





Analysis of the Current State of COPD Nursing Based on a Bibliometric Approach from the Web of Science

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Background and Aim: COPD nursing plays a crucial role in alleviating disease symptoms, prolonging patient survival, and is therefore of paramount importance. However, authoritative research findings, research hotspots, and development trends in the field of COPD are still unclear. This study aimed to examine authoritative research findings, research hotspots, and trends in the field of COPD nursing. Descriptive statistics and bibliometric and visual analyses of the literature were conducted.

Methods: Bibliometric data were obtained from the Web of Science database. Citespace was used to explore publication trends, countries, institutions, journals, authors, keywords, and co-citation characteristics of the included literature in order to summarize the key research in the field of COPD nursing.

Results: In total, 693 articles on COPD nursing were published. 1998–2014 showed a rapid growth period in this research field, which stabilized in 2015–2022. The research content could mostly be summarized into five categories: acute exacerbation, quality of life, risk, evidence-based nursing, and pulmonary rehabilitation. The research hotspots in 1998–2014 included randomized controlled trials, education, elderly patients, nursing home residents, nursing homes, rehabilitation, and prevalence. Research in 2015–2022 focused on impact, palliative care, needs, and predictors. In recent years, research mainly concentrated on symptom management models, cost-effectiveness, and cumulative meta-analysis.

Conclusion: Bibliometric analysis of COPD nursing articles indicates that the focus of COPD nursing research is shifting from tertiary prevention to primary and secondary prevention. Helping patients achieve self-management of symptoms, reducing the financial burden of COPD on healthcare, and summarizing research evidence by meta-analyses will likely remain the focus of future research.

Keywords: bibliometric analysis, COPD, nursing, Citespace, research hotspots

Introduction

Chronic obstructive pulmonary disease (COPD) is a prevalent chronic respiratory disease characterized primarily by airflow limitation.¹ According to a meta-analysis released by Lancet in 2022, COPD is the leading cause of death and disability worldwide, with a global prevalence rate of up to 10.3%. Furthermore, with the increasing issue of an aging population, the prevalence of COPD is projected to continue rising.² A global burden of COPD survey published in BMJ reveals that the global number of COPD cases has reached a staggering 212.3 million, with 3.3 million deaths reported and a disability-adjusted life year of 74.4 million.³ By 2030, COPD will have become the third leading cause of death globally, affecting one-tenth of the world's population.⁴ A growing body of research indicates that COPD nursing can effectively improve lung function and enhance the quality of life for COPD patients. It plays a crucial role in alleviating disease symptoms, prolonging patient survival, and is therefore of paramount importance.^{5–7} The importance of COPD nursing in the global healthcare field is increasingly apparent and it holds significant importance in alleviating the healthcare burden caused by COPD.⁸ However, there is limited research that

specifically focuses on the comprehensive knowledge structure within the COPD nursing field, making it challenging for scholars to gain a holistic understanding of the current state of research and explore potential research directions.

Bibliometrics is a type of intelligence science that uses mathematical and statistical methods to analyze the structure, volume, and patterns of change in the distribution of literature. Bibliometrics combines various techniques from scientific mapping, information visualization, and text mining to study the evolution of various scientific fields.⁹ This method enables the quantification of the impact of individual studies and discipline-specific literature developments and assesses trends in specific research areas.¹⁰ The bibliometric analysis explores the characteristics of different publications in a specific field over time, such as countries, institutions, journals, authors, keywords, and co-citations. Therefore, researchers can summarize the current status and trends of research in a particular research area and provide directions and ideas for future research in the field. Citespace is a visualization software developed by Chen that can generate rich and beautiful visualizations.^{11,12} Citespace is an important literature retrieval and analysis tool in the field of science and technology and has become the most popular bibliometric software. It uses Co-citation and Path Finder in a java environment to visualize key paths and knowledge inflection points in research areas, providing scholars with a basis for understanding the evolutionary mechanisms of disciplines and detecting the direction of disciplinary development.¹³ Therefore, this study aims to comprehensively analyze the literature within the COPD nursing field using a bibliometric approach and Citespace software, in order to enhance scholars' understanding of authoritative research achievements, research hotspots, and development trends within the COPD nursing field, provide basis for further COPD nursing research, and promote the clinical application of research outcomes.

Methods

Search Strategy

Data for this study were obtained from the Web of Science database. The Web of Science database is the most commonly used database for bibliometric analyses. All papers in the database have been strictly reviewed by experts and have high academic authority. Compared with databases such as CNKI and CSSCI, Web of Science contains richer data sources.¹⁴ In this study, the search time frame was set to all papers before October 2022. The publishing language was restricted to English, including only articles or reviews for a more scientific and comprehensive literature search.¹⁵ Finally, 693 articles were identified for inclusion in the study. The search formula was as follows: (TS = ["Chronic Obstructive Lung Disease" OR "Chronic Obstructive Pulmonary Diseases" OR "COAD" OR "COPD" OR "Chronic Obstructive Airway Disease" OR "Chronic Obstructive Pulmonary Disease" OR "Airflow Obstruction, Chronic" OR "Airflow Obstructions, Chronic" OR "Chronic Airflow Obstructions" OR "Chronic Airflow Obstruction"]) AND (TS = ["nursings" OR "nursing"]) AND (Language = [English]) AND (document type = ["article" OR "review"]). **Figure 1** illustrates the steps involved in screening and analyzing data.

Data Analysis

Citespace 5.8.R3 was used for bibliometric and visual analysis. Firstly, this study used Microsoft Excel to count the number of annually published literature on COPD nursing. Secondly, Citespace was used to conduct a bibliometric and visual analysis of the authors, institutions, countries, keywords, and co-cited literature in the field. Nodes in different maps represent authors, institutions or keywords. Size of nodes indicates the frequency of occurrence, and color of nodes indicated the occurrence years. The line connecting the nodes represents the keywords are related in the publications, the thickness the line, the closer the relationship between keywords.

Synonyms were merged prior to the keyword analysis, for example, the terms "chronic obstructive pulmonary disease" and "chronic pulmonary disease" were combined into "COPD". For clearer visualization of the important content, the parameters were set as follows: (1) time slicing from 1998 to 2022 at 1 year per slice; (2) the selection uses a modified g-index in each slice: $k = 8$, which means that data were extracted on the top 8 results for each time slice; (3) the node type was set as authors/ institutions/ countries/ keywords/ co-cited literature; (4) choosing "Pathfinder" and "Pruning the merged network" for Pruning parameters area to simplify the network and highlight its important structural features. The remaining parameters were the default settings.

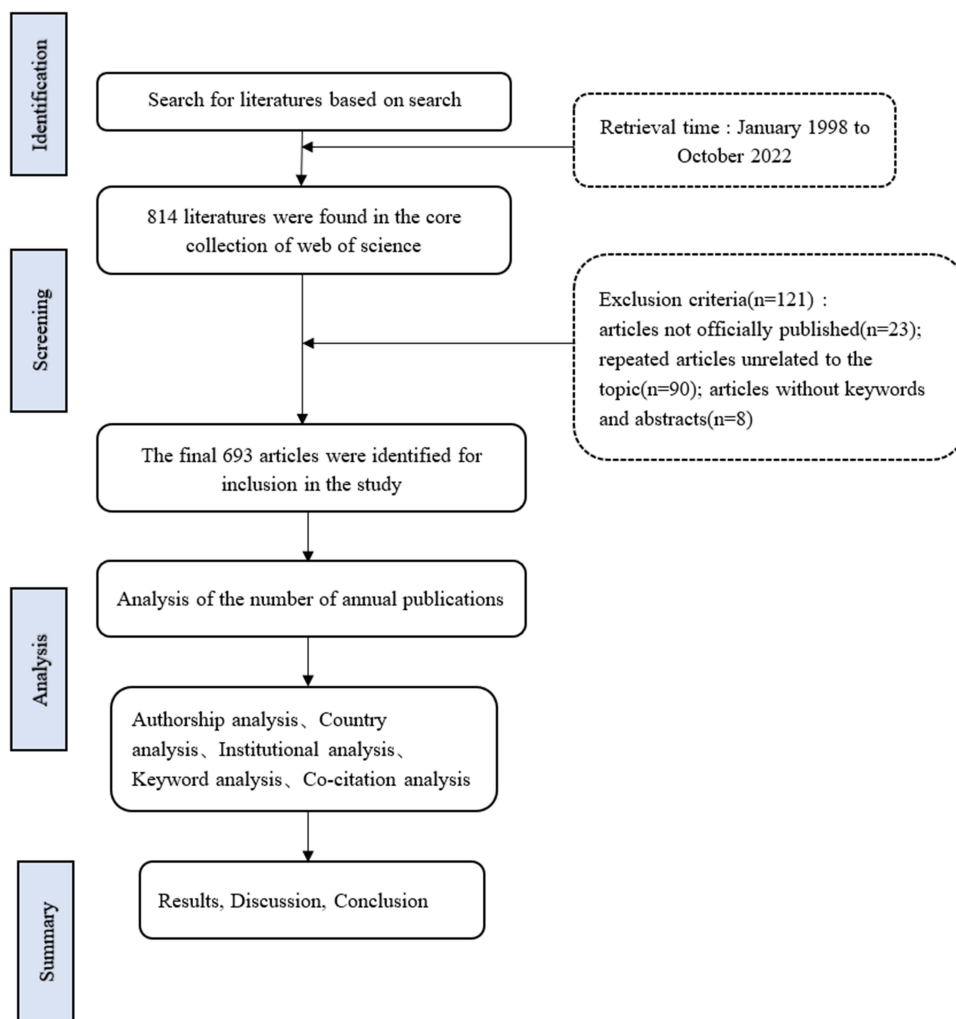


Figure 1 Flowchart of literature selection and scientific econometric analysis.

Results

Analysis of the Number of Annual Publications

The annual number of publications and growth rates can reflect a field's current research status and trend.¹³ Figure 2 displays the annual number of publications and trends in COPD nursing research between 1998 and 2022, with the total number of publications showing an upward trend and multiple growth peaks. The fastest growth rates were observed in 1999, 2001, 2004, 2007, and 2014, with growth rates of 66.67%, 50.00%, 133.33%, 63.64%, and 43.75%, respectively. Two small growth peaks of 32.65% and 30.77% were seen in 2020 and 2021, respectively. Based on the growth rate, 1998–2014 was defined as a period of rapid growth, characterized by a low number of annual publications and a high growth rate. 2015–2022 was defined as a period of stable growth, during which the growth rate was lower than in the rapid growth period, but with a steady annual increase in article volume.

Authorship Analysis

Author co-occurrence networks are used in bibliometric analysis to examine the influence of authors in their relevant field and the collaborative relationships between different research groups. Figure 3 represents the author co-occurrence network of COPD nursing studies drawn in Citespace, including a total of 670 nodes and 710 links. The co-linear graph revealed several independent author collaborative teams, but no connection was observed between the collaborative

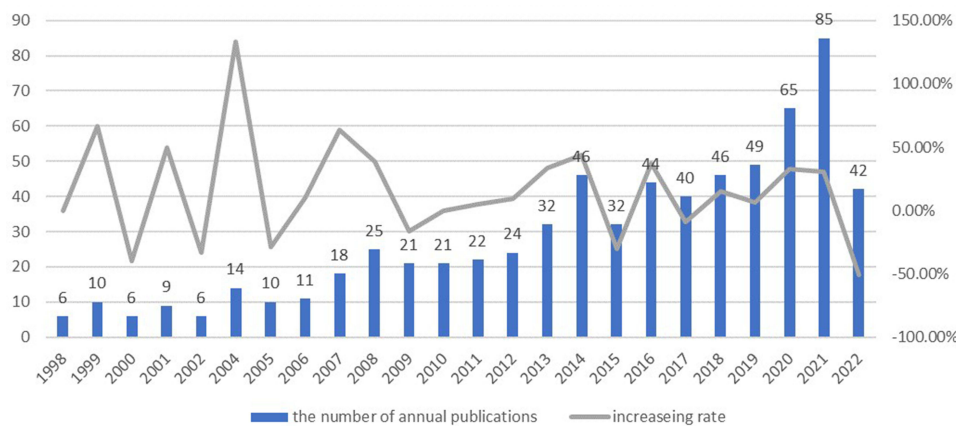


Figure 2 Number of annual literature publications related to COPD nursing from 1998 to 2022.

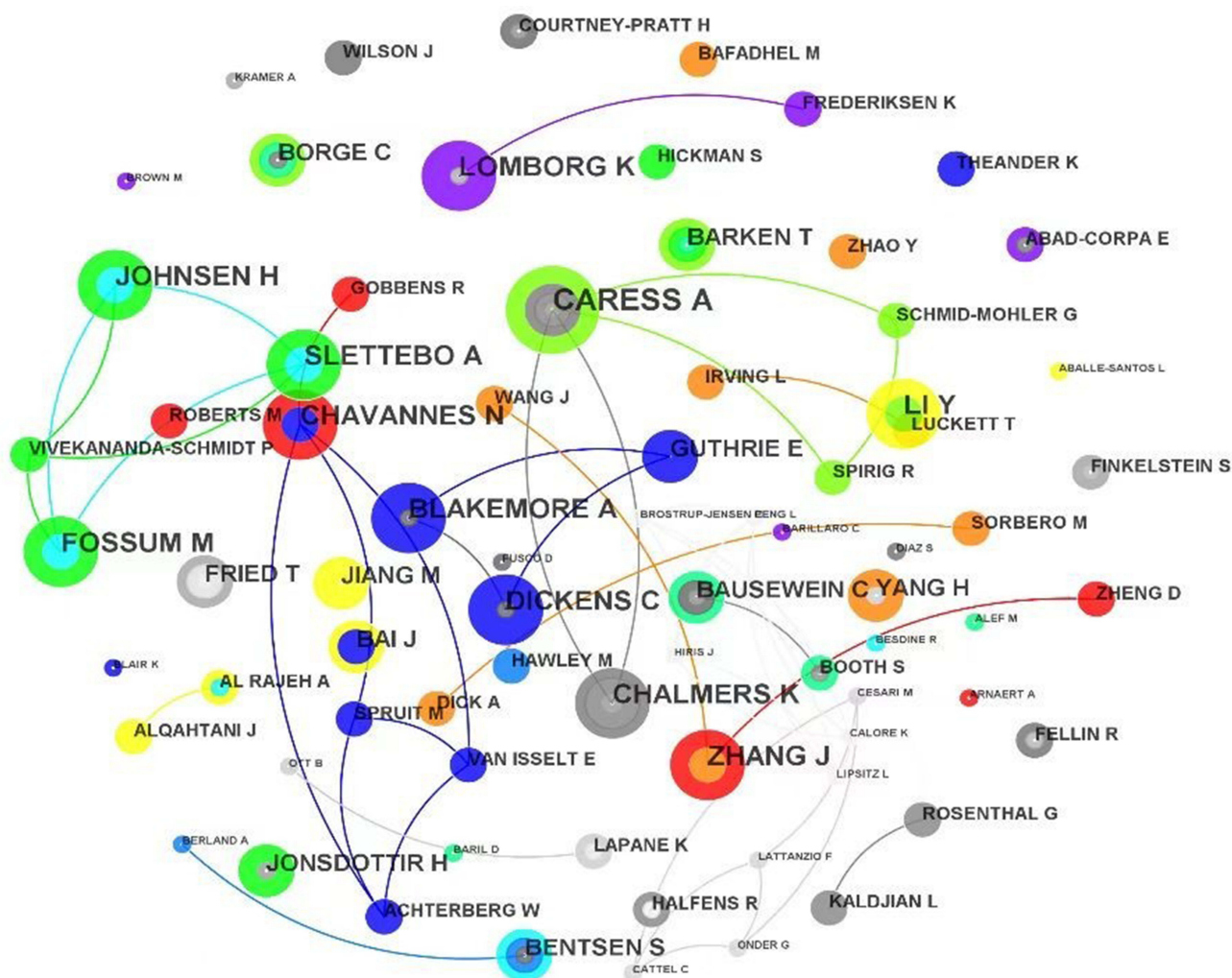


Figure 3 Author co-occurrence network.

teams and the teams. The results indicated that most of the authors engaged in COPD nursing research work in small teams, without much collaboration between them. The top 11 authors in terms of the number of published articles were identified, as shown in Table 1. The author Caress A had the highest number of published articles.

Table I Top 11 Authors in Terms of the Number of Publications

Rank	Author	Count	Centrality	Year
1	CARESS A	5	0	2007
2	CHALMERS K	4	0	2007
3	BLAKEMORE A	4	0	2012
4	CHAVANNES N	4	0	2014
5	FOSSUM M	4	0	2016
6	LI Y	4	0	2019
7	ZHANG J	4	0	2021
8	DICKENS C	4	0	2012
9	SLETTEBO A	4	0	2016
10	LOMBORG K	4	0	2005
11	JOHNSEN H	4	0	2016

Institutional Analysis

As shown in Figure 4, the institution co-occurrence network included a total of 511 institutions and 475 institutional cooperation links. The co-occurrence network demonstrated a tightly linked collaborative network of institutions,

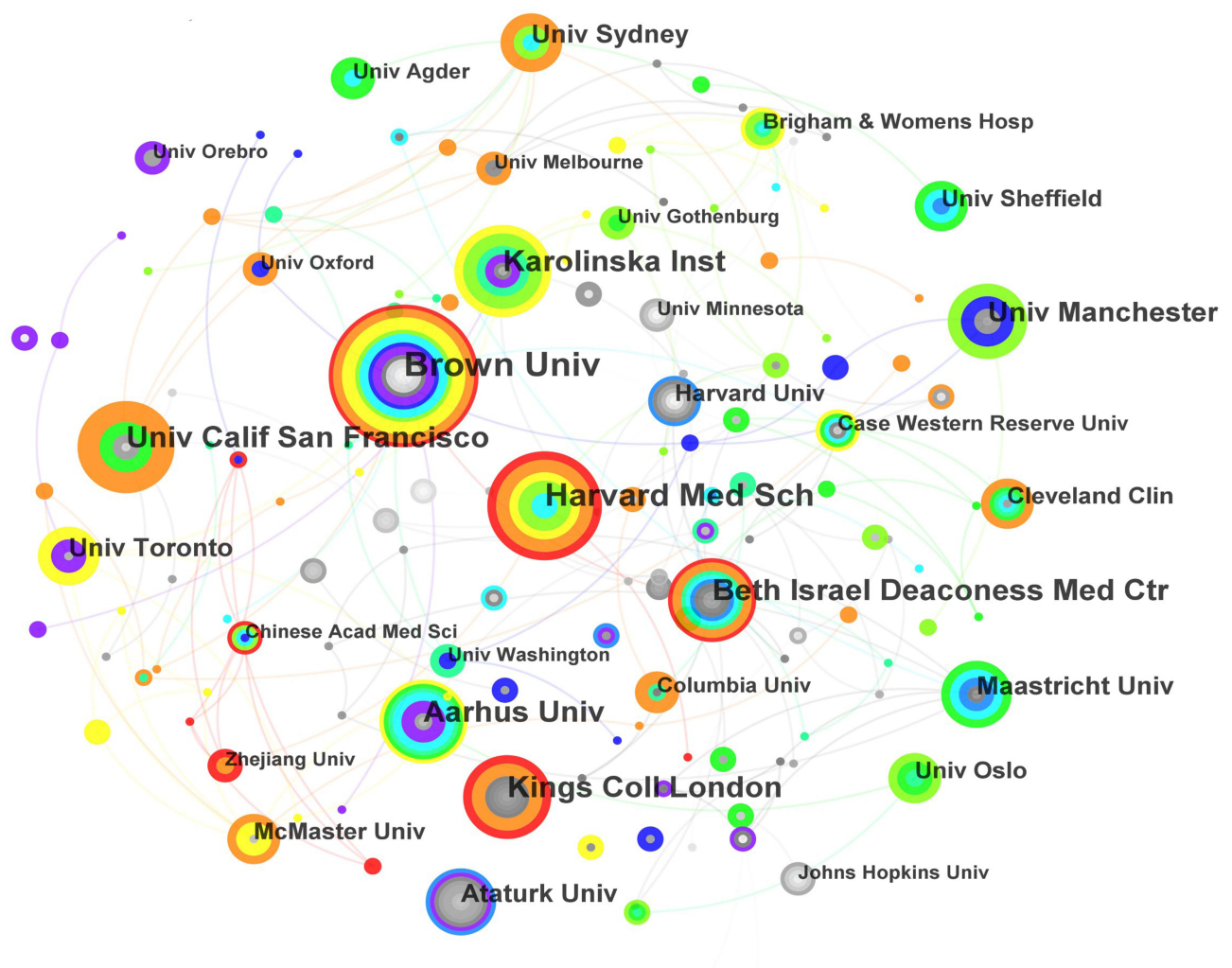
**Figure 4** Institution co-occurrence network.

Table 2 Top 10 Institutions in Terms of the Number of Articles Issued

Rank	Institution	Count	Centrality	Year
1	Brown University	17	0.04	1998
2	Harvard Medical School	13	0.02	2016
3	Karolinska Institutet	11	0.03	2006
4	University of California San Francisco	11	0.05	2002
5	Aarhus University	10	0	2005
6	King's College London	10	0	2008
7	Beth Israel Deaconess Medical Center	10	0.03	2007
8	University of Manchester	9	0	2007
9	Ataturk University	8	0	2004
10	Maastricht University	8	0.01	2009

indicating close academic exchange between institutions. Centrality can reflect the importance of nodes in the network, with a centrality of > 0.1 indicating high influence in the field.¹⁵ The top 10 institutions in terms of the number of published articles are shown in Table 2, with Brown University, Harvard Medical School, Karolinska Institutet, and the University of California San Francisco having the highest number of publications. Furthermore, universities published more papers than hospitals, with four of the top 10 publishers originating from the USA.

Country Analysis

The country co-occurrence network was reviewed to assess the current status of research and collaboration in the field of COPD nursing across different countries. As shown in Figure 5, 53 countries were included in the country co-occurrence network, with 102 national cooperation links. The density and complexity of the lines between countries in the co-occurrence network indicated a close collaboration between multiple countries, further highlighting the fact that COPD nursing research is a global challenge. The centrality of the country is >0.1 , indicating that the country has a high influence in the field.¹⁵ As shown in Table 3, the United States, England, China, Australia, and Italy performed the most research on COPD nursing and have made contributions that cannot be ignored. The US has published far more articles than any other country, and Spain showed the highest centrality, indicating the strong academic influence of these two countries. Notably, China is the only developing country in the top 10.

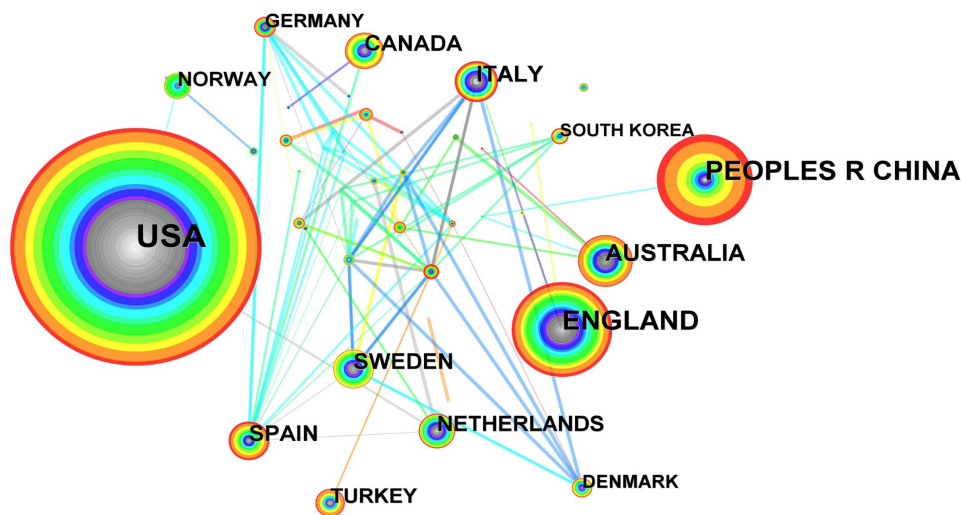
**Figure 5** Country co-occurrence network.

Table 3 Top 10 Countries in Terms of the Number of Articles Published

Rank	Country	Count	Centrality	Year
1	USA	220	0.13	1998
2	ENGLAND	88	0.26	1999
3	CHINA	84	0	2001
4	AUSTRALIA	48	0.25	1999
5	ITALY	38	0	1998
6	SPAIN	36	0.44	2003
7	SWEDEN	36	0.01	2001
8	CANADA	34	0.07	2004
9	NETHERLANDS	32	0.26	1998
10	TURKEY	26	0	2004

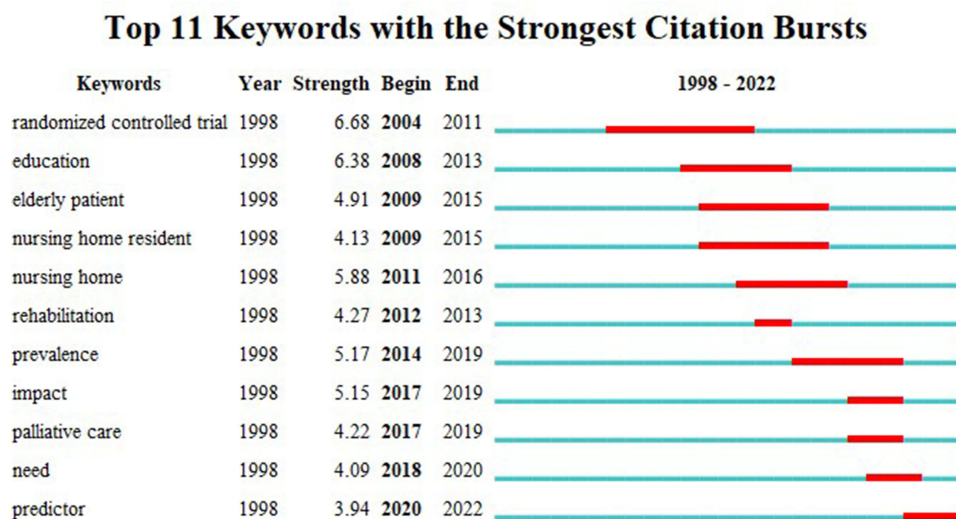
Keyword Analysis

Keyword burst analysis can reflect significant changes in research hotspots within a certain time period.¹⁶ According to the burst detection on Citespace, a total of 11 burst keywords appeared in the COPD nursing field between 1998–2022. Figure 6 shows the first occurrence of the 11 burst keywords and their duration in the field. Seven burst keywords appeared during the rapid growth period of COPD nursing (1998 to 2014), namely randomized controlled trials, education, elderly patient, nursing home residents, nursing home, rehabilitation, and prevalence. Four burst keywords appeared after 2015, namely impact, palliative care, need, and predictor.

Keyword clustering is an interconnected network of clusters of keywords with similar themes, with cluster #0 being the largest cluster and #9 being the smallest cluster. Cluster analysis of keywords can further analyze the focus of the research and portray the main research content in a given field.¹⁷ As shown in Figure 7, a total of ten clusters were obtained from the keyword cluster analysis. In this study, the ten clusters were further grouped into five major categories: acute exacerbation, quality of life, risk, evidence-based nursing, and pulmonary rehabilitation. The main keywords in the five clusters are shown in Table 4.

Co-Citation Analysis

Two articles form a co-citation relationship when they are referenced in the same article, and the citation frequency can reflect the quality and authority of the article in the relevant field.¹⁸ The literature was ranked according to citation

**Figure 6** Top 11 keywords with the strongest citation bursts.

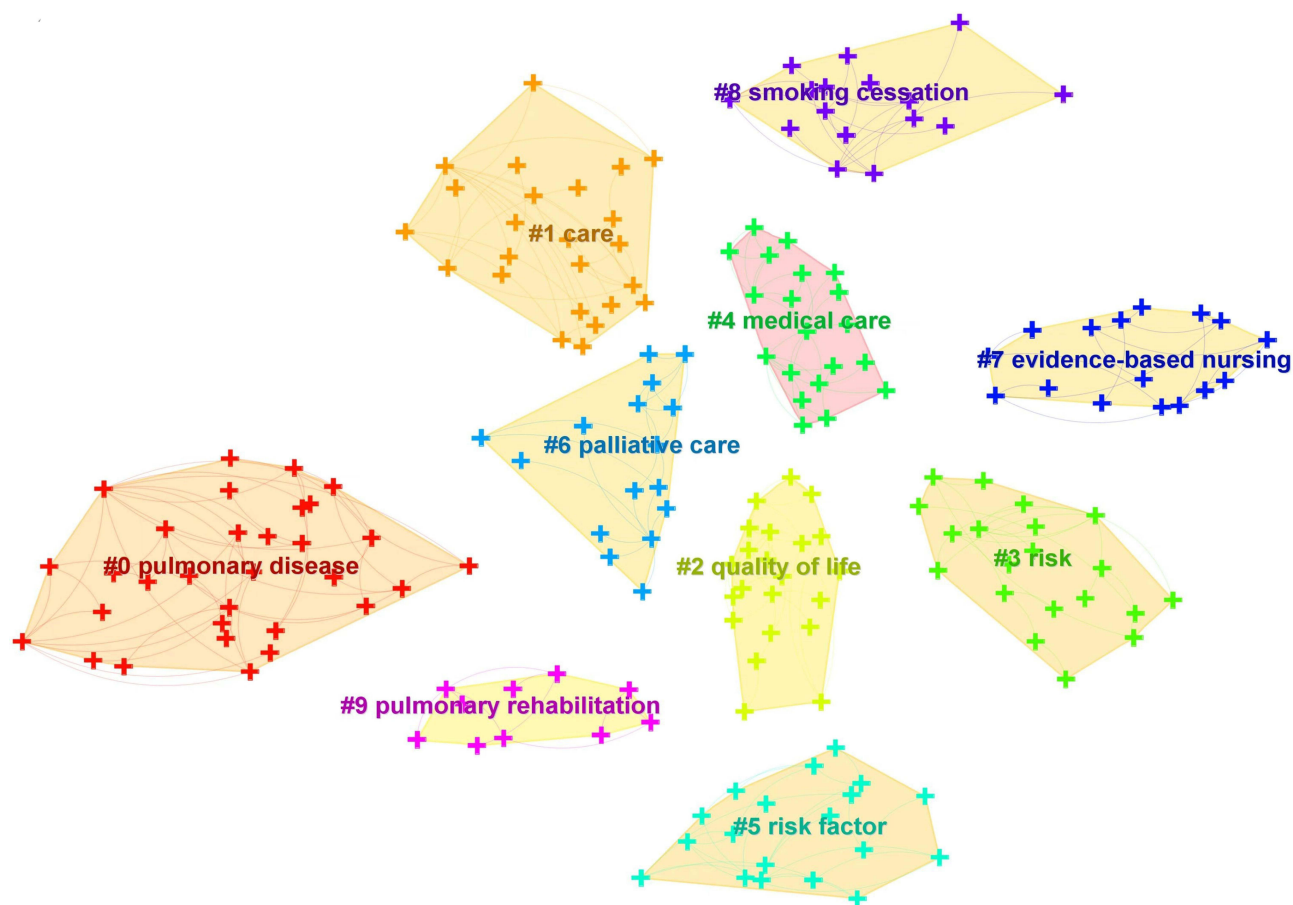


Figure 7 The clusters of keywords.

frequency; the top 5 references in the field of COPD nursing in terms of citation frequency are displayed in Table 5. The most frequently cited study focused on pulmonary rehabilitation, reporting the differences in treatment outcomes between community and hospital-based pulmonary rehabilitation programs. The study promoted research related to the specific implementation of pulmonary rehabilitation programs, including the optimal time, place, and intensity of training to perform pulmonary rehabilitation.¹⁹ Two of the most cited articles were reports of the COPD Global Initiative, which provides essential guidance for clinical work.

Furthermore, this study plotted the timeline view. In the timeline view, literature of the same type is clustered on the same level, with more recent studies presented on the right side, indicating that the content of the cluster is a hot research topic in

Table 4 The Main Keywords in the Clusters

Category Name	Clusters Contained in the Category	Keywords
Acute exacerbation	#0	Acute exacerbation, acute respiratory failure, asthma, COVID 19.
Quality of life	#2	Quality of life, self-management, nursing home, adherence.
Risk	#3, #5	Rehospitalization, comorbidities, risk factors, mortality.
Evidence-based nursing	#1, #4, #7, #6	Evidence-based nursing, meta-analysis, nursing planning, health care delivery
Pulmonary rehabilitation	#8, #9	Pulmonary rehabilitation, smoking cessation, activities of daily living, six-minute walk test.

Table 5 Top 5 Most Frequently Cited Publications

Rank	Frequency	Centrality	Year	Cited Publication
1	13	0.03	2015	Pulmonary rehabilitation for chronic obstructive pulmonary disease
2	11	0	2017	Dyspnoea, hyperventilation and functional cough: a guide to which tests help sort them out
3	10	0.04	2017	Self-management interventions including action plans for exacerbations versus usual care in patients with chronic obstructive pulmonary disease (Review)
4	9	0.01	2017	Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Lung Disease 2017 Report
5	9	0.01	2019	Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Lung Disease: The GOLD Science Committee Report 2019

recent years. In this study, the co-citation literature was analyzed and ten clusters were obtained, as displayed in Figure 8: #0 symptom management model, #1 support need, #2 cost-effectiveness, #3 clinical trial, #4 nurses knowledge, #5 urgent care use, #6 cumulative meta-analysis, #7 COPD action research project, #8 critical challenge, and #9 acute respiratory failure. In recent years, the research hotspots in the field of COPD nursing in recent years were clustered in the #0 symptom management model and #6 cumulative meta-analysis, with #0 mainly focusing on developing models to promote symptom self-management in COPD patients.²⁰ In contrast, #6 focused on summarizing evidence by meta-analysis in the field of COPD nursing.⁶

Discussion

This study explored the research hotspots and development trends in the field of COPD nursing and conducted a bibliometric and visual analysis of authors, institutions, countries, keywords, and co-cited literature to highlight the research themes and hotspots for further COPD nursing research.

Research Status and Development Trend

Overall, the number of publications in the field of COPD nursing is on the rise, with 1998–2014 being a period of rapid growth and 2015–2022 being a period of stable growth. COPD nursing research was in its infancy between 1998 and 2014, and research and theory were still immature. Advances in COPD nursing theory and research in 2015–2022 led to a growing number of researchers studying this field, maintaining a high number of published articles. According to the

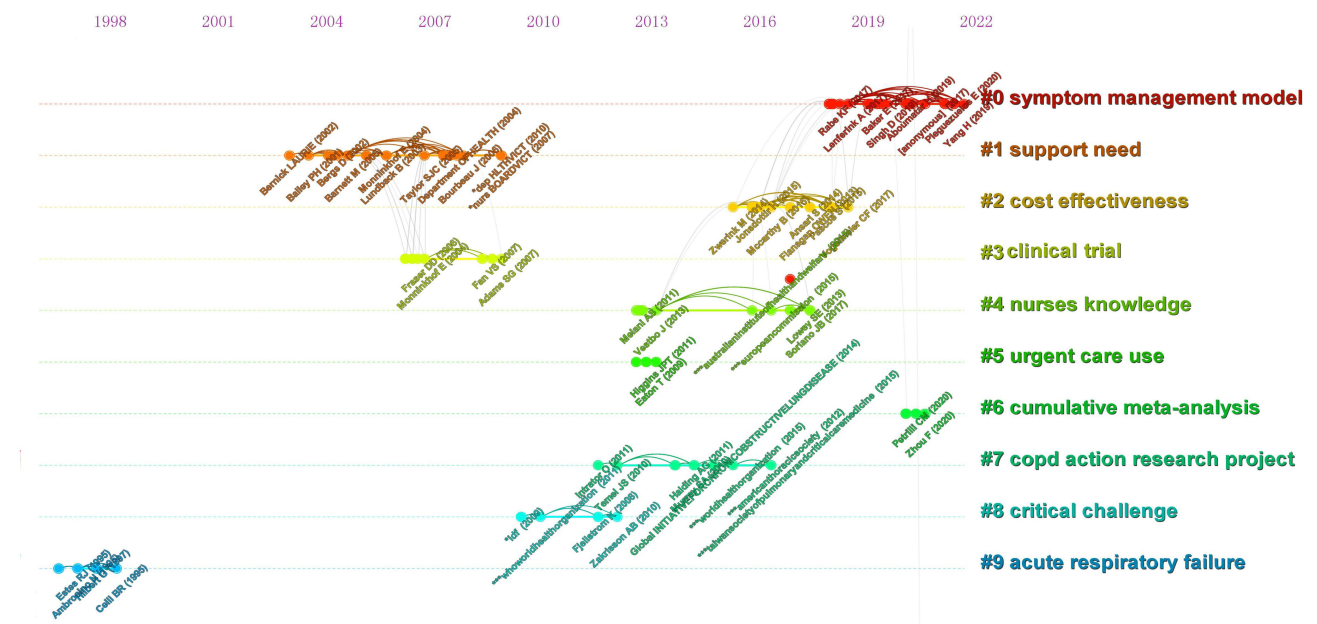


Figure 8 Reference timeline view.

BMJ, the global age-specific prevalence and age-specific mortality of COPD in 2019 decreased by 8.7% and 41.7% compared with 1990, respectively.³ The decreasing global prevalence and mortality of COPD coincide with the increasing trend of COPD nursing research articles. Some studies have shown that nursing interventions can effectively improve pulmonary function and quality of life in COPD patients.^{5,7} Therefore, it can be inferred that COPD nursing plays an important role in promoting the health status of patients with COPD. Two small growth peaks in literature publication were observed in 2020 and 2021, indicating that the field of COPD nursing is still evolving and sustained research interest.

Collaboration and Distribution of Results

Collaborative exchanges among research teams can promote scientific output and advance research progress.²¹ This study examined the collaborative relationships and distribution of outcomes among collaborative teams in COPD nursing at three levels (author, institution, and country) in order to provide references for future disciplinary development. At the author level, multiple independent author collaborative teams were observed in the field of COPD nursing, but the team size was small and collaboration was insufficient. At the institutional level, universities were more prolific than hospitals, with most of the relevant research being concentrated in universities in the United States. At the national level, not much academic exchange was observed between developing countries, while a closer academic exchange was found between developed countries. The United States and Spain were leaders in COPD nursing, which is similar to the institutional analysis results. China is the only developing country in the top 10 in terms of publication volume. Notably, the BMJ published data on the global burden of COPD disease, showing the largest decrease in age-standardized mortality in China between 1990 and 2019, at 70.1%.³ This finding may be attributed to the outstanding contribution of scholars in COPD nursing. The Lancet epidemiological survey showed that 80.5% of COPD patients live in low- and middle-income countries, with the highest overall prevalence in the Western Pacific region.² Therefore, enhancing COPD nursing research in developing countries and establishing a closer academic collaboration network between developing and developed countries to share disease management experiences and conduct research could promote high-quality research outputs.²² In addition, developing countries can organize global health workforce capacity-building activities to improve the scientific skills of scholars by providing peer support through training and mentoring from highly skilled healthcare workers.²³

Main Research Content

The main research studies in the field of COPD nursing can be summarized as acute exacerbation, quality of life, risk, evidence-based nursing, and pulmonary rehabilitation. Acute exacerbation included keywords such as acute exacerbation, acute respiratory failure, asthma, and COVID 19. In this cluster, researchers focused on pulmonary diseases associated with acute exacerbations, which are prone to hypoxemia and carbon dioxide retention, leading to acute respiratory failure.²⁴ Researchers have found that patient-centered care can effectively improve lung function, satisfaction with care, and blood gas indicators in patients with AECOPD combined with respiratory failure.²⁵ Researchers also focused on inhaler care in patients with COPD combined with asthma, where inhaler use led to acute exacerbations,^{26,27} readmissions, and increased healthcare costs.²⁸ 42.9% of patients had improper inhaler use, demonstrating quick and shallow breaths. Caregivers should carefully monitor patients' inhaler use and provide detailed directions.²⁶ The implementation of chronic disease care in the context of the COVID 19 epidemic has been a hot topic in recent years, and the COVID 19 epidemic has highlighted the need for telecare for patients with COPD.^{29,30} Studies have shown that providing telecare for patients with COPD can effectively improve patient anxiety and give patients the confidence to self-manage in this specific period.³¹ COPD is an independent risk factor associated with the development of COVID 19, which increases the risk of serious COVID 19 infections by more than five times.³² Therefore, nurses need to provide routine care to patients with COPD while calming their anxiety about COVID 19 and protecting them against transmission of the virus. Nurses in many countries are under tremendous physical and mental stress due to excessive patient numbers, nursing shortages, and underprepared health systems, and they face intractable and complex ethical issues in their practice, as well as the dilemma of high patient mortality rates and long working hours.³³ In the future, COPD nursing scholars should conduct extensive research on the issues in order to be better prepared to respond to large-scale public health emergencies.

The quality of life keywords included quality of life, self-management, nursing homes, and adherence. Since patients with COPD are predominantly elderly, COPD nursing studies were mostly conducted in nursing homes.³⁴ It has been

found that poor self-management in patients with COPD leads to poor adherence to treatment and reduces the level of quality of life.^{35,36} Effective and continuous self-management in COPD patients can improve health-related quality of life and reduce hospitalization rates and the frequency of dyspnea episodes.³⁷ The main keywords of risk included rehospitalization, comorbidities, risk factors, and mortality. A large number of researchers have conducted studies on risk factors for adverse events. Death in patients with COPD imposes a heavy economic burden on global healthcare.^{37–39} Identifying these risk factors for adverse events allows nurses to manage patients earlier.⁴⁰ The keywords of evidence-based nursing comprise evidence-based nursing, meta-analysis, nursing planning, and healthcare delivery. The core idea of evidence-based nursing is to use the latest and best scientific evidence to guide nursing practice.⁴¹ Meta-analysis is a statistical method used to compare and synthesize the results of studies addressing the same scientific question. This method is often used for quantitative merger analysis in systematic reviews, but the significance of the conclusions depends on the quality of the included studies.⁴² Currently, evidence-based nursing makes use of a large body of evidence to guide the development of nursing plans and implementation of health care delivery for COPD patients.⁷

Pulmonary rehabilitation includes studies such as pulmonary rehabilitation, smoking cessation, daily living activities, and the six-minute walk test. An article in the *Am J Respir Crit Care Med* states that pulmonary rehabilitation can reduce hospital admissions, reduce unplanned health checks, and improve patients' exercise capacity.¹ Therefore, pulmonary rehabilitation has received much attention in the field of COPD nursing. Researchers have focused heavily on smoking cessation care because smoking cessation is an important component of pulmonary rehabilitation in patients with COPD.⁴³ Caregivers who implement smoking cessation interventions can effectively improve patients' lung function and promote pulmonary rehabilitation.⁴⁴ The ability to perform daily living activities is an important indicator for assessing pulmonary rehabilitation in patients with COPD. The key to pulmonary rehabilitation care is to strive for maximum activity in daily living and to improve endurance for exercise and activity, thereby increasing their ability to care for themselves.⁴⁵ The American Thoracic Society introduced the 6-minute walk test in 2002, which is the most commonly used test in clinical practice, providing a cost-effective and easy-to-perform method to determine cardiopulmonary function in patients with chronic lung disease.⁴⁶

Research Hotspots

From the perspective of keywords, research hotspots in COPD nursing from 1998–2014 included randomized controlled trials, education, elderly patient, nursing home residents, nursing home, rehabilitation, and prevalence. The research hotspots for COPD nursing in 2015–2022 included impact, palliative care, need, and predictor. As COPD nursing research was in its infancy from 1998–2014, the studies focused on developing useful clinical evidence through randomized controlled trials,^{17,47} with an emphasis on older patients and nursing home residents,⁴⁸ nursing education for older COPD patients,⁴⁹ and the impact of care on the prevalence and rehabilitation of older patients with COPD.⁵⁰ COPD nursing research from 2015–2022 mainly focused on exploring the impact of different models of care on the disease,⁵¹ progressively incorporating geriatric principles of palliative care into the practice of severe COPD.⁵² Additionally, studies investigated the needs of patients with COPD and explored the predictors of COPD onset and associated adverse events.^{53,54} The research focused on the elderly, while following the evolving concept of person-centered services. Nurses can retrospectively analyze the predictors of adverse events such as readmission and acute exacerbation in patients with COPD through nursing research, provide early interventions for patients who are likely to experience adverse events, contributing to the primary prevention of COPD-related adverse events.^{55,56} Therefore, The hotspot of COPD nursing research has shifted from “rehabilitation” in the period of rapid growth to “predictors” in the period of stable growth, highlighting a shift in the focus of COPD nursing research from tertiary prevention to primary and secondary prevention.

In the co-citation analysis, the hotspots of research in the field of COPD nursing in recent years mainly clustered on symptom management models, cost-effectiveness, and cumulative meta-analysis. Developing models to help patients achieve symptom management and reducing the economic burden on the healthcare system has become a hot topic of research. COPD patients are characterized by high symptom burden and low physical function, and reducing their symptom burden can effectively improve their functional status.⁵⁷ Reportedly, symptom burden in COPD patients is significantly correlated with scores related to self-management,⁵⁸ and self-management interventions can help COPD patients cope with changing symptoms and effectively reduce symptom burden.⁵⁹ More researchers are speculated to be involved in the development of models to help patients achieve self-symptom management in the future. Studies have shown that nursing interventions can reduce the hospitalization rate of COPD patients, thereby reducing the economic burden on patients, accelerating the turnover

of hospital beds, and enhancing the social and economic benefits of hospitals.⁵ Cost-effectiveness has emerged as an important research hotspot in the field of COPD nursing, as WHO predicts that the economic burden of COPD will be the 5th highest worldwide in 2030.⁶⁰ Therefore, further reducing the economic burden of healthcare caused by COPD remains a future research hotspot. A cumulative meta-analysis is a systematic evaluation method in evidence-based care that can help researchers quantitatively integrate research evidence.⁴³ An analysis of annual publications shows that COPD nursing research is still in the developmental stage and further evidence analysis is required. Additional meta-analysis articles in this field are expected to appear in the future.

Limitation

Firstly, as the results of the analysis of literature from different data sources could not be combined, this study only included literature from the Web of Science database, which could lead to some bias in the results. Secondly, the quality of the studies was highly variable, for example, some of the high-quality literature was not adequately analyzed due to late publication dates or insufficient citations. Thirdly, although the keyword analysis and co-citation analysis can infer the main research content and research hotspots in the field of COPD care, such a general analysis is somewhat subjective and the conclusions are limited. Finally, some articles related to COPD nursing were published without including the keyword nursing, which may have led to less comprehensive articles.

Conclusion

The present bibliometric analysis indicates that the field of COPD nursing is still evolving and has a continuing research interest. Most of the relevant research in this field is concentrated in universities in the United States, with small author collaborative teams, an insufficient collaboration between teams, and a lack of academic exchange among developing countries. COPD nursing research in developing countries can be further strengthened through joint health support projects and capacity-building activities for health personnel, and a closer academic cooperation network can be established. The research in the field of COPD nursing can be mainly summarized into five major categories: acute exacerbation, quality of life, risk, evidence-based nursing, and pulmonary rehabilitation. Currently, the focus of COPD nursing research is shifting from tertiary prevention to primary and secondary prevention. Helping patients achieve self-symptom management, reducing the economic burden of healthcare caused by COPD, and summarizing research evidence based on meta-analysis will likely remain the focus of future research.

Ethics Statement

This is a bibliometric article and therefore not applicable.

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Disclosure

The authors report no conflicts of interest in this work.

References

1. GOLD. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease. Available from: <https://goldcopd.org/about-us/>. Accessed December 18, 2023.
2. Adeloje D, Song P, Zhu Y, et al. Global, regional, and national prevalence of, and risk factors for, chronic obstructive pulmonary disease (COPD) in 2019: a systematic review and modelling analysis. *Lancet Respir Med*. 2022;10(5):447–458. doi:10.1016/S2213-2600(21)00511-7

3. Safiri S, Carson-Chahhoud K, Noori M, et al. Burden of chronic obstructive pulmonary disease and its attributable risk factors in 204 countries and territories, 1990–2019: results from the Global Burden of Disease Study 2019. *BMJ*. 2022;378. doi:10.1136/bmj-2021-069679
4. Fazleen A, Wilkinson T. Early COPD: current evidence for diagnosis and management. *Therapeutic advances in respiratory disease*. *Ther Adv Respir Dis*. 2020;14:1753466620942128. doi:10.1177/1753466620942128
5. Aranburu-Imatz A, López-Carrasco JC, Moreno-Luque A, et al. Nurse-led interventions in chronic obstructive pulmonary disease patients: a systematic review and meta-analysis. *Int J Environ Res Public Health*. 2022;19(15):9101. doi:10.3390/ijerph19159101
6. Helvacı A, Gök Metin Z. The effects of nurse-driven self-management programs on chronic obstructive pulmonary disease: a systematic review and meta-analysis. *J Adv Nurs*. 2020;76(11):2849–2871. doi:10.1111/jan.14505
7. Xiaofang Q. Effect of quality nursing on pulmonary function and quality of life in patients with COPD. *Stud Trace Elem Health*. 2020;37(04):89–90.
8. Lareau SC, Fahy B, Meek P, et al. Chronic obstructive pulmonary disease (COPD). *Am J Respir Crit Care Med*. 2019;199(1):1–P2. doi:10.1371/journal.pone.0190228
9. Chandra Y. Mapping the evolution of entrepreneurship as a field of research (1990–2013): a scientometric analysis. *PLoS One*. 2018;13(1):e0190228. doi:10.1371/journal.pone.0190228
10. Ke L, Lu C, Shen R, et al. Knowledge mapping of drug-induced liver injury: a scientometric investigation (2010–2019). *Front Pharmacol*. 2020;11:842. doi:10.3389/fphar.2020.00842
11. Carve M, Allinson G, Nuggeoda D, et al. Trends in environmental and toxicity research on organic ultraviolet filters: a scientometric review. *Sci Total Environ*. 2021;773:145628. doi:10.1016/j.scitotenv.2021.145628
12. Chen X, Liu Y. Visualization analysis of high-speed railway research based on CiteSpace. *Transport Pol*. 2020;85:1–17.
13. Chen Y, Chen CM, Liu ZY, et al. The methodology function of CiteSpace mapping knowledge domains. *Stud Sci Sci*. 2015;33(2):242–253. doi:10.16192/j.cnki.1003-2053.2015.02.009
14. Xu D, Wang YL, Wang KT, et al. A scientometrics analysis and visualization of depressive disorder. *Curr Neuropharmacol*. 2021;19(6):766–786. doi:10.2174/1570159X18666200905151333
15. Chen C. Science mapping: a systematic review of the literature. *J Data Inf Sci*. 2017;2(2):1–40. doi:10.1515/jdis-2017-0006
16. Guo J, Xue J, Hua J, et al. Research status and trends of underwater photosynthesis. *Sustainability*. 2022;14(8):4644. doi:10.3390/su12187810
17. Houben CHM, Spruit MA, Wouters EFM, et al. A randomised controlled trial on the efficacy of advance care planning on the quality of end-of-life care and communication in patients with COPD: the research protocol. *BMJ Open*. 2014;4(1):e004465. doi:10.1136/bmjopen-2013-004465
18. Li X, Du J, Long H. A comparative study of Chinese and foreign green development from the perspective of mapping knowledge domains. *Sustainability*. 2018;10(12):4357. doi:10.3390/su10124357
19. McCarthy B, Casey D, Devane D, et al. Pulmonary rehabilitation for chronic obstructive pulmonary disease. *Cochrane Database Syst Rev*. 2015;2. doi:10.1002/14651858.CD003793.pub3
20. Schmid-Mohler G, Caress AL, Spirig R, et al. Introducing a model for emotional distress in respiratory disease: a systematic review and synthesis of symptom management models. *J Adv Nurs*. 2019;75(9):1854–1867. doi:10.1111/jan.13968
21. Yan T, Xue J, Zhou Z, et al. The trends in research on the effects of biochar on soil. *Sustainability*. 2020;12(18):7810. doi:10.3390/su12187810
22. Rawal LB, Kanda K, Biswas T, et al. Non-communicable disease (NCD) corners in public sector health facilities in Bangladesh: a qualitative study assessing challenges and opportunities for improving NCD services at the primary healthcare level. *BMJ Open*. 2019;9(10):e029562. doi:10.1136/bmjopen-2019-029562
23. Mormina M, Pinder S. A conceptual framework for training of trainers (ToT) interventions in global health. *Global Health*. 2018;14(1):1–11. doi:10.1186/s12992-018-0420-3
24. Chen Y, Li X. Risk factors and risk model construction of respiratory failure in elderly Patients with COPD with acute exacerbation. *Chin J Gerontol*. 2022;42(22):5478–5480.
25. Zhang J, Xu N, Zheng D. Effect of high-quality nursing care on patients with acute exacerbation of chronic obstructive pulmonary disease complicated with respiratory failure: an observational cohort study. *Appl Bionics Biomech*. 2022;9440899. doi:10.1155/2022/9440899
26. Ahn JH, Chung JH, Shin KC, et al. Critical inhaler handling error is an independent risk factor for frequent exacerbations of chronic obstructive pulmonary disease: interim results of a single center prospective study. *Int J Chron Obstruct Pulmon Dis*. 2019;2767–2775. doi:10.2147/copd.S234774
27. Loh CH, Peters SP, Lovings TM, et al. Suboptimal inspiratory flow rates are associated with chronic obstructive pulmonary disease and all-cause readmissions. *Ann Am Thorac Soc*. 2017;14(8):1305–1311. doi:10.1513/AnnalsATS.201611-903OC
28. De Tratto K, Gomez C, Ryan CJ, et al. Nurses' knowledge of inhaler technique in the inpatient hospital setting. *Clin Nurse Spec*. 2014;28(3):156–160. doi:10.1097/nur.0000000000000047
29. Pleguezuelos E, Del Carmen A, Moreno E, et al. The experience of COPD patients in lockdown due to the COVID-19 pandemic. *Int J Chron Obstruct Pulmon Dis*. 2020;2621–2627. doi:10.2147/copd.S268421
30. Rutkowski S. Management challenges in chronic obstructive pulmonary disease in the COVID-19 pandemic: telehealth and virtual reality. *J Clin Med*. 2021;10(6):1261. doi:10.3390/jcm10061261
31. Arnaert A, Ahmad H, Mohamed S, et al. Experiences of patients with chronic obstructive pulmonary disease receiving integrated telehealth nursing services during COVID-19 lockdown. *BMC Nurs*. 2022;21(1):205. doi:10.1186/s12912-022-00967-2
32. Gasmi A, Peana M, Pivina L, et al. Interrelations between COVID-19 and other disorders. *Clin Immunol*. 2021;224:108651. doi:10.1016/j.clim.2020.108651
33. Turale S, Meechamnan C, Kunaviktikul W. Challenging times: ethics, nursing and the COVID-19 pandemic. *Int Nurs Rev*. 2020;67(2):164–167. doi:10.1111/inr.12598
34. Zarowitz BJ, O'Shea T, Lefkowitz A, et al. Development and validation of a screening tool for chronic obstructive pulmonary disease in nursing home residents. *J Am Med Dir Assoc*. 2011;12(9):668–674. doi:10.1016/j.jamda.2010.11.007
35. Tang Y, Yuan L. Effect of respiratory muscle function exercise combined with personalized health education on patients with chronic obstructive pulmonary disease during rehabilitation period. *CHINA MED Pharm*. 2022;10:24.
36. Xiao Y, Zhang E. Analysis of the effect of comprehensive breathing exercise on self-management behavior and lung function of patients with COPD. *Syst Med*. 2021;6(13):180–183+187.

37. Zwerink M, Brusse-Keizer M, van der Valk PD, et al. Self management for patients with chronic obstructive pulmonary disease. *Cochrane Database Syst Rev.* 2014;3. doi:10.1002/14651858.CD002990.pub3
38. Rehman AU, Hassali MAA, Muhammad SA, et al. The economic burden of chronic obstructive pulmonary disease (COPD) in Europe: results from a systematic review of the literature. *Eur J Health Econ.* 2020;21:181–194. doi:10.1007/s10198-019-01119-1
39. Zafari Z, Li S, Eakin MN, et al. Projecting long-term health and economic burden of COPD in the United States. *Chest.* 2021;159(4):1400–1410. doi:10.1016/j.chest.2020.09.255
40. Blair KA, Evelo AJ. Risk factors for COPD: what do NPs know? *J Am Assoc Nurse Pract.* 2014;26(3):123–130. doi:10.1002/2327-6924.12032
41. Haghoshayie E, Hasanpoor E. Evidence-based nursing management: basing organizational practices on the best available evidence. *Creat Nurs.* 2021;27(2):94–97. doi:10.1891/cnrn-d-19-00080
42. Siddaway AP, Wood AM, Hedges LV. How to do a systematic review: a best practice guide for conducting and reporting narrative reviews, meta-analyses, and meta-syntheses. *Annu Rev Psychol.* 2019;70:747–770. doi:10.1146/annurev-psych-010418-102803
43. Qin R, Liu Z, Zhou X, et al. Adherence and efficacy of smoking cessation treatment among patients with COPD in China. *Int J Chron Obstruct Pulmon Dis.* 2021:1203–1214. doi:10.2147/copd.S301579
44. Hill Rice V, Heath L, Livingstone-Banks J, et al. Nursing interventions for smoking cessation. *Cochrane Database Syst Rev.* 2017:12. doi:10.1002/14651858.CD001188.pub5
45. Ma C, Weng F, Wang Z, et al. Research progress of pulmonary rehabilitation in chronic obstructive pulmonary disease. *J Clin Pulm Med.* 2011;16:12.
46. Zeng GS, Chen LC, Fan HZ, et al. The relationship between steps of 6MWT and COPD severity: a cross-sectional study. *Int J Chron Obstruct Pulmon Dis.* 2018:141–148. doi:10.2147/copd.S188994
47. Wang Y, Zang XY, Bai J, et al. Effect of a Health Belief Model-based nursing intervention on Chinese patients with moderate to severe chronic obstructive pulmonary disease: a randomised controlled trial. *J Clin Nurs.* 2014;23(9–10):1342–1353. doi:10.1111/jocn.12394
48. Van Noort E, Mennema-Vastenhout TH. Online self-management in patients with COPD: with or without the doctor/nurse. *Int J Integr Care.* 2012;12(Suppl1):e83.
49. Zakrisson AB, Hägglund D. The asthma/COPD nurses' experience of educating patients with chronic obstructive pulmonary disease in primary health care. *Scand J Caring Sci.* 2010;24(1):147–155. doi:10.1111/j.1471-6712.2009.00698.x
50. Song HY, Yong SJ, Hur HK. Effectiveness of a brief self-care support intervention for pulmonary rehabilitation among the elderly patients with chronic obstructive pulmonary disease in Korea. *Rehabil Nurs.* 2014;39(3):147–156. doi:10.1002/rnj.92
51. Baker E, Fatoye F. Patient perceived impact of nurse-led self-management interventions for COPD: a systematic review of qualitative research. *Int J Nurs Stud.* 2019;91:22–34. doi:10.1016/j.ijnurstu.2018.12.004
52. Disler R, Pascoe A, Luckett T, et al. Barriers to palliative care referral and advance care planning (ACP) for patients with COPD: a cross-sectional survey of palliative care nurses. *Am J Hosp Palliat Care.* 2022;39(2):169–177. doi:10.1177/10499091211018192
53. Schmid-Mohler G, Clarenbach C, Brenner G, et al. Evaluation of the need for an Advanced Practice Nurse for COPD patients with a pulmonary exacerbation in Switzerland. *Eur Respir J.* 2019:54. doi:10.1183/13993003.congress-2019.OA268
54. Sloots JM, Barton CA, Buckman J, et al. The predictive value of an adjusted COPD assessment test score on the risk of respiratory-related hospitalizations in severe COPD patients. *Chron Respir Dis.* 2017;14(1):72–84. doi:10.1177/1479972316687099
55. Bentsen SB, Holm AM, Christensen VL, et al. Changes in and predictors of pain and mortality in patients with chronic obstructive pulmonary disease. *Respir Med.* 2020;171:106116. doi:10.1016/j.rmed.2020.106116
56. Chen L, Chen L, Zheng H, et al. Emergency admission parameters for predicting in-hospital mortality in patients with acute exacerbations of chronic obstructive pulmonary disease with hypercapnic respiratory failure. *BMC Pulm Med.* 2021;21:1–10. doi:10.1186/s12890-021-01624-1
57. Melhem O, Savage E, Al Hmairat N, et al. Symptom burden and functional performance in patients with chronic obstructive pulmonary disease. *Appl Nurs Res.* 2021;62:151510. doi:10.1016/j.apnr.2021.151510
58. Bringsvor HB, Skaug K, Langeland E, et al. Symptom burden and self-management in persons with chronic obstructive pulmonary disease. *Int J Chron Obstruct Pulmon Dis.* 2018:365–373. doi:10.2147/COPD.S151428
59. Cravo A, Attar D, Freeman D, et al. The importance of self-management in the context of personalized care in COPD. *Int J Chron Obstruct Pulmon Dis.* 2022:231–243. doi:10.2147/COPD.S343108
60. Vogelmeier CF, Criner GJ, Martinez FJ, et al. Global strategy for the diagnosis, management, and prevention of chronic obstructive lung disease 2017 report. GOLD executive summary. *Am J Respir Crit Care Med.* 2017;195(5):557–582. doi:10.1164/rccm.201701-0218PP

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