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REVIEW ARTICLE

COVID-19 AND PALLIATIVE CARE: A BIBLIOMETRIC ANALYSIS

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ABSTRACT

COVID-19 continues to disrupt the life of people worldwide. One of the most vulnerable sections affected by the pandemic are very old and seriously ill people. The present study provides a detailed analysis of the trends in the global scientific production on COVID-19 and palliative care.

An analysis of the documents searched from the Scopus database was interpreted by Biblioshiny, an R-based software for bibliometric analysis. A descriptive examination of sources, authors, and records was done, and network analysis of conceptual, intellectual, and social structures.

The research revealed ongoing research on this topic in the recent two years. The United States, the UK, India, and Spain have all done extensive research on the subject. The study's findings may aid medical practitioners and policymakers in focusing on critical sections in palliative care in the context of COVID-19. The study also identifies crucial areas in the chosen issue and guides future researchers on developing themes, contexts, and possible collaborations.

KEYWORDS

COVID-19, palliative care, bibliometric analysis, Scopus

INTRODUCTION

Palliative care is a multidisciplinary medical healthcare strategy focused on improving patient outcomes and reducing pain in patients suffering from severe, life-threatening illnesses. [1] As medical systems become more stressed due to COVID-19 [2], delivering secure and reliable hospice care, including end-of-life care, becomes more critical and challenging. [3] Due to a lack of funds, some practitioners may be forced to choose who receives essential treatment and who does not. At the very least, strong hospice care must be offered for people who will not survive. COVID-19, on the other hand, renders this much more challenging. As people suddenly weaken, health personnel are overburdened, isolation is required, and relatives are instructed to just not contact or occupy the same room as dear ones. This predicamentis exacerbated in low-income and middle-income nations, where the healthcare system and palliative care services are in poor supply. It's also more difficult to maintain society hospice care safely. Many patients who are in need of it seem to be at risk of COVID-19, safety equipment is in insufficient supply, and rising death rates may overwhelm the current provision of services [4]

The World Health Organization (WHO) has made guidelines about keeping important health care services running throughout an outbreak, emphasizing vaccination, maternity care, emergency care, and chronic illnesses,

among many other things, but hospice care was left out. The author considers this a mistake. Palliative care should be prominently mentioned in COVID-19 response strategies at home and abroad. [4] During the pandemic, specialist palliative care services (SPCS) have a critical role. SPCS are perfectly positioned to take a strategic approach in crisis management planning, with core expertise in complicated symptom control, strategic planning in ambiguous situations, advocating and training, and assuring a sympathetic response. SPCS by that is expected to be exceeded, hence promoting and supporting significantly high hospice care throughout all care settings should be considered. SPCS has also created a Pain Management Outbreak Pack [1] to convey concise and precise knowledge, instructions, and tools to assist nonspecialist physicians who really need to offer hospice care. It is also a valuable tool for SPCS partners to adopt as they work together to address this worldwide crisis. [1] Policymakers must ensure that stimulants (such as opioids) and safety equipment are available, expand the use of telemedicine and video, talk about progress treatment plans, enhance planning and practice all across the health care workforce, and start embracing the responsibility of lay caretakers and the larger community. These pragmatic steps can improve the well-being of people with severe illnesses. Through physical ailment and mortality, anxiety and stress, and economic and institutional upheaval, a contagion is both a source of misery and a tremendous amplifier of it. Among the most important aspects of the solution ought to ease the suffering in all its manifestations.

BIBLIOMETRIC ANALYSIS

A statistical review of published scientific papers, books, or book chapters is known as bibliometric analysis, and it is a useful tool for measuring the influence of publishing in the scientific community. [5] Bibliometric analyses have been carried out in various domains. [6–10] However, no bibliometric research on COVID-19 and palliative care has been done to date. As a result, reviewing existing studies to enhance the COVID-19 inquiry and palliative care becomes critical. To review the descriptive and network analysis of the fragmented literature on COVID-19 and palliative care, this study used various bibliometric analytic techniques. In effect, this paper sketches a bibliometric analysis of empirical work on the impact of COVID-19 and palliative care. The study aimed to find the most productive countries, publications, researchers, institutes, trends, and collaborations in COVID-19 related to palliative research. The study output used descriptive analysis, social, intellectual, and conceptual structures to estimate the most commonly used terms, providing the scientific research communities with a full assessment of the implications of the COVID-19 pandemic on worldwide palliative care. The following are the research questions that were used in the study.

a. What are the worldwide trends in logical production on COVID-19 and palliative care?
b. What types of information might this pattern provide?
c. What is the future path of this field's research?

To uncover the research questions, the following research objectives were laid down.

a. To provide bibliometric visualization of 536 documents retrieved from the Scopus database.
b. To use Biblioshiny to visualize the pattern of quantitative data selected from various articles, sources, and authors.
c. To understand the conceptual, intellectual, and social structure on the theme 'COVID-19 and palliative care.'

MATERIALS AND METHODS

Aria and Cuccurullo [11] designed a workflow for bibliometric analysis, which was applied in this study. The science mapping tools developed by Börner [12] and Cobo [13] were also employed in the workflow. The five steps mentioned by Zupic and Cater [14] were also followed in this study to conduct bibliometric analysis. According to these authors, design, data collection, analysis, visualization, and interpretation are the five stages of bibliometric analysis. The first stage selected the three research objectives for the current study and identified the main keywords for data extraction from the Scopus database as 'COVID-19' and 'Palliative care.' Scopus is one of the most widely used bibliographic databases for bibliometric analysis due to several reasons such as comprehensive coverage, quality of data, citation metrics, user-friendly interface, and integration with other tools. [15-16] These reasons urged the researcher to use the Scopus database for bibliometric analysis. The keyword technique is beneficial for bibliometric analysis because it fits expert selection and reveals the domain's research competence in greater depth. There are two approaches to choosing keywords. High-level keywords are one option. The second set of keywords is aligned with the analysis theme and will

aid in exploring a large number of search spheres and their relationships at the micro-level. [17] The second method was applied in the research. A search using the keyword 'palliative care' yielded 180793 results when the search filter was restricted to 'all fields'. The researcher limited the

search to a microdomain level in order to visualise the pattern in relation to the current study, using the terms 'COVID-19' AND 'palliative care' and the search limited to article title, abstract and keywords. The study was also restricted to the type 'article'. The Scopus database yielded 536 documents as a result of this query. The study included a wide range of topics (specialist and generalist journals in Scopus). This aided in comprehending the scientific breadth of the selected field of study. [18] These documents were used to analyse data. The Scopus database was chosen for the study because of the large number of diverse journals and high-quality publications it contains. [19] The data was analysed in the second step using Biblioshiny [11], an open-source R-based tool. The third step was executed after the data gathering stage extracted the.bib file. In the third and fourth steps, i.e., the data analysis and visualisation stage, descriptive and network analysis (data visualisation) were performed. The investigation of numerous sources, authors, and documents was part of descriptive statistics. The analysis of conceptual structure (co-concurrence analysis, thematic maps, and factorial analysis), social structure (collaboration analysis), and intellectual structure (co-citation analysis) was carried out using network analysis. The interpretation of the data analysis was completed in step five under discussion.

RESULTS

DESCRIPTIVE ANALYSIS

As of December 2021, 536 research articles were retrieved from 233 journals from the Scopus database using the keywords and search strategy mentioned above. A total of 12,338 references were reported out of these sources. As COVID-19 was the period of consideration for the study, the study's period fell between 2020 to 2022. The period 2022 included the documents ahead of the production schedule. Average years from publication (0.412 years), Average citations per documents (5.022 citations), Average citations per year per document (2.855 citations), Keyword plus (2,392 items), Author's keywords (1,066 items) were also reported. There were 3,156 authors, 3,603 author appearances, 50 single-authored documents, and 3,106 multiauthor documents. Documents per author (0.17 documents), authors per document (5.89 authors), co-authors per document (6.72 co-authors), and collaboration index of 6.43 were also reported. Annual scientific production reported a 70.9% increase from 2020 to 2021.

THREE FIELD PLOT

The relationship between three fields is shown using three field plots [20] or Sankey plots, with the size of the component corresponding to the node's value. A three-field plot was executed with the top five items across keyword plus (middle field), countries (left field), and sources (right field). It was observed that all top countries and sources were using keyword plus such as 'human,' 'palliative therapy,' and 'pandemic' quite frequently in their publications (Figure:1).

SOURCES

Table 1 shows the top 10 journals publishing work related to COVID-19 and palliative care. Journal of Pain and Symptom Management was at the top spot with 68 articles, followed by the American Journal of Hospice and Palliative Medicine and Palliative Medicine. Journal of Social Wwork in End-of-life and Palliative Care was at the ninth spot with ten articles. About top local cited sources from reference list (Figure:2), Journal of Pain and Symptom Management topped the place listing followed by JAMA and Lancet. Source clustering through Bradford's law [21] indicated six journals in Zone 1 (core group), namely Journal of Pain and Symptom Management, American Journal of Hospice and Palliative Medicine, Palliative Medicine, Journal of Palliative Medicine, IndianJjournal of Palliative Care and BMJ Supportive and Palliative Care. The remaining journals were in Zone 2 and Zone 3. Journal of Social Work in End-of-life and Palliative Care was in Zone 2 with ninth ranking. Further, Table 2 indicated the source local impact (*h* index, *m* index, *g* index, and total global citation). Journal of Pain and Symptom Management topped the list, followed by Palliative Medicine and the American Journal of Hospice and Palliative Medicine. The journals had good source growth as well.

FIGURE1 THREE FIELD PLOT USING KEYWORD PLUS, COUNTRIES AND SOURCES

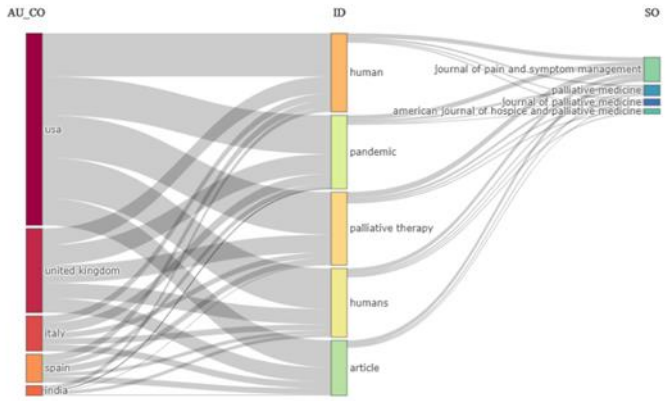


TABLE1 MOST RELEVANT JOURNALS

Sources	Articles
Journal of pain and symptom management	68
American journal of hospice and palliative medicine	30
Palliative medicine	27
Journal of palliative medicine	22
Indian journal of palliative care	19
BMJ supportive and palliative care	13
BMJ open	11
Medicina paliativa	11
Journal of social work in end-of-life and palliative care	10
Journal of hospice and palliative nursing	9

FIGURE 2 TOP LOCAL CITED JOURNALS

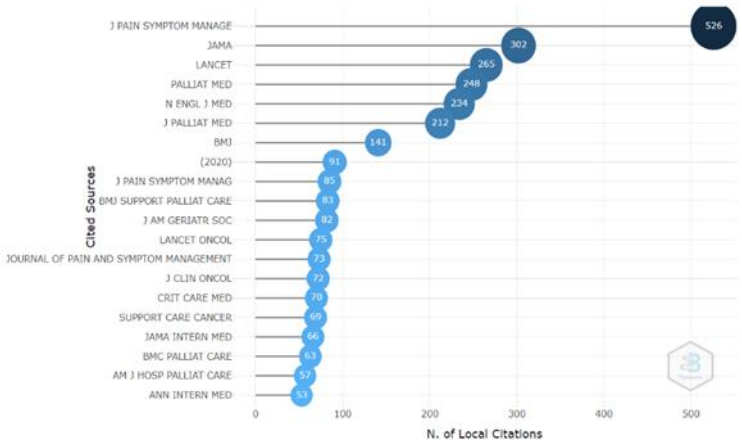


TABLE 2 SOURCE LOCAL IMPACT

Journal	*h* index	*g* index	*m* index	TC
Journal of pain and symptom management	18	34	9	1234
Palliative medicine	8	12	4	180
American journal of hospice and palliative medicine	6	8	3	72

Healthcare (Switzerland)	2	2	2	7
Indian journal of palliative care	4	5	2	43
JCO oncology practice	2	2	2	14
Journal of hospice and palliative nursing	2	2	2	6
Journal of palliative medicine	4	8	2	80
BMJ supportive and palliative care	3	5	1.5	29
JCO global oncology	3	3	1.5	36

*TC: Total global citation

AUTHORS, AFFILIATIONS, AND COUNTRIES

Bhatnagar was the most prevelevant author with ten articles, followed by Sleeman (9 articles) and Radbruch (7 articles). Benduduh topped the local citations (41 citations), followed by Hirsch (37 citations) & Lefaucheur (35 citations), and Rustichelli (30 citations). Author productivity supported Lotka's law. [22] Theproportion of authors who had written one document on COVID-19 and palliative care was 91.7%. It dropped to 5.4 % to 1.6% when the authors had written two and three papers on this theme, respectively. The top ten authors (local impact) is presented in Table 3 Higginson I J toped the *h,g,m* indices and total global citations. The University of California was the most prevelevant affiliation contributing 22 articles, followed by the University of Washington (21 articles) and Cahn school of medicine at mount sinai (19 articles). USA topped the single country publications followed by UK and India (Figure:3). The USA topped the list regarding country scientific production with 669 articles followed by the UK (276 articles) and Italy (132 articles). The USA was also the most cited (1,186 citations) country, followed by the UK (401 citations), Italy (80 citations), and India (73 citations)

MOST RELEVANT DOCUMENTS AND WORDS

Work by Wallace [23] was the most cited document with over 193 citations. Work by Calton [24] was the second most relevant document. This document had 173 citations. Work on COVID-19 pneumonia by George [25] was the third top article with over 98 citations. The top 20 globally cited documents are shown in Figure:4

FREQUENTLY USED WORDS.

Keyword plus analysis indicated humans, pandemic, beta coronavirus, etc., at the top of the list. This was backed up by a word cloud study (Figure 5). The size of the words in the word cloud is related to the number of times they appear in document. 'Human' was most frequently used word in word cloud analysis. This word was used 416 times, followed by humans (361 times) and pandemic (349 times). Word growth of top 5 words from 2020 to 2021 is shown in Table 4

TABLE 3 AUTHOR LOCAL IMPACT

Author	*h* index	*g* index	*m* index	TC	NP
Higginson IJ	5	8	2.5	196	8
Sleeman KE	5	7	2.5	195	7
Gibson A	1	1	0.5	193	1
Wallace CL	1	1	0.5	193	1
White P	1	1	0.5	193	1
Wladkowski SP	1	1	0.5	193	1
Abedini N	1	1	0.5	173	1
Calton B	1	1	0.5	173	1
Fratkin M	1	1	0.5	173	1
Maddocks M	4	5	2	128	5

*TC: Total global citation; NP: Number of papers

FIGURE 3 CORRESPONDING AUTHOR COUNTRY

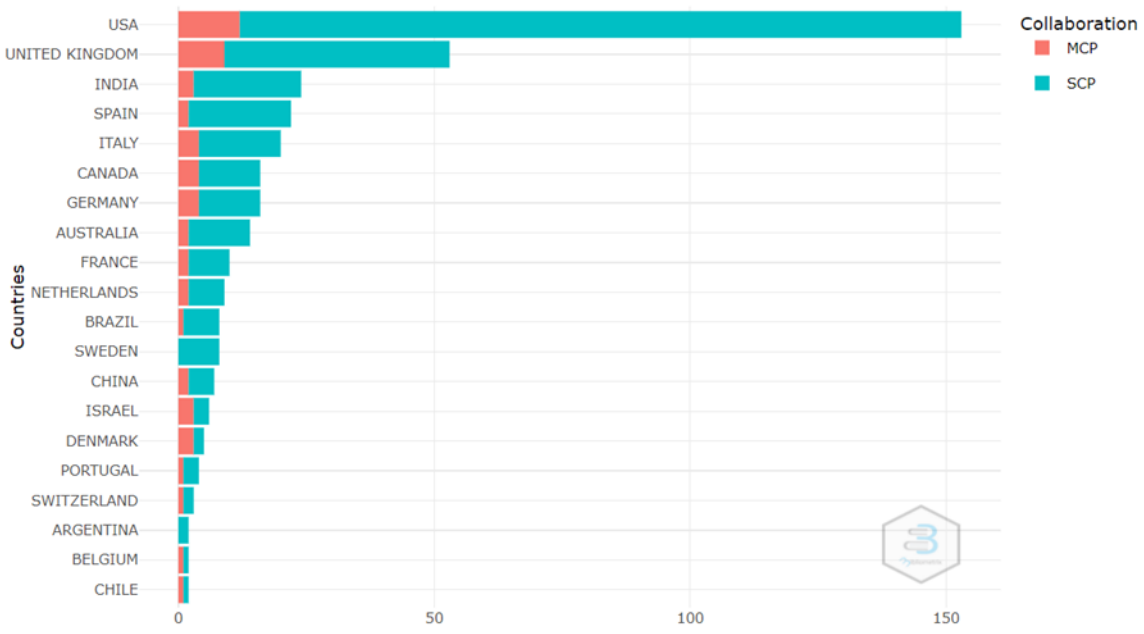


FIGURE 4 TOP 20 GLOBALLY CITED DOCUMENTS

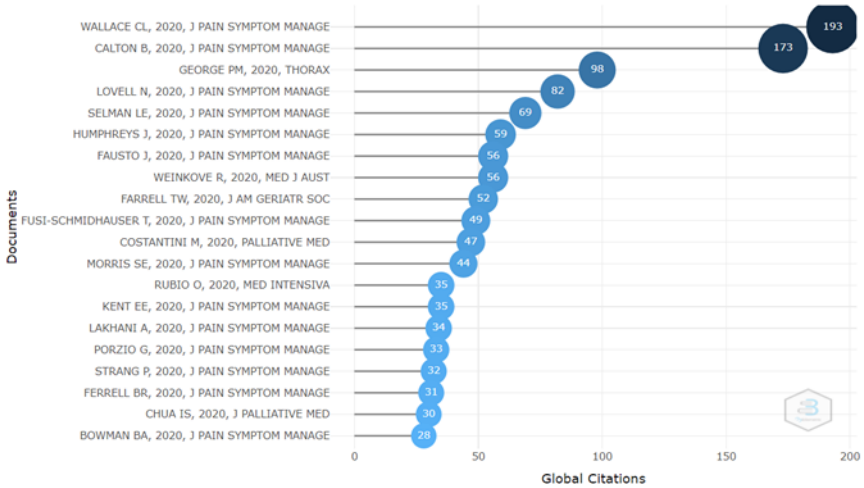


FIGURE 5 WORD CLOUD

TABLE 4 WORD GROWTH

Year	Human	Palliative therapy	Humans	Pandemic	Article	Palliative care
2020	185	191	154	196	130	118
2021	416	394	361	349	257	250

CLUSTERING

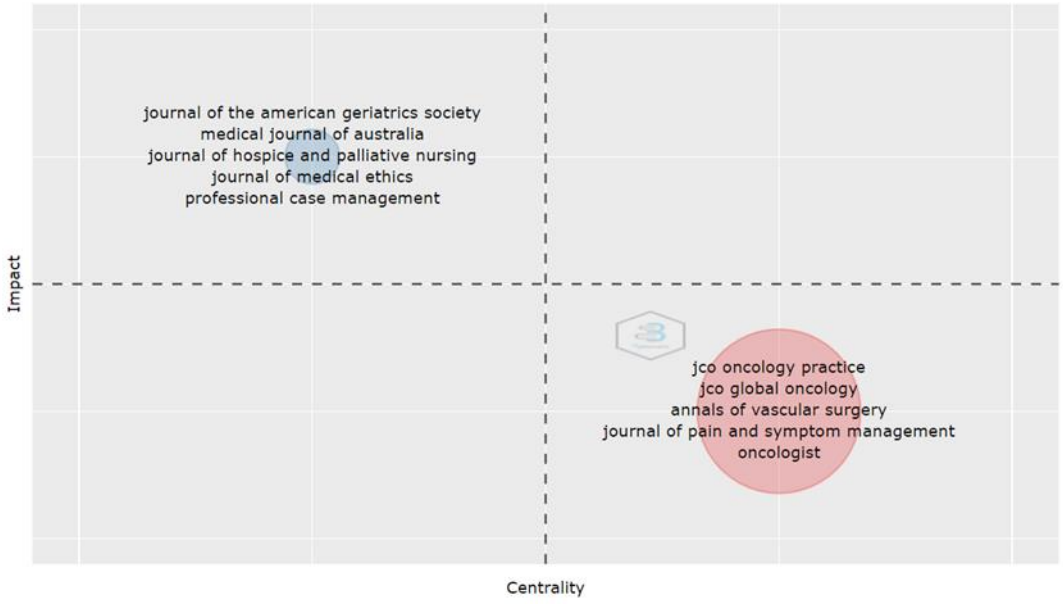
Clustering is the technique of grouping data items into several groups so that data kinds and sources in the same group are significantly more comparable than data points in different classes. [26] Put another way, the goal is to divide groups into clusters based on shared characteristics. The development of two clusters was indicated by journal coupling as evaluated by keywords plus, impact as measured by global citation score on 250 units, and minimum cluster frequency as 5. The cluster coupling were measured using centrality and impact. [27] The red cluster containing the journals had low centrality but high impact. The blue collection included journals with a low impact but high centrality.

CONCEPTUAL STRUCTURE

The conceptual structure depicts the connection between numerous themes, areas, and trends (11). The creation of three clusters was observed by a co concurrence analysis (using keyword plus), revealing the frequency of connected variables (Figure 7). The three colours denoted three distinct groupings. The distance (joining lines) between the nodes in the cluster indicated that they were related. Words represented the vertex, and the size of the nodes was proportional to the number of times it appeared. A co concurrence network using Louvain clustering algorithm, association as normalization, and number of nodes as 50 indicated the formation of three clusters. The first cluster (red) was centred around palliative care associated with COVID-19. The second cluster (blue) was clustered around coronavirus infection and associated diseases. The third cluster (red) was inclined towards hospitalizations and clinical studies related to significant age groups and genders.

A factorial analysis (Figure 8) using multiple correspondence analysis using keyword plus as field with the number of terms restricted to 50 indicated the formation of two clusters (Figure 8). The first cluster was related to pandemic and palliative care. The second cluster was on the clinical and controlled study with regard to gender and diverse age groups. The factorial analysis does not measure perfect cluster association. It gives an estimate of the number of clusters to help with future studies. [28]

FIGURE 6 CLUSTER COUPLING OF JOURNALS



*Journals per cluster were restricted **TO 5**.

FIGURE 7 CO CONCURRENCE NETWORK

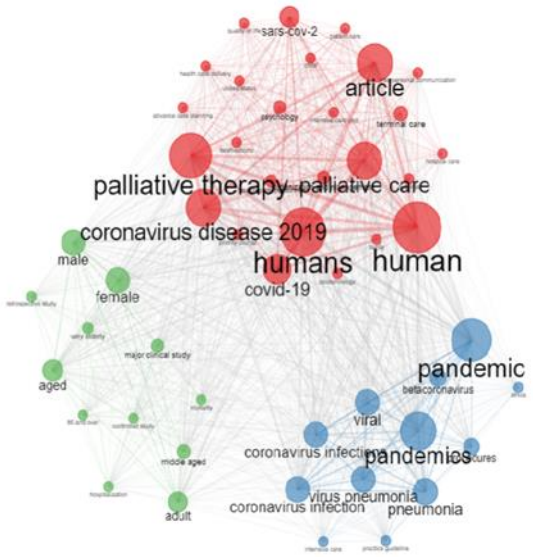
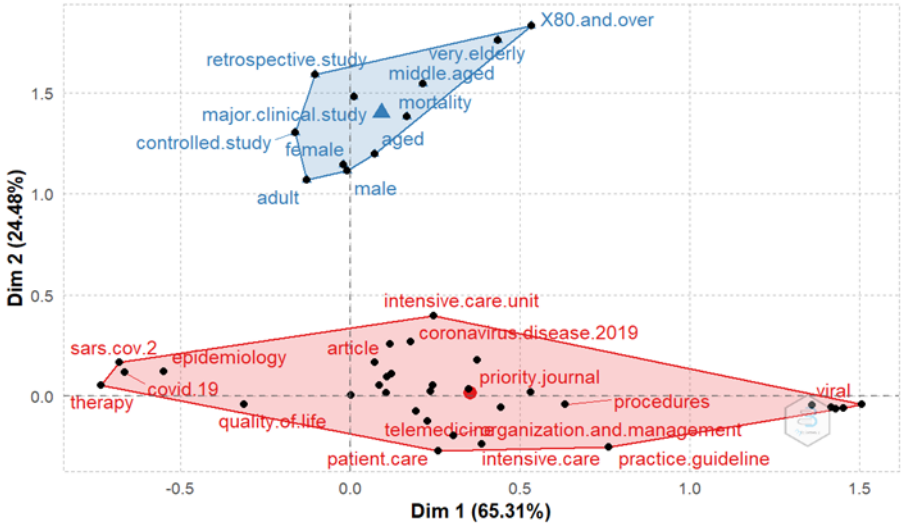


FIGURE 8 FACTORIAL ANALYSIS



THEMATIC MAP

Special distributions are indicated on thematic maps. [29] The map is built on co-word network analysis and grouping utilizing keywords, as inspired by. Based on centrality and density, the map is divided into four quadrants. The first quadrant is devoted to a fundamental concept (high density and low centrality). A motor theme is found in the second quadrant (high density and high centrality). The fourth quadrant (niche theme) is central yet sparsely populated. Low centrality and density characterize the final quadrant (emerging or waning theme). Thematic mapping of author's keywords indicated the formation of words into all four zones (Figure:8). Words such as covid, palliative care, pandemic, death, hospice, end of life, advance care planning, bereavement, social work, support care, and quality of life were falling into basic themes. Coronavirus, prognosis, palliative medicine fell into the motor theme. Covid, palliative, geriatrics, ethics, dying, challenges and social isolation fell into niche areas. Qualitative research, nursing and public health were into emerging areas (Figure:9).

COLLABORATION NETWORK

Collaboration network analysis (Figure:11) indicated the formation of five clusters. The USA collaborated mainly with Argentina, Canada, etc., forming the first cluster (red). The UK, Ireland, Singapore, etc., formed the second cluster (blue). Germany, Austria, Italy, etc., formed the third cluster (green). The final clusters were stand-alone clusters. The collaboration was between Denmark and Sweden (orange) and Portugal and Brazil (purple).

FIGURE 9 THEMATIC MAPS

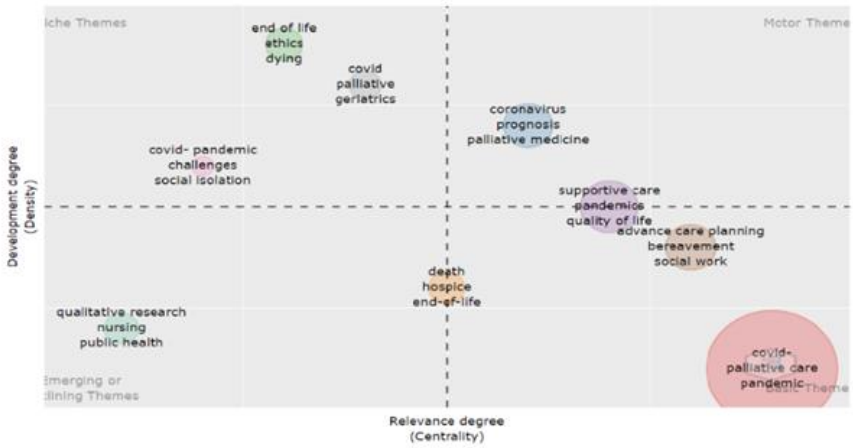


FIGURE 10 CO-CITATION ANALYSIS

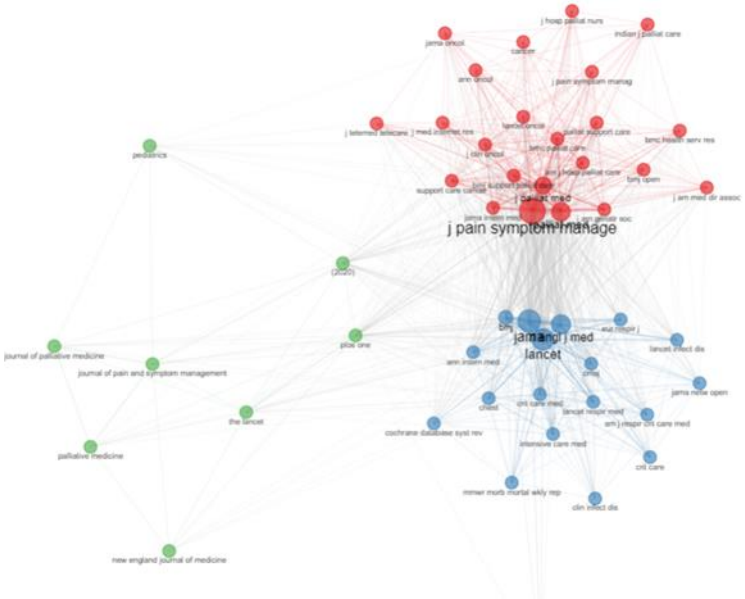
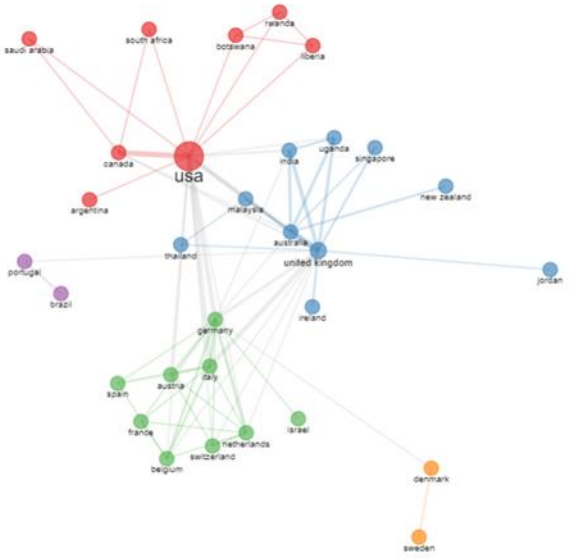


FIGURE 11 COLLABORATION NETWORK



DISCUSSION

From 2020 to 2022, Biblioshiny's bibliometric study [11] highlighted the importance of determining trends in terms of writers, journals, citations, affiliations, collaborations, documents, words, and numerous themes. Data was retrieved from the Scopus database because of its solid structure and the quality and amount of research sources. The analysis of the data revealed an increase in the number of publications relevant to the theme 'COVID-19' and 'palliative care' from 2020 to 2021. The average number of citations per document was reasonable. Between 2020 and 2021, there was a considerable increase in the number of publications produced, according to a study. This time period correlates with the spread of COVID-19, mutations, and exponential waves around the globe. The USA came out on top in the global citation. UK, Spain, Italy contributed the majority of the intellectual contributions, and their relationships with developing economies were progressing from infancy to maturity. The findings of such collaborative studies will assist medical practitioners in confidently planning their strategy in the face of COVID-19.

Bhatnagar, Sleeman and Radbruch were found to be the most productive authors. Benduduh, Hirsch, and Lefaucheur topped the local citations. Higginson I J topped various indices, according to the analysis. The investigation also indicated that journals like Journal of pain and symptom management, American journal of hospice and palliative medicine, and Palliative medicine had the most articles. The majority of the publications on the theme 'COVID-19 and 'palliative care' was from pain journals. Most of the pain journals were classified as zone 1, the most relevant and influential zone, according to Brandford law. Multidisciplinary publications were included in Zones 2 and 3. This allows academics to investigate the subtleties of COVID-19 and palliative care from a variety of interdisciplinary perspectives. In terms of research on COVID-19 and palliative care, the growth rate of the leading pain journals was entirely satisfactory. Pain management, palliative care, and hospitalizations were revealed by reviewing internationally cited publications. The examination of the conceptual structure points the researchers in the right direction for future research. The pandemic and palliative care cluster and the clinical and controlled study cluster could aid in better understanding of patient patterns. The results of the cluster patterns may help the medical practitioners to develop strategies matched to COVID-19 by understanding these clusters' designs and behaviour mechanisms.

The thematic mapping provided an exciting result. Much research was done in basic areas amidst the pandemic. Researchers may shift their focus from these areas. The motor theme areas have been well developed in literature and may help researchers focus on systematic literature reviews. More effort is needed to understand the nuances of niche themes to profile COVID-19 induced palliative care, such as geriatrics and its actions. COVID-19 generated qualitative research in less researched areas, particularly nursing and public health. These areas can appear to be better in future research areas.

LIMITATIONS AND FUTURE RESEARCH

The scope of the research was limited to documents acquired from the Scopus database and search limited to article titles, abstracts, and keywords. To have a deeper grasp of the patterns and trends, future research should focus on databases such as Google Scholar, Web of Science, Dimensions, and others. The majority of data analysis employed keyboard plus as the field. Other areas of research could be used in the future to estimate more outcomes. To better comprehend the existing literature pattern, the science mapping produced in this work could be enhanced with systematic literature reviews and meta-analyses. Future research could also look at comparison studies between countries involved in this field of study and others who aren't. It will aid in determining the many parameters that determine COVID-19-and palliative care.

CONCLUSION

The study looked at a bibliometric examination of COVID-19 and palliative care literature on a variety of topics and areas. The study could serve as a guide for academic practitioners interested in understanding the pattern of existing literature on COVID-19 and palliative care. During the previous two years, a significant quantity of research has been conducted on the subject. Using bibliometric mapping and descriptive analysis, the author investigated different trends in publications, consequences, and future research directions. The significant trends identified in this study may aid academicians, medical practitioners, and policymakers in developing palliative care plans in the face of the pandemic.

The bibliometric analysis of COVID-19 and palliative care used in the study has entailed reviewing relevant and

prominent literature particularly research articles. This analysis has provided significant insights into the trends and patterns in COVID-19 and palliative care research, including the most regularly explored themes, notable researchers and institutions, influential publications, and so on. The output of the study may help researchers discover research gaps and potential for further exploration concerning COVID-19 and palliative care, identifying areas that require extra research and places where previous research has been effective. Numerous data visualization techniques such as clustering, thematic maps, three-field plots, word clouds, and so on have helped in the interpretation of patterns and trends. This study can serve to guide future research in these areas, leading to a better knowledge of how to deliver appropriate palliative care to COVID-19 patients. Overall, a bibliometric analysis of COVID-19 and palliative care used in this study may contribute to the body of knowledge by providing a thorough understanding of the research on these topics, identifying research gaps and opportunities, and ultimately improving the quality of care provided to COVID-19 patients.

DECLARATION OF INTEREST STATEMENT

No potential conflict of interest

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