et al., 2020; Zheng et al., 2020), Air quality improvement during lockdowns (Mathew et al., 2025; Balasubramaniam et al., 2025; Jephcote et al., 2021), Digital divide and access to technology (Mathrani et al., 2022; Azıonya & Nhedzı, 2021; Sosa Díaz, 2021), *Reinfection and immune memory* (Sette & Crotty, 2022; Zhang et al., 2022; Dan et al., 2021), Impact of lockdowns on social (Völker, 2023; Long et al., 2022; Cooper et al., 2021), *Medical waste* (Aidonojie et al., 2025; Karimi et al., 2024; Olabi et al., 2024), *Preparedness* (Agampodi et al., 2024; Desclaux et al., 2024; Rakeman-Cagno et al., 2024). Statistics are particularly important in multidisciplinary research for understanding post-COVID effects and preparing for future diseases because they allow evidence from various fields—such as medicine, public health, psychology, economics, and social sciences—to be integrated into a single, coherent analysis. Statistical methods enable us to evaluate and combine several datasets to show how biological effects interact with mental health, social behavior, economic conditions, and healthcare systems. This strategy enables researchers to identify intricate, interrelated patterns that might otherwise go undetected within a single discipline, such as how long-term physical problems impact productivity, education, and social well-being. By statistically analyzing previous multidisciplinary research, scientists and policymakers can create more comprehensive models, educated interventions, and resilient policies to address the health and socioeconomic consequences of COVID-19 and future disease outbreaks.

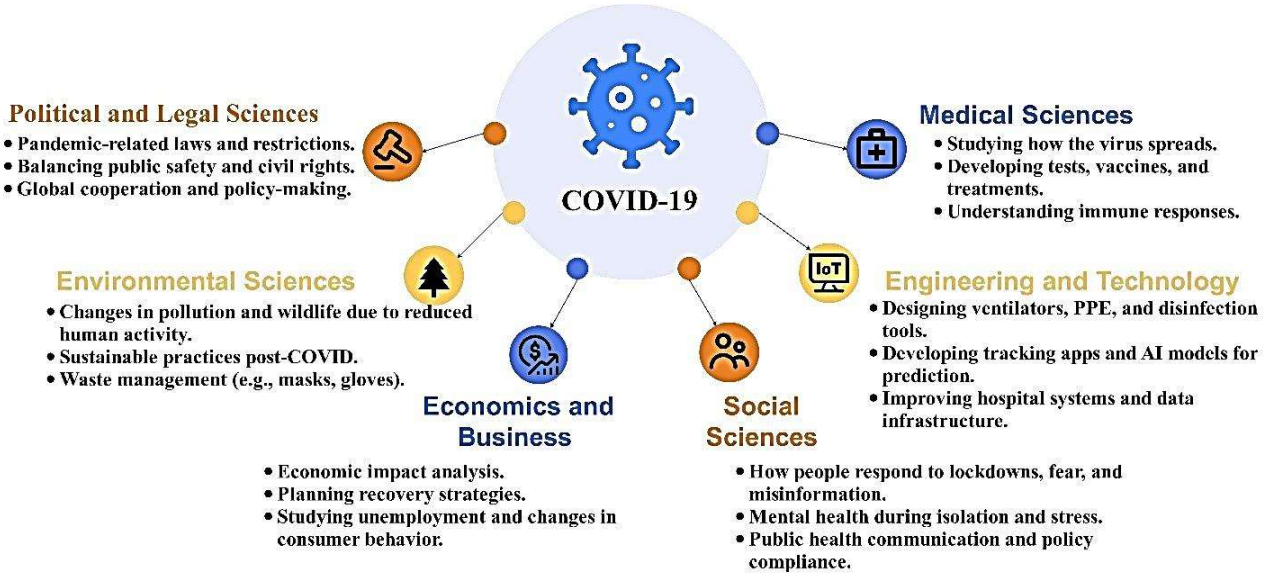


Figure 1. Immerging different sciences in COVID-19 pandemic research.

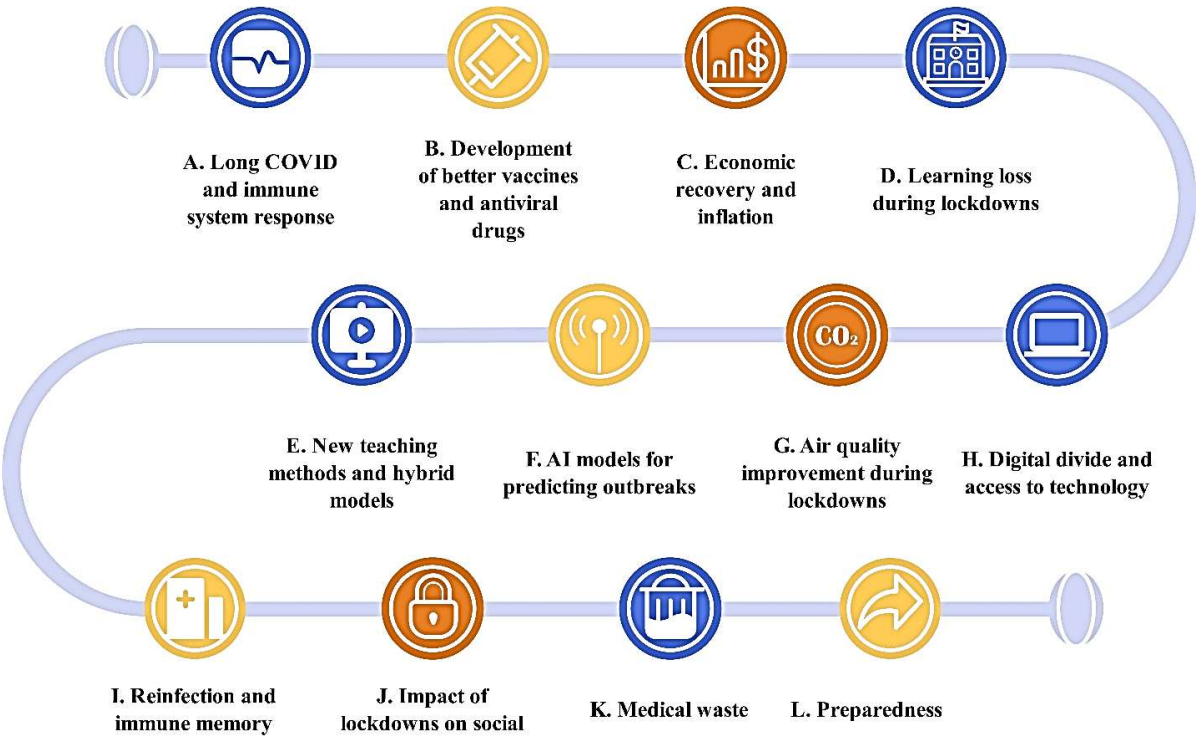


Figure 2. There are still certain current COVID-19 studies.

2. Methodology

This study presents a rigorous and comprehensive bibliometric evaluation of global scholarly output related to COVID-19, with the objective of systematically mapping research trends across key academic domains. A total of 384,319 publications were examined using ENDNOTE, enabling a structured analysis of multiple terminologies associated with COVID-19 and their temporal distribution across publication years. The dataset was categorized into five principal disciplinary areas: social sciences, humanities, formal sciences, professions, and natural sciences, each of which was further subdivided into relevant sub-disciplines to provide a more granular understanding of the volume, diversity, and thematic orientation of research contributions. The significance of this bibliometric analysis lies in its ability to capture the evolution and expansion of coronavirus-related research within the global academic landscape. By identifying patterns in publication output, citation behavior, and thematic clustering, the study offers valuable insights into how different fields have engaged with the pandemic over time. It highlights the unprecedented and rapid growth of academic interest in COVID-19, reflecting the urgency and multidisciplinary nature of the global response to the crisis. Furthermore, this investigation contributes to a deeper understanding of the intellectual structure underpinning COVID-19 research by revealing relationships among various topics, disciplines, and methodological approaches. It also facilitates the identification of research gaps and underrepresented areas, thereby informing future scholarly directions and policy-oriented research priorities. Overall, the study not only documents the scale and scope of COVID-19-related publications but also provides a critical framework for assessing the progression, interconnectedness, and prospective trajectory of pandemic-related research across the global scientific community.

3. Science Disciplines Analysis

This study report examined five categories of sciences, which include a wide range of disciplines, such as natural sciences, professions, social sciences, formal sciences, and humanities. In accordance with these five primary disciplines and their subclasses, as seen in Figure 3, a total of 384,319 published articles were examined based on their title, the year of publication, and the COVID-19 terminology they used. Moreover, Figure 4 and Figure 5 clearly demonstrate that COVID-19 research mostly concentrated on applied and professional sectors, emphasizing the urgent need for practical solutions and therapeutic interventions during the epidemic. The contributions of social sciences, formal sciences, natural sciences, and humanities demonstrate the multidisciplinary nature of the challenge, affecting all facets of human understanding and society. The bar chart (Figure 4) clearly illustrates the quantity of publications in each domain. The Professions category has the highest number of articles, totaling 121,990. The pie chart (Figure 5) represents the same information in an alternative format: 71% of all publications are to professions, far exceeding any other subject matter. This demonstrates the speed and intensity with which experts concentrate on subjects.

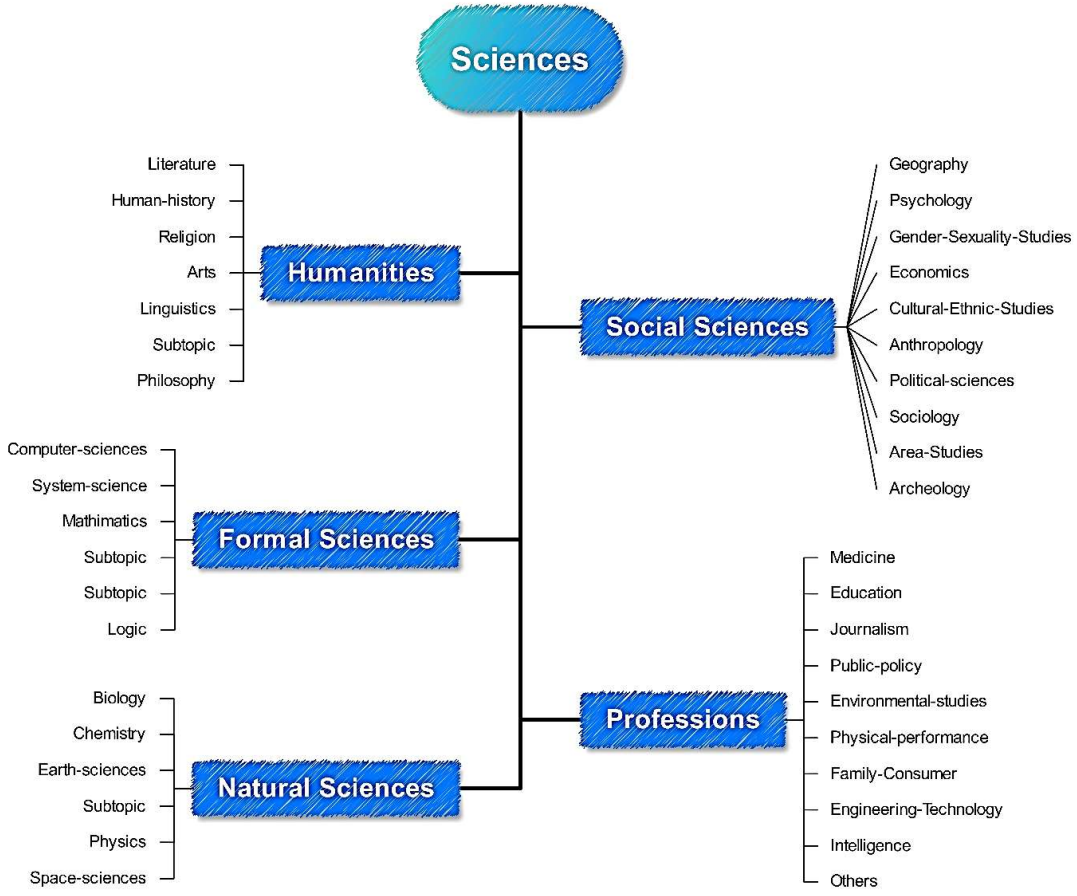


Figure 3. Different science classes and their sub-sections included in the study.

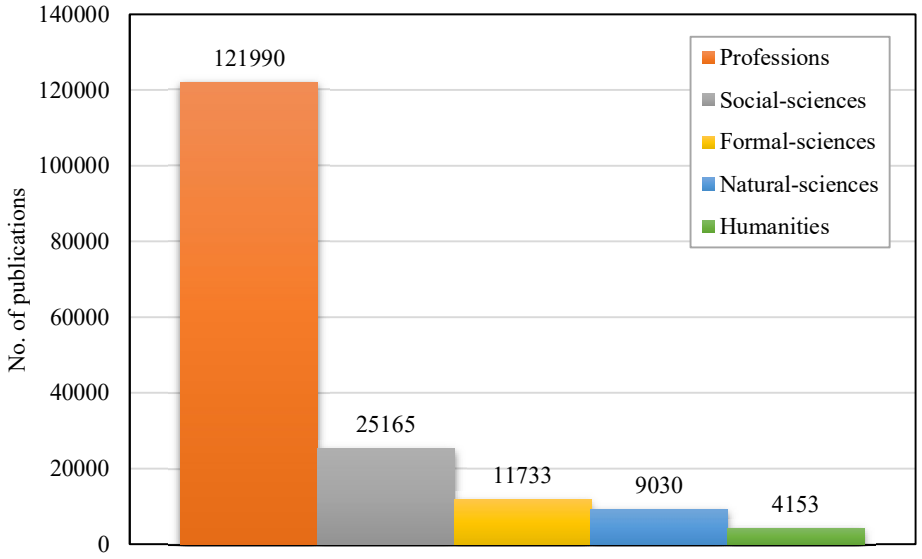


Figure 4. Number of publications included in the library corresponding to different scientific fields.

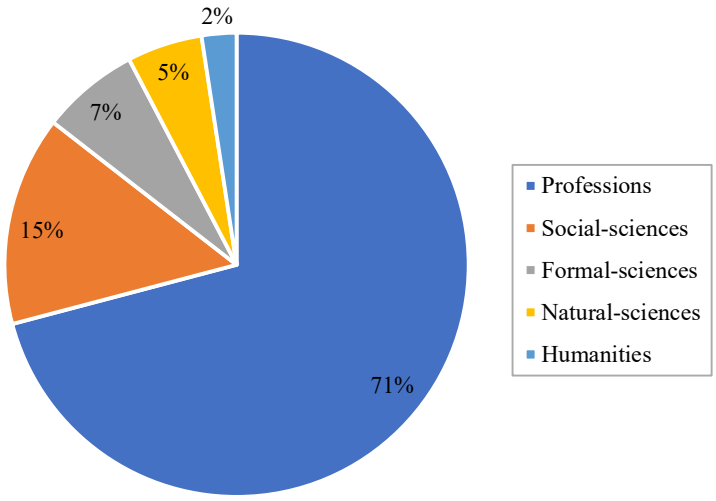


Figure 5. Percentage of each science class included in the library.

Specifically, the value of 121,990 publications corresponds to 71% of the total 172,071 records included in the field classification. It is important to note that only these 172,071 publications were categorized into the five disciplinary groups analyzed in the study. The remaining records (212,248 publications) were not included in the disciplinary breakdown and therefore were excluded from the percentage calculations. As a result, all reported proportions are based solely on the classified subset of publications, ensuring the validity of the presented statistics. The Social Sciences constitute 15%, followed by Formal Sciences at 7%, and Natural Sciences at 5%. The Humanities, however, comprising just 2%, are essential for contextualizing the epidemic within wider humanistic and cultural contexts. Figure 6 and

Figure **7** depict the temporal evolution of research output, classifying publications by year. As anticipated, 2021 saw the highest level of scholarly activity, accounting for 29% of all publications. This occurred during the peak of the epidemic's global spread. In 2022, the percentage was 24%, indicating that individuals persist in pursuing understanding and resolutions to contemporary

challenges, such as vaccination efficacy, long COVID, and legislative modifications. Figure 8 and Figure 9 show the terminologies used in COVID-19 literature, reflecting how scientists and scholars articulate the virus and the associated pandemic. The phrase "COVID-19" appeared in 283,892 articles, representing 74% of the total in the pie chart. The prominence of "COVID-19" in public debate, media coverage, and governmental communications is shown by the significant number of persons who choose to engage with it. This makes it the most universally acknowledged designation for the disease caused by the virus.

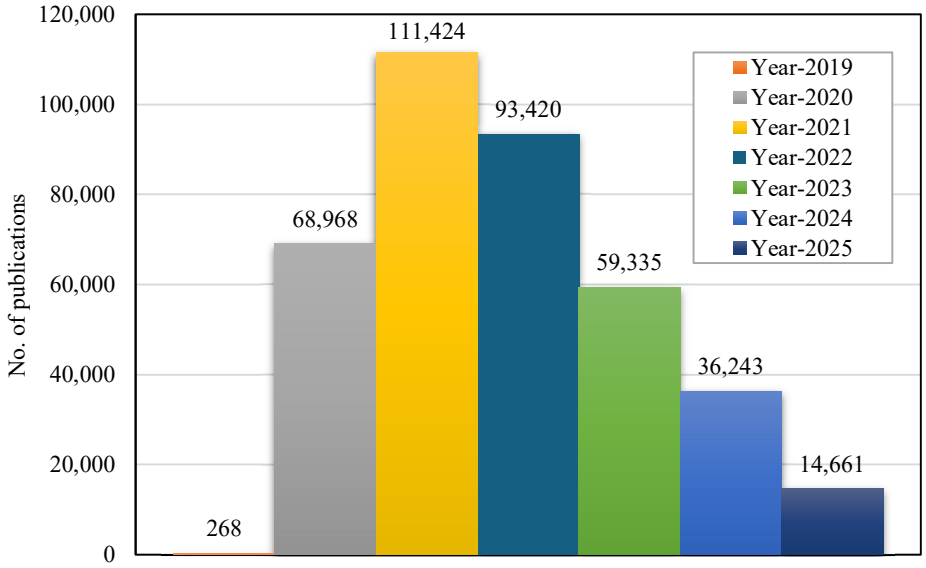


Figure 6. Number of publications per year from 2019-2025.

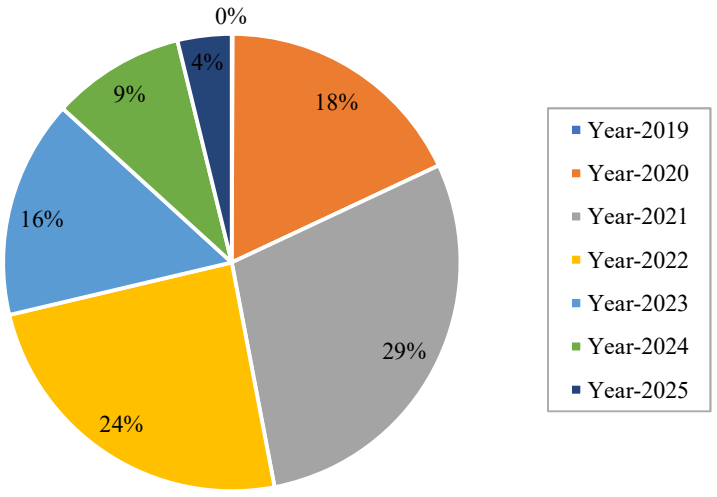


Figure 7. Percentage of publications per year from 2019-2025.

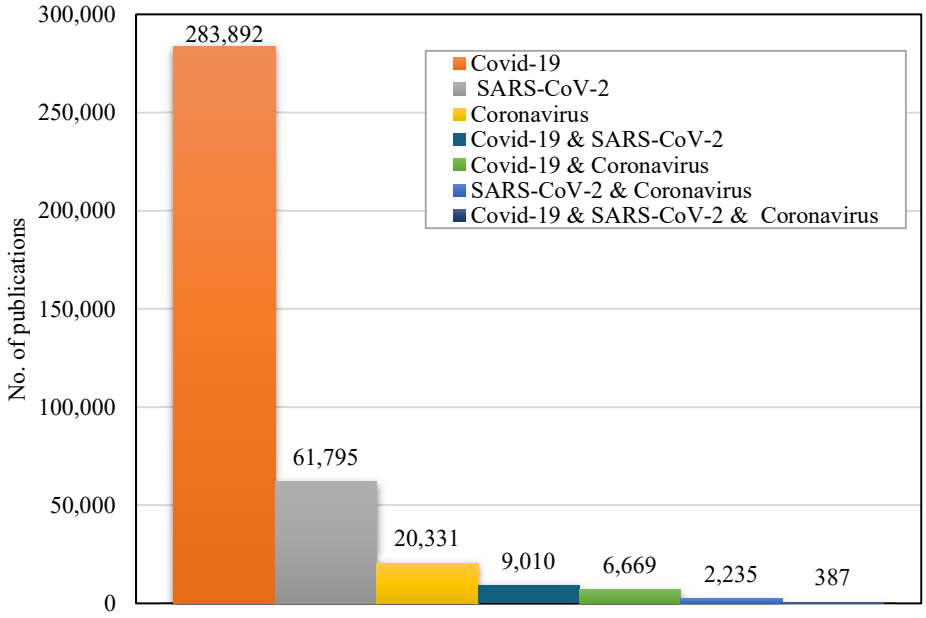


Figure 8. Frequency of use of terminologies of COVID-19.

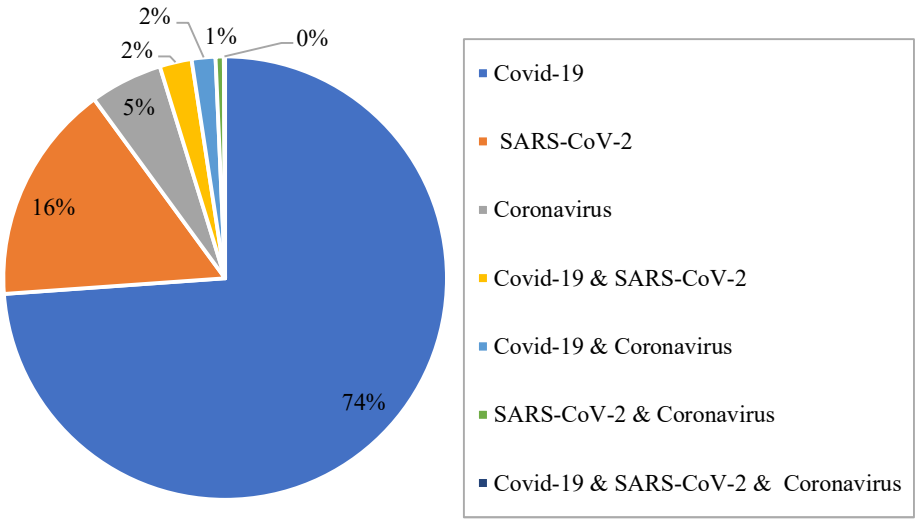


Figure 9. Percentage of frequency of used terminologies of COVID-19.

4. Social Sciences

In this bibliographic study, the social sciences were categorized into ten distinct sub-domains as elucidated in Figure 10. Additionally, Figure 11 and Figure 12 illustrate the quantity of publications produced across these domains of the social sciences, reflecting the productivity of academics in diverse ways. Geography constitutes the discipline with the highest volume of published works, accounting for almost 42% of all publications. Psychology constitutes over 13% of the articles, ranking as the second most common subject. Approximately 10% and 8% of the articles are on economics and cultural-ethnic studies, respectively. This illustrates their significance in the social sciences. Gender-Sexuality Studies, comprising 13% of the total, is a significant aspect that highlights the influence of gender on relationships. Anthropology, political science, sociology, area studies, and archaeology are other disciplines represented in the publications. A lesser proportion of the whole comprises each of these divisions.

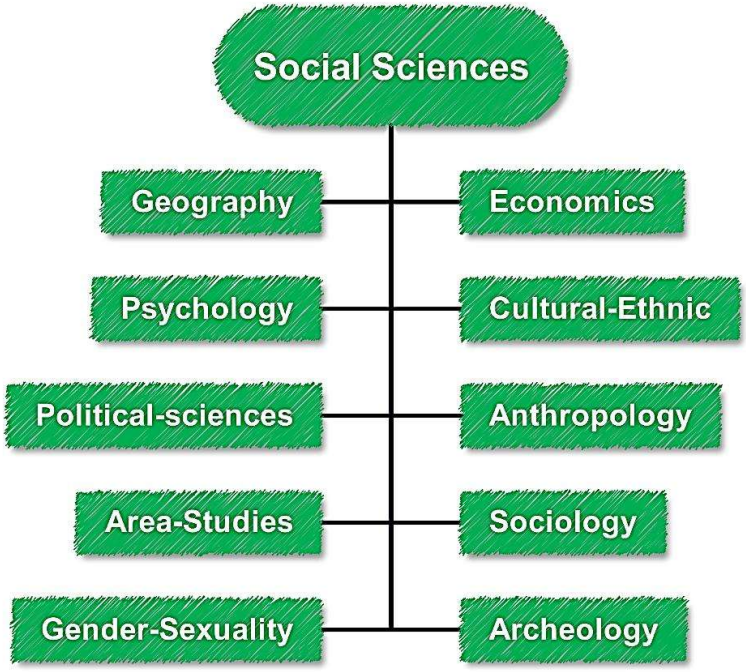


Figure 10. Different sub-disciplines under the theme of social sciences.

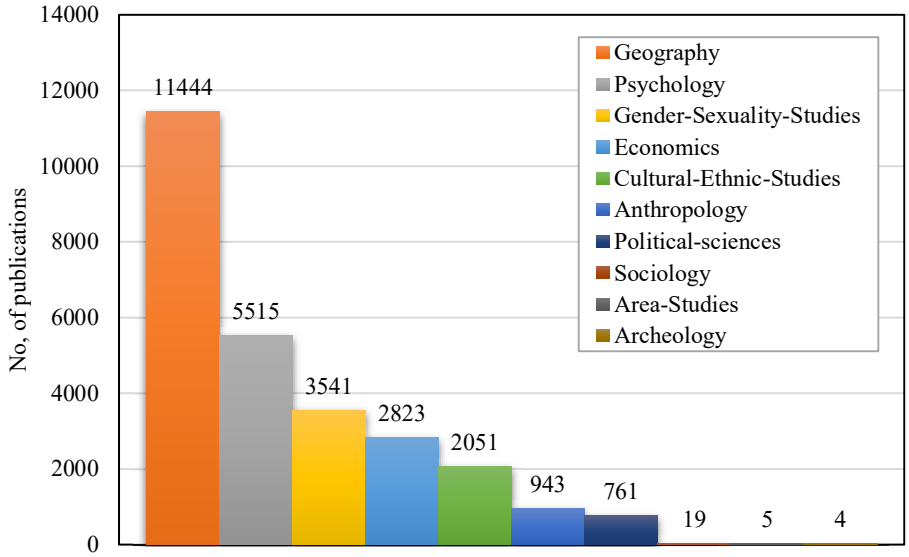


Figure 11. Frequency of published articles in the field of social sciences corresponding to 10 different sub-domains.

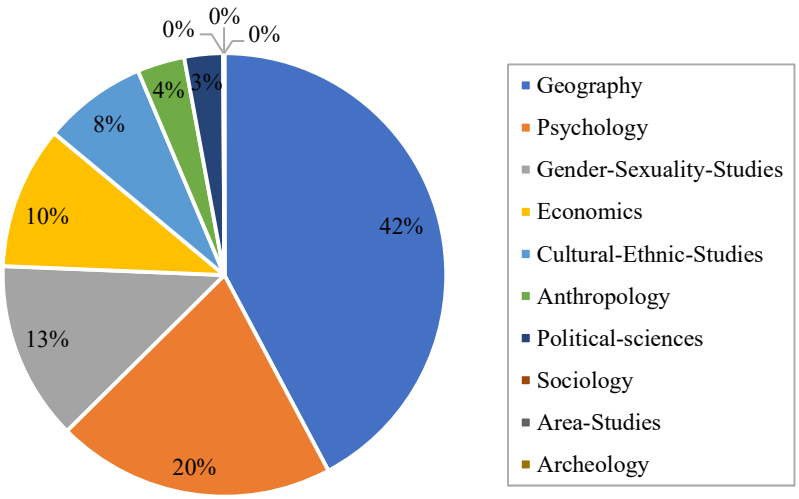


Figure 12. Percentage of frequency for social sciences sub-domains published articles.

For example, anthropology and political science have lower percentages due to their specialized or theoretical nature. They remain crucial for comprehending human lifestyles and governmental functions. Scholars published COVID-19 research to respond to urgent questions about how societies were affected by the pandemic. They aimed to understand changes in behavior, inequality, trust in institutions, and public response to policies like lockdowns and vaccination campaigns. Another major driver was the need to provide evidence that could help governments and organizations design effective social and public health interventions during a rapidly evolving crisis. The pandemic created unprecedented disruptions in labor markets (Cortes & Forsythe, 2023; Casarico & Lattanzio, 2022; Khamis et al., 2021; Albanesi & Kim, 2021; Borjas & Cassidy, 2020; Marek et al., 2020), international and national economies (Arriola et al., 2021; CEPAL, 2020; Coquidé et al., 2022; Hayakawa & Mukunoki, 2021; Oven & Hicintuka, 2020; Vo & Tran, 2021). Researchers looked at how lockdowns (Hoehn-Velasco et al., 2021; Jaiswal & Arun, 2020; Lastauskas, 2022; Li et al., 2023), travel restrictions (Liu, 2020), and the suspension of companies affected employment, income distribution, and economic stability. Ceylan et al. (2020) focused on evaluating the initial effects of the pandemic on consumption, services, finance, investments, and other enterprises. The implementation of lockdown measures and voluntary social distancing negatively affected the services sector, including travel, tourism, catering, and recreation. The outbreak has substantial economic consequences across all sectors, negatively affecting global trade, interest rates, financial market liquidity, and demand. The timing for global economic recovery from the pandemic and the length of recovery efforts remain uncertain (Roy, 2020). The economic downturn caused by the persistent COVID-19 pandemic has substantial implications for gender equality, both during the recession and in the subsequent recovery phase. Unlike conventional recessions that mostly impact male employment, the employment downturn resulting from social distancing measures notably impacts sectors with a substantial female workforce (Alon et al., 2020). This, along with other statistics, demonstrates that women's employment is diminishing at a pace above the average, even when accounting for the many industries in which both women and men are involved (Mckinsey et al., 2020). Furthermore, sociologists examined the social and cultural changes prompted by the outbreak (Iyamu et al., 2023; Ryan, 2022; Ratten, 2021). The researchers examined responses of individuals and groups to changes in social norms, including social distancing and digital interaction, with the psychological impacts of isolation and uncertainty (Andrighetto et al., 2024; Latkin et al., 2022; Neville et al., 2021; Young &

Goldstein, 2021). Also, political scientists examined the responses of various regimes: democratic, authoritarian, and hybrid to the crisis (Kaim & Kubbe, 2025; Chen et al., 2023; Schmotz & Tansey, 2023; Blair et al., 2022; Cassani, 2022; San et al., 2021; Alon et al., 2020; Kavanagh & Singh, 2020), providing comparative evaluations of leadership techniques, transparency, and public confidence (Rameshan, 2024; Spyridonidis et al., 2022; Samad et al., 2022; Bhalla, 2021; Watkins & Clevenger, 2021; Al Saidi et al., 2020; Memish et al., 2020).

5. Humanities

Humanities sciences were divided into 6 sub-domains, which are shown in Figure 13. Each of the six subfields of the humanities: literature, human history, religion, the arts, linguistics, and philosophy, offers a unique perspective on cultural events and human experiences that, when combined, aid in our understanding of them. Figure 14 shows the total number of published publications on COVID-19 research in six different humanities sub-domains. There is a big difference in the amount of academic work done in these areas. With 2,607 published papers, literature makes up around 63% of all humanities publications. Figure 15 shows the percentage distribution of these articles to make this point clearer. The sub-domain of human history has 1,054 articles, representing about 25% of the entire output in the humanities. This considerable but relatively little portion underscores the need to analyze history to position the pandemic within a wider chronological framework and to describe the short- and long-term impacts of COVID-19 via historical narratives. The areas of Religion, Arts, Linguistics, and Philosophy have much lower publication rates, resulting in diminished shares of academic output. There are 262 articles on religion (6%), 128 on the arts, 81 on linguistics, and 38 on philosophy. This little presence indicates a lack of substantial academic interest in these aspects of COVID-19, underscoring potential gaps and opportunities for future comprehensive research.

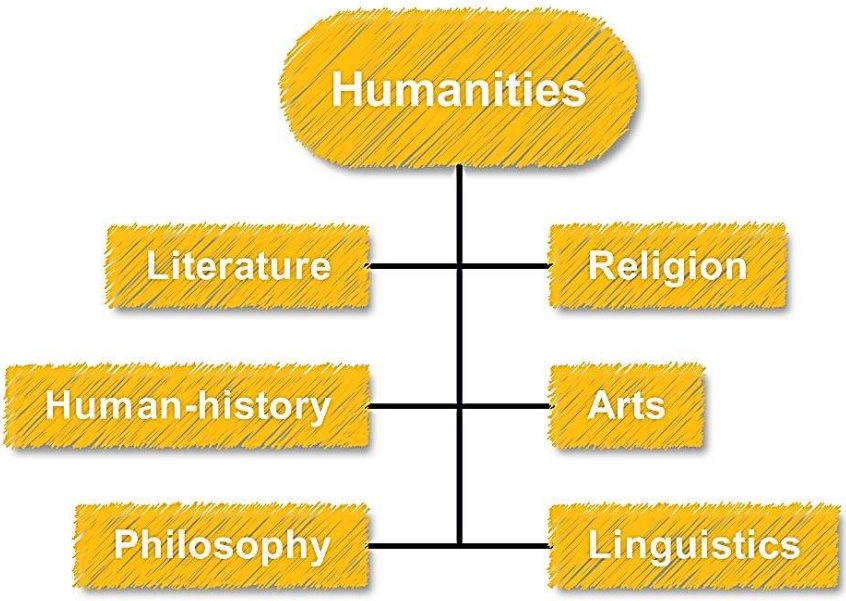


Figure 13. Different sub-disciplines under the theme of humanities.

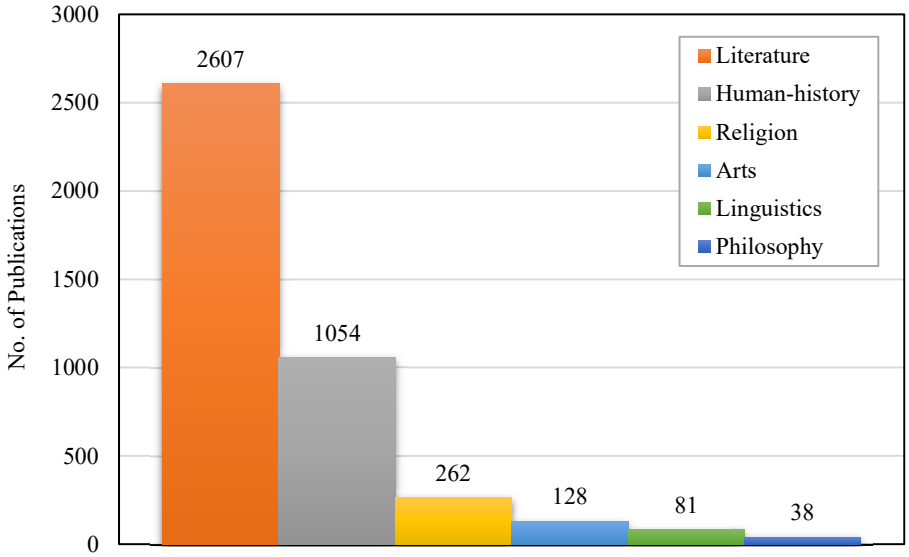


Figure 14. Frequency of published articles in the field of humanities corresponding to 6 different sub-domains.

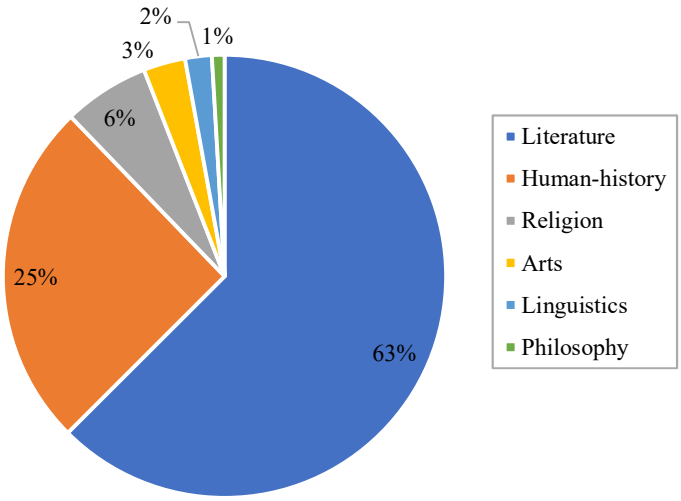


Figure 15. Percentage of frequency for humanities sub-domains published articles.

The pandemic's wider cultural, ethical, and historical relevance was discussed by humanities experts. Concerns concerning morality (such as fairness in healthcare choices), how societies portray major crises, and the spread of fear and uncertainty served as their inspiration. By documenting real-life events, many also sought to preserve how COVID-19 affected communal memory and identity. During the COVID-19 pandemic, researchers in literature, religious studies, and philosophy made substantial contributions to understanding the personal, cultural, and existential dimensions of the issue. In literature, researchers and authors focused on the representation of the epidemic in tales, poetry, and storytelling (Barrett et al., 2020; Dera, 2021; Sárdi, 2021; Sayır & Aydın, 2024; Sharma, 2021; Silvest & Ganapathy, 2020). Researchers in religious studies examined the reactions of faith communities to the pandemic and the impact of religious beliefs on individuals' views of suffering, mortality, and recovery. Subsequent to the closure of places of worship, scholars examined the shift to digital and remote religious practices, as well as the modification of rituals and traditions in response to new constraints (Ayub et al., 2023; DeFranza et al., 2021; Hart & Koenig, 2020; Kowalczyk

et al., 2020; Lahav et al., 2022; Sen et al., 2022; Sisti et al., 2023; Tan et al., 2022; Wildman et al., 2020). Furthermore, philosophical debate elucidated the fundamental topics of life's worth, human fragility, and social justice. Existentialist and moral philosophers examined issues of pain, solitude, and death, providing frameworks for comprehending the human experience among global uncertainty (Arocha, 2020; Michopoulou, 2022; Randall & Rafferty, 2020; Rošker, 2021; Sfetcu, 2020).

6. Formal Sciences

The sub-domains of formal sciences are shown in Figure 16. Five primary fields are categorized under the main category: Computer Sciences, Mathematics, System Science, Logic, and Statistics. Each of these disciplines possesses distinct methodologies and epistemologies that contribute to the broader domain of formal science. Figure 17 and Figure 18 illustrate the quantity of publications in essential domains of the formal sciences, facilitating straightforward comparisons. It displays both the quantity of publications and the percentage of publications within each domain. Computer Sciences accounts for the highest number of publications, totaling 7,258, which constitutes approximately 63% of the overall count. This predominance indicates that contemporary research primarily focuses on emerging technologies, artificial intelligence, and digital infrastructures. System Science follows with 3,412 publications, constituting 29% of the overall corpus. This illustrates the significance of modeling and analyzing intricate frameworks and interdisciplinary systems. Statistics and mathematics indicate diminished figures, with 541 (5%) and 361 (3%) publications, respectively. Logic, with merely 24 publications and a negligible 0% share, is the least significant domain, indicating a paucity of recent scholarly work on the fundamental structures of reasoning.

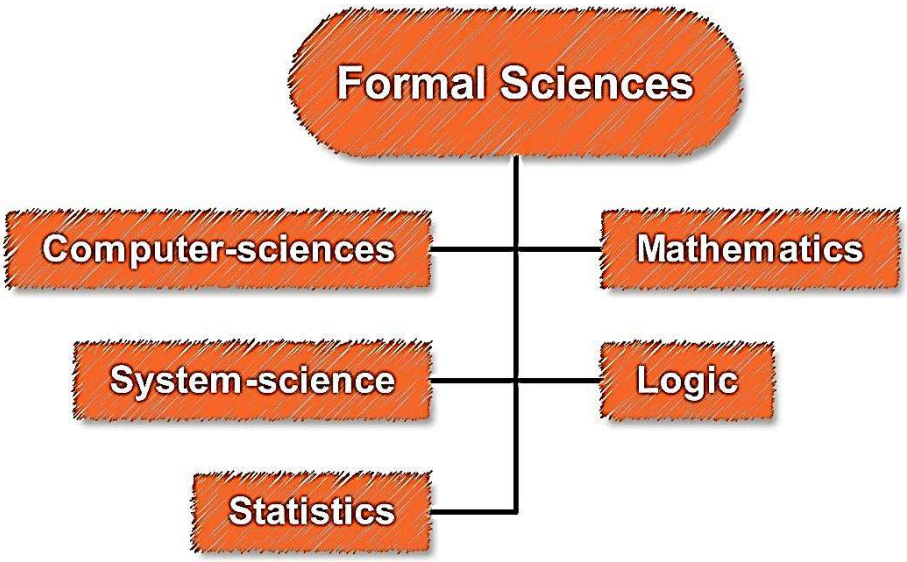


Figure 16. Different sub-disciplines under the theme of formal sciences.

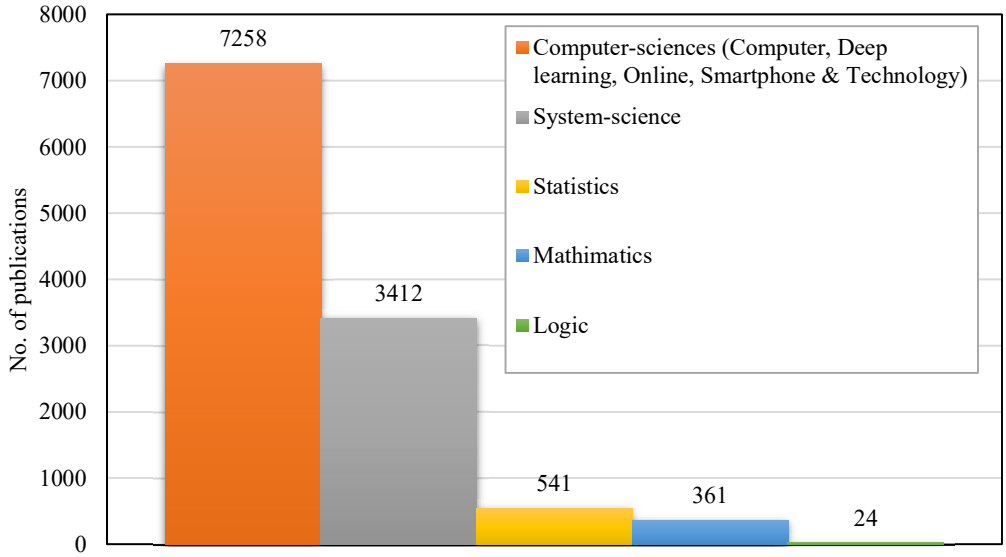


Figure 17. Frequency of published articles in the field of formal sciences corresponding to 5 different sub-domains.

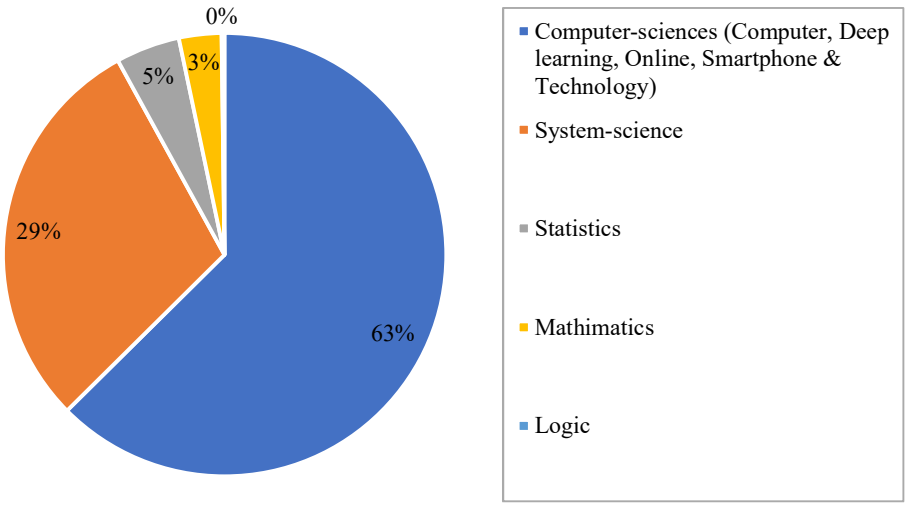


Figure 18. Percentage of frequency for formal sciences sub-domains published articles.

In formal sciences, scholars published to develop and refine mathematical, statistical, and computational models that could explain and predict the spread of COVID-19. The availability of real-time data created a strong incentive to test and improve theoretical methods under real-world conditions. A key motivation was also to support decision-making through forecasting tools and data-driven simulations. The pandemic accelerated the development and use of several technologies in computer science. Experts focused on creating digital tools for contact tracing (Jahmunah et al., 2021; Jahmunah et al., 2021; Amann et al., 2021; Barrat et al., 2021; Huang et al., 2020; Jian et al., 2020; Akarturk, 2020; Mbunge, 2020), health monitoring , and telemedicine (Ftouni et al., 2022; Bashshur et al., 2020; Colbert et al., 2020; Kichloo et al., 2020; Portnoy et al., 2020). Artificial Intelligence (AI) and machine learning algorithms were used to analyze symptoms and predict forthcoming epidemics (Husnain et al., 2024; Mhlanga, 2022; Syeda et al., 2021; Van der Schaar et al., 2021; Alimadadi et al., 2020; Kannan et al., 2020; Lalmuanawma et al., 2020). Mathematics established the theoretical foundation for many models used to understand and predict the spread of COVID-19. Mathematical

modeling was essential for predicting the virus's behavior under different scenarios, including the impacts of lockdowns, vaccination initiatives, and social distancing protocols (Aldila et al., 2022; Rahman et al., 2021; Shankar et al., 2021; Vytla et al., 2021; Adiga et al., 2020; Ahmed et al., 2020; Aldila et al., 2020; Jewell et al., 2020; Khoshnaw, Salih, et al., 2020; Khoshnaw, Shahzad, et al., 2020). Statisticians were vital in assessing and interpreting the extensive data produced during the pandemic. They conducted an evaluation of infection rates, computed death rates, and analyzed the efficacy of vaccinations and therapies via the study of clinical trial data (Chen, 2022; Nunes et al., 2020; Roser et al., 2020).

7. Professions

The distribution pattern in Figure 19 demonstrates how the COVID-19 crisis simultaneously required targeted medical treatments and promoted considerable interdisciplinary research across several professional domains. The data presented in Figure 20 and Figure 21 provides a quantitative perspective on the distribution of COVID-19-related academic output across several professional domains. This elucidates the research priorities during the outbreak. The data suggest that Medicine is the predominant field, with the biggest share of papers. This aligns with the urgent demand for biomedical research during a global health crisis, where studies in virology and quantitative analysis suggest that medicine represents 76% of total publications within this professional domain subgroup, highlighting its crucial role in pandemic response.

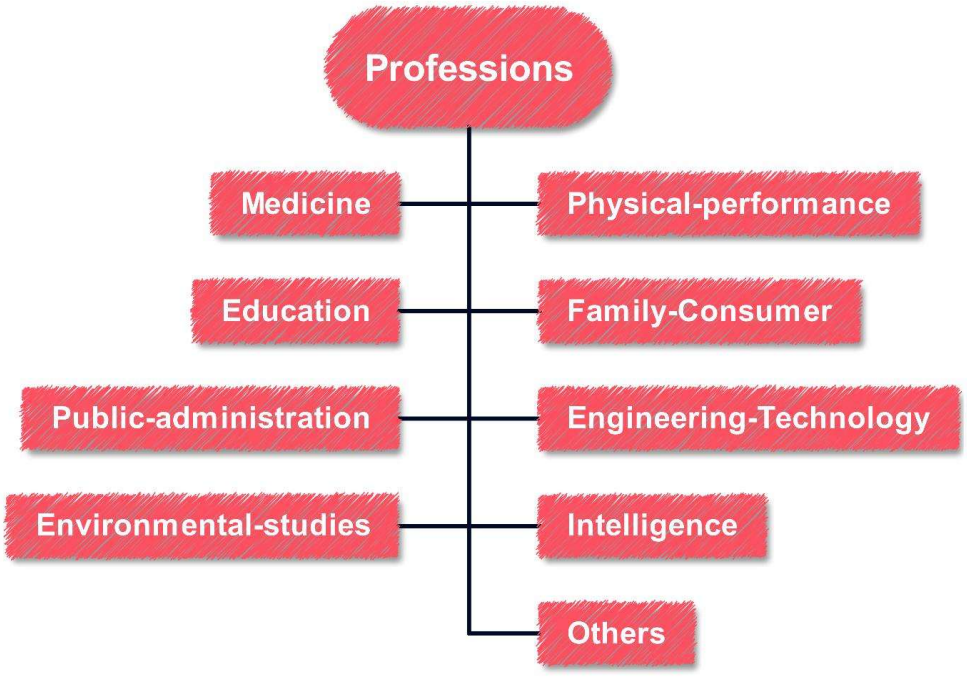


Figure 19. Different sub-disciplines under the theme of professions.

Researchers with a professional background published primarily to address pressing issues that arise in real-world systems including public services, healthcare, and education. Evidence on treatment strategies, hospital administration, protective gear, and remote service delivery was urgently needed as a result of the disaster. The institutional necessity to preserve safety and functionality throughout the epidemic was a major motivator for their efforts. Education and journalism emerge as secondary focuses, each possibly accounting for 6% of articles. Environmental studies and physical performance constitute a minor but significant portion, accounting for around 2% of the total. Researchers,

physicians, and public health specialists were responsible for the response to the COVID-19 pandemic within the medical domain. Medical professionals were the first discoverers of the virus, elucidated its transmission mechanisms, and formulated therapeutic protocols for its treatment. Significant advancements occurred in the industry within a brief period, including vaccine discoveries, drug repurposing, and novel therapies such as monoclonal antibodies and antiviral medications (onzález-Aguña et al., 2021; Lyu et al., 2021; Mulcahey et al., 2021; Abdel-Basst et al., 2020; Carda et al., 2020; Dzieciatkowski et al., 2020; G Pereira et al., 2020; Smereka et al., 2020). Conversely, environmental studies investigated the impact of human-environment interactions on the pandemic and the subsequent effects on ecological systems (Saadat et al., 2020; Verma & Prakash, 2020). During COVID-19, the medical field attracted the most attention because the pandemic was a worldwide health emergency that directly threatened human life. Immediate concerns included examining the virus's spread, clinical symptoms, treatment options, immunizations, and long-term health consequences, all of which fall under the purview of medical and biological sciences. To lower mortality and keep the healthcare system from collapsing, governments, funding agencies, and international organizations immediately transferred resources to medical research. Furthermore, medical data such as clinical trials, hospital records, and epidemiological surveillance were in great demand and easily accessible, allowing for a quicker release. As a result, medicine dominated early and overall COVID-19 research production, while other disciplines, such as social sciences, economics, and education, arose later to address the pandemic's broader societal and economic impacts. As a result, medicine dominated early and overall COVID-19 research output, while other fields, such as social sciences, economics, and education, evolved later to address the pandemic's broader societal and economic implications.

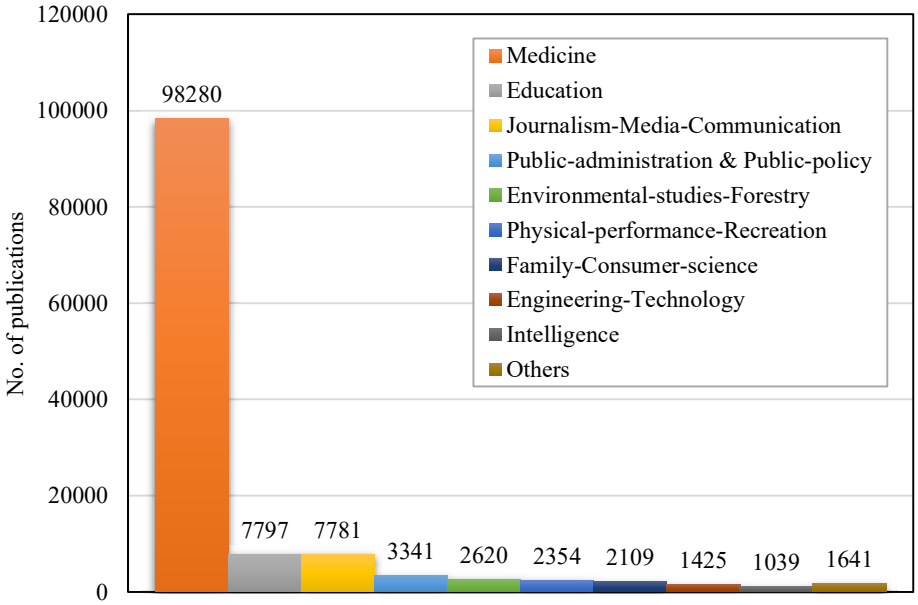


Figure 20. Frequency of published articles in the field of professions corresponding to 5 different sub-domains.

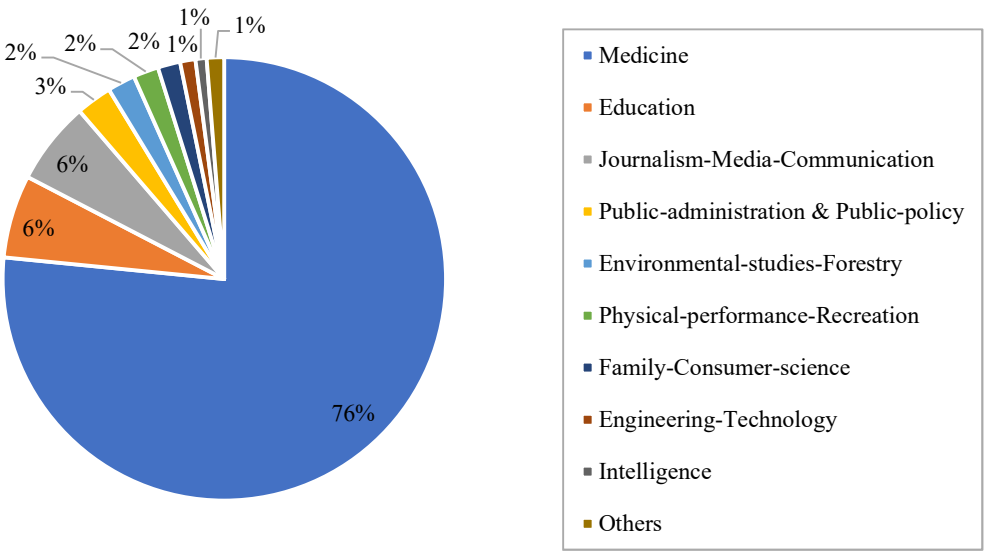


Figure 21. Percentage of frequency for professions sub-domains published articles.

8. Natural Sciences

Analysis of COVID-19-related publications in the natural sciences category reveals significant disparities in research volume across its sub-domains, as shown in Figure 22, both in total counts and percentage contributions. Chemistry is the most prolific discipline, accounting for 7,313 publications, or nearly 80% of the overall output, as illustrated in Figure 23 and Figure 24. This obvious emphasis illustrates the significance of the area to virology, immunology, and public health, establishing it as the primary facilitator for pandemic-related research. Biology published 1,467 articles, constituting approximately 16% of the total. This indicates that they made a modest yet significant contribution to addressing the issue. Space sciences, comprising 132 publications, account for approximately 1% of the total output. Natural scientists published in order to quickly comprehend the biological makeup of the virus and how it affects human health.

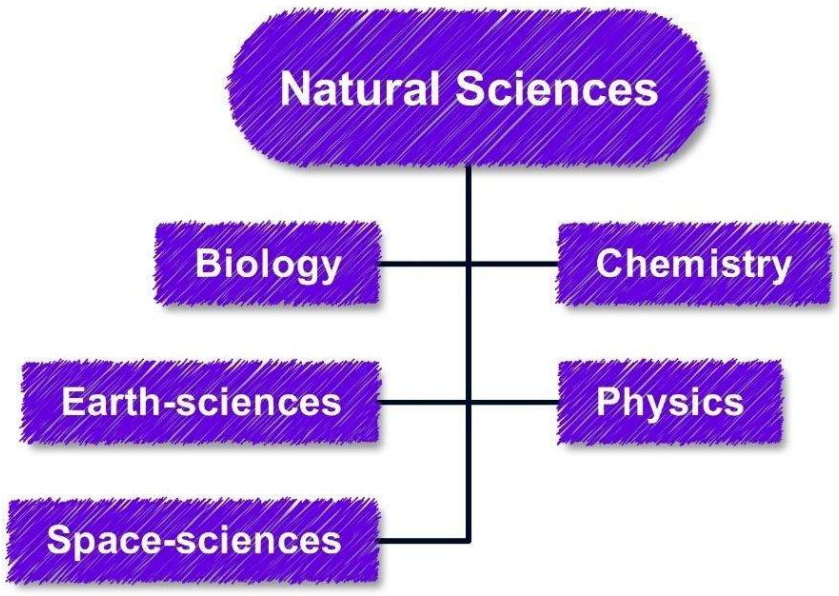


Figure 22. Different sub-disciplines under the theme of professions.

Research into viral structure, transmission methods, immune response, and variant development was accelerated by the pandemic's urgency. The worldwide effort to create vaccinations, diagnostics, and therapies to manage the illness was another important motivator. Conversely, earth sciences account for merely 133 publications, constituting only 1% of the overall total. This indicates a lack of interest in COVID-19 research, possibly due to the epidemic's concentration on Earth. The significant difference in publication numbers and their corresponding percentages highlights the critical importance of biomedical sciences during the pandemic. Interestingly, Biology is the paramount subject to study at present. This is due to its instruction on the virus's mechanisms, transmission, and prevention methods. Biology and chemistry were crucial disciplines in understanding, diagnosing, and mitigating the COVID-19 pandemic. These sciences provide critical understanding of the virus's characteristics, its interaction with the human body, and the development of vaccinations, therapies, and diagnostic instruments (Song et al., 2023; Kumar et al., 2021; Wu et al., 2021; Kumar et al., 2021; Soga et al., 2021; Sood et al., 2020; Dömling & Gao, 2020).

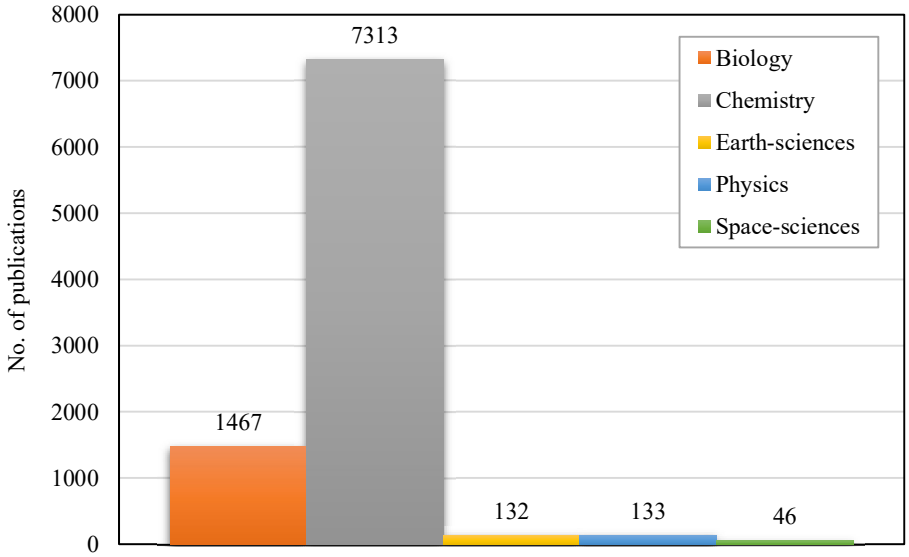


Figure 23. Frequency of published articles in the field of professions corresponding to 5 different sub-domains.

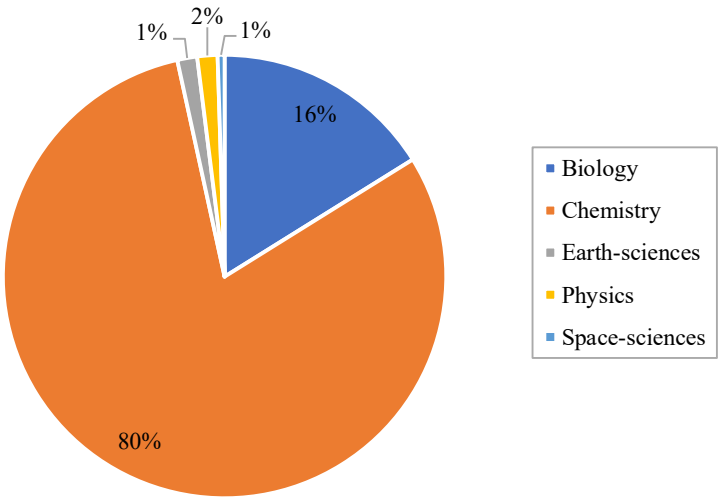


Figure 24. Percentage of frequency for professions sub-domains published articles.

9. Impact Analysis

Some disciplines contributed less to COVID-19 research for a mix of practical, methodological, and relevance-related reasons. First and foremost, clear relation to the issue is crucial for influencing the focus of different domains on the research publications on COVID-19 outbreak and post COVID issues. Because they deal directly with infectious illness, transmission, and treatment, disciplines including epidemiology, virology, public health, medicine, and biostatistics were inherently crucial. Conversely, there were fewer direct entrance points into COVID-19-specific topics in more specialized or abstract domains such as particular subfields of the humanities, classical engineering, or pure mathematics. Second, the accessibility and availability of data were important. Large datasets, including patient information, viral genomes, and population-level statistics, were necessary for COVID-19 study. In several cases, disciplines that depend on controlled trials or qualitative materials found it difficult to modify their approaches in this type of sensitive data environment that is changing quickly. Third, research infrastructure and funding priorities shifted heavily toward COVID-19–related work. Fields closely aligned with biomedical and health sciences received more urgent funding opportunities, while other disciplines were not prioritized in the same way. Finally, publication and incentive structures influenced participation. Journals and conferences rapidly prioritized COVID-19 topics in health-related areas, encouraging those communities more strongly than others.

10. Conclusions

This study assesses the research on COVID-19 spread throughout critical disciplines by global experts. A total of 384,319 published research papers span five primary disciplines. Social sciences, humanities, formal sciences, professions, and natural sciences were analysed using ENDNOTE software, focusing on various terminologies associated with COVID-19 and their corresponding publication years. The Professions category has the most articles, amounting to 121,990, 71% of included publications. The Social Sciences comprise 15%, followed by Formal Sciences at 7%, and Natural Sciences at 5%. The Humanities, however, constituting just 2%, are crucial for contextualizing the pandemic. In the social sciences, geography constitutes the discipline with the highest volume of published works, accounting for nearly 42% of all publications. Psychology constitutes about 20% of the articles, making it the second most frequent subject. About 13% are in gender and sexuality studies. Literature constitutes around 63% of all humanities publications, totaling 2,607 published pieces. The sub-domain of human history comprises 1,054 articles, or over 25% of the entire output in the humanities. The domains of Religion, Arts, Linguistics, and Philosophy have much lower publication rates, resulting in diminished levels of academic output. In the formal sciences, Computer Science accounts for the highest number of publications, totaling 7,258, which is around 63% of the whole total. Statistics and mathematics indicate decreased figures, with 541 (5%) and 361 (3%) publications, respectively. Logic, including 24 articles and an inconsequential 0% share, is the least important domain. The research reveals that medicine comprises 76% of total publications within the professions category, highlighting its crucial role in pandemic response. Education emerges as a secondary focal point, possibly constituting 6% of the papers. Chemistry is the most productive field in natural sciences, including 7,313 papers, or around 80% of the total production of natural sciences.

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AI Use and Originality Declaration: Authors used AI and generative AI tools only for language assistance. They reviewed and edited all such content and take full responsibility for the accuracy, originality, plagiarism, integrity, and final content of the current work, regardless of whether any issue is detected by the journal.

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