PERFORMANCE ANALYSIS OF THE TOP 50 PULMONOLOGY JOURNALS IN 2023: A DESCRIPTIVE BIBLIOMETRIC REVIEW

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Abstract

Publication metrics, which measure how frequently a journal or article is cited, offer insights into its impact. With increasing competition in publishing, bibliometrics have evolved to assess a journal's reputation and a researcher's output. This review conducts a descriptive analysis of the top 50 pulmonology journals using bibliometric indicators to understand the evolution of pulmonary research from 2019 to 2023 and examines how these changes may be related to the COVID-19 pandemic. The analysis reveals shifts in journal rankings, with some journals improving and others declining along with changes in research output and citation dynamics. The review provides researchers with perspective into journal performance in pulmonary research, particularly in the context of COVID-19 pandemic's influence on respiratory health.

Categories: Pulmonology, Bibliometrics, COVID-19

Keywords: Publication Metrics, Journal Rankings, Research Output, Citation , Respiratory Health

Introduction:

The increasing competition in publishing has led to the development of bibliometric metrics to assess both a journal's academic reputation and a researcher's output. Academic publishing is shaped

by three interconnected factors: authors aiming to publish more, readers overwhelmed by research wanting to read less, and editors focusing on enhancing their journal's readership and scientific impact.[1,2]

Various metrics are used to evaluate journal quality, with the Journal Impact Factor (JIF) often emphasized. The JIF is widely believed to reflect a journal's reputation for original scientific findings and, by extension, can serve as an objective measure of a researcher's contributions.[1] However, no single metric fully captures an author's impact; the most appropriate metric depends on the specific purpose and context.[2]

This review aims to analyze trends in key metrics for the top 50 pulmonology journals in 2023 using data from the Scopus database and compare them with those from 2019. The descriptive bibliometric analysis done in this review will offer researchers valuable insights into journal performance in pulmonary research, especially in the context of the COVID-19 pandemic's impact on respiratory health.

Bibliometrics

Bibliometrics involves using mathematical and statistical methods to analyze books and other forms of communication. Bibliometrics is used to quantitatively analyze scientific literature, and has been widely used in medicine to measure the impact of a journal. To use and analyze these metrics properly, it's important to understand the underlying principles. The study of bibliometrics and their correlations is widely conducted in researching publications in medical specialties. With the advancement of computer technology and the widespread use of the internet, bibliometric analysis has increased since the early 2000s.[3]

Current status of publication metrics

Publication metrics used to measure the impact of a publication provide an overview of how often a journal or article has been cited or used. For example, the Journal Impact Factor (JIF) shows the average citation performance of articles in a journal. However, it's not appropriate to use journal-level metrics like the JIF to evaluate individual authors. Metrics at the author level and citations to specific articles tend to increase over time, but self-citations can artificially inflate these numbers. Therefore, publication metrics should not be the only factor used to judge the scientific value of research or researchers.[4]

Publication metrics can pertain to the journal in which articles are published, the authors of scientific articles, or the articles themselves. Much of the data on publication metrics is gathered from bibliographic databases where scientific articles are indexed. It is important to note that these metrics have limitations. For example, assessing the research output of an individual researcher based solely on a single figure, such as the h-index, is not comprehensive.

Journal-level metrics are based on citation and usage data of scientific journals in the databases in which they are indexed. It is important to consider that publishing in a journal with a high impact factor is often considered prestigious. However, this may not necessarily reflect the quality of an individual article published in the journal, as the impact factor primarily indicates the average number of citations an article receives in the next 2-5 years in that particular journal. Also, certain types of articles, such as review articles, are more likely to be cited than original articles, leading to potential instabilities in journal impact factors over time.[4,5]

Scientific publications can sometimes contain unreliable results due to honest mistakes, statistical variations, or intentional misconduct. The current publication system plays a significant role in evaluating the success of scientific community members by focusing on their ability to get published in prestigious journals. This hierarchical publication system, also known as "journal rank," not only shapes the scientific community by selecting its members but also influences science's standing in society. In recent years, there has been increased scientific research on the effectiveness of these quality control measures.[6]

As global research continues to expand, research organizations are increasingly relying on quantitative methods to recruit and advance researchers, allocate funding, and assess the impact of

previous funding. It is common practice to use various quantitative metrics to rank researchers, papers, journals, and even institutions and countries. Many of these metrics are based on research publications.[5,6]

In the age of digital resources and widespread online content, article level metrics such as Altmetric are being increasingly used to assess the spread of scientific information and research impact. While traditional metrics like citations are slow to reveal how articles are being used and their overall significance, alternative metrics have emerged to highlight noteworthy articles promptly and help in adjusting research and journal publishing strategies. Academic disciplines and countries with low citation metrics could particularly benefit from supplementing article citations with alternative metrics and adapting their research and development strategies accordingly.

Selecting ethical, highly visible, and professionally relevant sources for publishing research data is the first step toward making a global impact for skilled researchers. Choosing target journals wisely is crucial in light of the proliferation of low-quality, poorly visible, and non-citable journals that prioritize quantity over quality. Understanding the value and relevance of the currently available evaluation metrics is equally important, and these metrics can be displayed on individual profiles by sourcing information from various bibliographic databases, search engines, and social networking platforms.[2,4,7]

Journal metrics employed

Our study focused on identifying systematically the trends in the rankings of the analysed journals in 2019 and 2023, all types of published articles in the selected journals between the years 2016-2019 and 2020-2023, SCImago journal rank indicator, journal quartile and CiteScore for the year 2019 and 2023. The following are the quantitative journal metrics that have been employed in this review.

SCImago Journal Rank (SJR)

The SCImago Journal Rank (SJR) indicator is a measure based on the SCOPUS database, which evaluates the quality of journals indexed in Scopus from 1996.The SJR uses a methodology that assigns different values to citations based on the "prestige" of the citing journal, while disregarding the impact of journal self-citations. SCImago Journal Rank (SJR) assesses how often articles published in a journal have been cited by other journals over the last three years. SJR provides a credible alternative to the widely accepted Impact Factor(IF).[3]

The SJR measures the prestige awarded to each article in a given year and is calculated using a complex iterative formula. Self-citations are not considered in the SJR calculation because a journal's prestige is only derived from other journals, not from itself.[8] We studied the ranking of pulmonology journals using the SJR.

Total Docs

This metric provides the total number of articles published by a journal of any type. The SCImago Journal & Country Rank portal provided data for the last three years and the current year individually, which allowed us to aggregate the data for a more broad comparison before and after the COVID-19 pandemic.

Journal Quartile

To categorize journals by quartile (Q), their impact factor or CiteScore is used, which shows how often articles from that journal are cited in other scientific papers. They are grouped under four quartiles[9] :

Q1: Top-tier journals with the most citations
Q2: High-quality journals with slightly fewer citations than Q1
Q3: Journals that are moderately influential and widely used for scientific research
Q4: Journals with lower impact, often newly added to the database

CiteScore

CiteScore is a metric similar to the impact factor. It offers advantages compared to the traditional Impact Factor (IF).[10] The analysis of citations at the journal level in Scopus database provides metrics such as CiteScore, Source-Normalized Impact Factor, and SCImago Journal Rank (SJR), which are all based solely on peer-reviewed articles.[9]

CiteScore of a journal is the average number of citations received by its published documents over a four-year period, divided by the total number of documents published in that journal during the same time frame.[10] Citable items include research and review articles, conference abstracts, data papers, and textbook chapters. It also specifies the types of articles considered for both the numerator and the denominator when calculating the CiteScore. The CiteScore has no upper limit. For example, the CiteScore for the New England Journal of Medicine is 110.5, and for The Lancet Rheumatology, it is 23.0.[10]

The Source Normalized Impact Factor (SNIP) calculates the mean number of citations to articles in a journal relative to the citations received by journals in the same field.[11]

Methodology

Data Sources

This descriptive bibliometric analysis using secondary data was performed by searching the SCImago Journal & Country Rank portal for the journals. The SCImago Journal & Country Rank is a free online platform that offers scientific rankings for journals and countries, based on data from the Scopus database.[12] We chose to use the SCImago Journal & Country Rank portal mainly because it provides open access to its indicators. Being based on the Scopus database, which has a large collection of journals, allows for a more comprehensive estimation of their scientific value and prestige.

Selection Criteria

We selected the top 50 journals in the field of Pulmonary and Respiratory Medicine from the SCImago journal rankings for the year 2023, without applying any filters on the search function. We then compared the metrics of these top 50 journals discussed above with their counterparts from the year 2019. One of the metrics used, the CiteScore, was retrieved from the official Scopus website (https://www.scopus.com/sources.uri?RN_AG_Sourced_400000654)

Data Export and Analysis

Extracted data were exported from the SCImago Journal & Country Rank portal and Scopus website to Microsoft Excel. Descriptive analysis with measures of central tendency and variability were done using SPSS (Statistical Package for the Social Sciences) software. Data visualisations were created using Google Sheets.

Results

SCImago Journal Rankings

The Lancet Respiratory Medicine maintained its top rank, while the Journal of Thoracic Oncology improved significantly to 2nd place. Journal of Heart and Lung Transplantation saw a notable drop from 3rd to 8th place. New entrants like Paediatric Respiratory Reviews and JTO Clinical and Research Reports entered the top 50, while several journals, including Lung Cancer International and BMC Pulmonary Medicine, dropped out of the rankings compared to 2019.

SJR Changes:

The Journal of Thoracic Oncology had the most significant SJR increase (+4.661), while the Journal of Heart and Lung Transplantation saw the largest decrease (-1.440). Moderate SJR changes were observed for several journals, with increases for European Respiratory Review (+0.943) and Journal of Cystic Fibrosis (+0.632) and decreases for American Journal of Respiratory and Critical Care Medicine (-0.546) and Chest (-0.460). Paediatric Respiratory Reviews, a new entry, had an SJR of

1.420 in 2023.**Table 1** shows the trends in rankings and SCImago Journal Rank indicator in the year 2019 and 2023

Table 1: Trends in SCImago Journal Rankings of top 50 pulmonology journals (2019 Vs 2023)

Journal Name	Rank-2019	Rank-2023	SJR Change (2019-2023)	Observation
Lancet Respiratory Medicine	1	1	0.449	Stable
Journal of Thoracic Oncology	7	2	4.661	Improved
American Journal of Respiratory and Critical Care Medicine	2	3	-0.546	Decreased
European Respiratory Journal	5	4	0.412	Improved
Sleep Medicine Reviews	4	5	-0.006	Slight Decrease
Thorax	6	6	-0.247	Stable
European Respiratory Review (Open Access)	9	7	0.943	Improved
Journal of Heart and Lung Transplantation	3	8	-1.44	Decreased
Chest	8	9	-0.46	Decreased
Journal of Cystic Fibrosis	20	10	0.632	Improved
Annals of the American Thoracic Society	11	11	0.205	Stable
American Journal of Respiratory Cell and Molecular Biology	10	12	-0.116	Slight Decrease
Lung Cancer	14	13	0.056	Improved
Journal of Thoracic and Cardiovascular Surgery	15	14	0.136	Improved
Respirology	12	15	-0.21	Decreased
Clinics in Chest Medicine	29	16	0.326	Improved
Respiratory Research (Open Access)	19	17	0.062	Improved
Influenza and other Respiratory Viruses (Open Access)	13	18	-0.224	Decreased
Paediatric Respiratory Reviews	NA	19	NA	New Entrant
American Journal of Physiology - Lung Cellular and Molecular Physiology	16	20	-0.16	Decreased
BMJ Open Respiratory Research (Open Access)	24	21	0.029	Improved
JTO Clinical and Research Reports (Open Access)	NA	22	NA	New Entrant
Clinical and Translational Allergy (Open Access)	22	23	-0.061	Decreased
Lung	18	24	NA	Dropped
Pulmonology (Open Access)	NA	25	NA	New Entrant
Current Allergy and Asthma Reports	30	26	0.076	Stable
Clinical Lung Cancer	21	27	-0.144	Decreased
ERJ Open Research (Open Access)	28	28	0.031	Stable
World Allergy Organization Journal (Open Access)	37	29	0.163	Improved
Annals of Thoracic Surgery	25	30	-0.09	Decreased
Journal of Cardiopulmonary Rehabilitation and Prevention (Open Access)	NA	31	NA	New Entrant
Respiratory Medicine	27	32	-0.07	Decreased
Therapeutic Advances in Respiratory Disease (Open Access)	44	33	0.266	Improved

Chronic Respiratory Disease (Open Access)	NA	34	NA	New Entrant
Respiration	35	35	-0.014	Stable
Journal of Clinical Sleep Medicine	31	36	-0.108	Decreased
npj Primary Care Respiratory Medicine (Open Access)	36	37	-0.067	Decreased
European Journal of Cardio-thoracic Surgery	17	38	-0.501	Dropped
Annals of Allergy, Asthma and Immunology	40	39	-0.002	Stable
Journal of Asthma and Allergy (Open Access)	23	40	-0.376	Decreased
International Journal of COPD (Open Access)	32	41	-0.178	Decreased
International Journal of Tuberculosis and Lung Disease (Open Access)	26	42	-0.326	Decreased
Current Opinion in Pulmonary Medicine	46	43	0.042	Improved
Expert Review of Respiratory Medicine	50	44	0.099	Improved
Seminars in Thoracic and Cardiovascular Surgery	41	45	-0.063	Decreased
Pediatric Pulmonology	42	46	-0.02	Decreased
Chronic Obstructive Pulmonary Diseases	NA	47	NA	New Entrant
Seminars in Respiratory and Critical Care Medicine	NA	48	NA	New Entrant
Neurobiology of Sleep and Circadian Rhythms (Open Access)	39	49	-0.196	Decreased
Allergy, Asthma and Immunology Research (Open Access)	33	50	-0.302	Decreased

*NA denotes that 2019 rankings and SJR for the new entrants in 2023 was not extracted.

Publication volume

During the period 2016-2019, the mean number of articles published by each journal was 1008, with a standard deviation of 1012. The minimum number of articles published was 46, and the maximum was 4762.

During the period 2020-2023, the mean number of articles published by each journal was 998, with a standard deviation of 717. The minimum number of articles published was 51, and the maximum was 4995.

The median number of publications across the selected top 50 journals was 803 per journal for the years 2016-2019 (Interquartile range- 889 articles). This decreased to 717 publications per journal for the years 2020-2023(Interquartile range- 893 articles).

Journals like ERJ Open Research, Chest, Respiratory Research, and BMJ Open Respiratory Research saw a significant increase in publication volume during the period 2020-2023 compared to the pre-COVID period. Several journals, such as Journal of Thoracic Oncology and European Respiratory Journal experienced decrease in publications in 2020-2023 period.

Journals like Lancet Respiratory Medicine, Sleep Medicine Reviews, and Journal of Clinical Sleep Medicine showed moderate to slight increases or stability in their publication output.

The **Table 2** illustrates the number of published articles in the journals between the two time periods (2016-2019, 2020-2023).

Table 2: Volume of Publications for Top Respiratory Journals (2016-2019 vs. 2020-2023)

Journal	Total Docs 2016-2019	Total Docs 2020-2023	Change
Lancet Respiratory Medicine	1115	1245	130
Journal of Thoracic Oncology	1551	1069	-482
American Journal of Respiratory and Critical Care Medicine	2735	2766	31
European Respiratory Journal	2322	2130	-192
Sleep Medicine Reviews	345	440	95
Thorax	930	900	-30
European Respiratory Review (Open Access)	286	405	119
Journal of Heart and Lung Transplantation	892	931	39
Chest	2295	3048	753
Journal of Cystic Fibrosis	622	877	255
Annals of the American Thoracic Society	1553	1285	-268
American Journal of Respiratory Cell and Molecular Biology	814	779	-35
Lung Cancer	1145	1120	-25
Journal of Thoracic and Cardiovascular Surgery	4762	4995	233
Respirology	911	918	7
Clinics in Chest Medicine	296	289	-7
Respiratory Research (Open Access)	925	1313	388
Influenza and other Respiratory Viruses (Open Access)	298	507	209
Paediatric Respiratory Reviews	NA	230	NA
American Journal of Physiology - Lung Cellular and Molecular Physiology	791	766	-25
BMJ Open Respiratory Research (Open Access)	226	540	314
JTO Clinical and Research Reports (Open Access)	NA	478	NA
Clinical and Translational Allergy (Open Access)	191	326	135
Lung	NA	365	NA
Pulmonology (Open Access)	NA	498	NA
Current Allergy and Asthma Reports	308	215	-93
Clinical Lung Cancer	595	667	72
ERJ Open Research (Open Access)	452	1412	960
World Allergy Organization Journal (Open Access)	195	425	230
Annals of Thoracic Surgery	4165	4090	-75
Journal of Cardiopulmonary Rehabilitation and Prevention (Open Access)	NA	339	NA
Respiratory Medicine	1004	1044	40
Therapeutic Advances in Respiratory Disease (Open Access)	184	284	100
Chronic Respiratory Disease (Open Access)	NA	184	NA
Respiration	540	490	-50

Journal of Clinical Sleep Medicine	1056	1330	274
npj Primary Care Respiratory Medicine (Open Access)	223	195	-28
European Journal of Cardio-thoracic Surgery	1937	2242	305
Annals of Allergy, Asthma and Immunology	1324	1364	40
Journal of Asthma and Allergy (Open Access)	126	490	364
International Journal of COPD (Open Access)	1380	1115	-265
International Journal of Tuberculosis and Lung Disease (Open Access)	1118	965	-153
Current Opinion in Pulmonary Medicine	363	353	-10
Expert Review of Respiratory Medicine	445	514	69
Seminars in Thoracic and Cardiovascular Surgery	538	980	442
Pediatric Pulmonology	1009	2070	1061
Chronic Obstructive Pulmonary Diseases	NA	182	NA
Seminars in Respiratory and Critical Care Medicine	NA	313	NA
Neurobiology of Sleep and Circadian Rhythms (Open Access)	46	51	5
Allergy, Asthma and Immunology Research (Open Access)	302	365	63

*NA- As metrics for new entrants in Top 50 journals of 2023 was not extracted from the earlier period, we could not calculate the publication output of these journals.

This following Pareto analysis helps to identify the journals that dominate the field in terms of publication volume. From **Figure 1**, it is evident that Journal of Thoracic and Cardiovascular Surgery has the highest publication output, significantly more than any other journal. Journals towards the right, such as Therapeutic Advances in Respiratory Disease, Chronic Obstructive Pulmonary Diseases and Neurobiology of Sleep and Circadian Rhythms have the lowest publication outputs.

Figure 1: Analysis of publication output of journals from 2016-2023
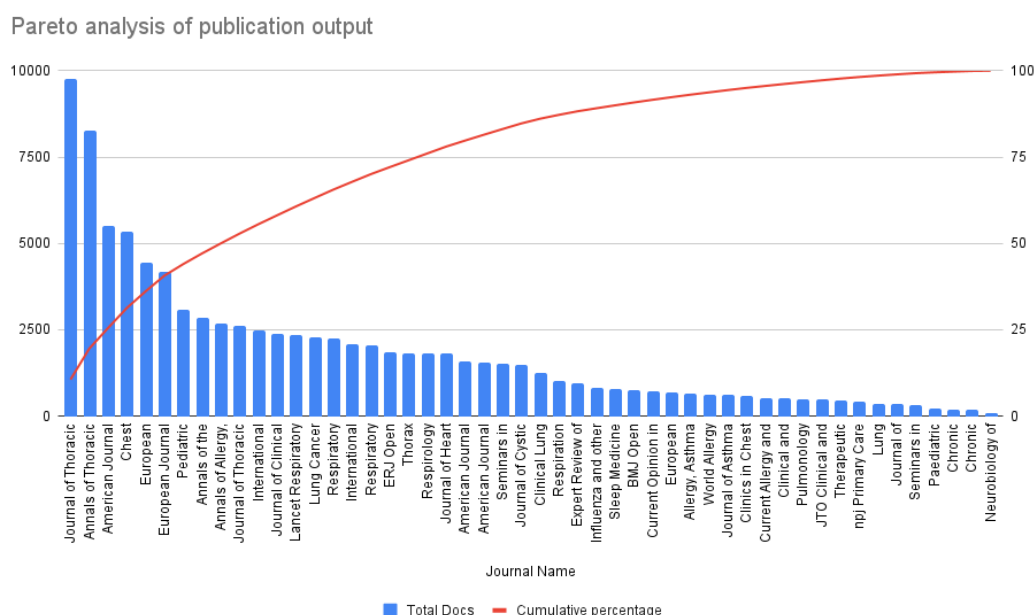
Journal Quartiles

Figure 2 shows comparison of journal impact factor quartiles between 2019 and 2023. There is a significant increase in the number of journals categorized under Q1 from 2019 to 2023 and a noticeable increase in the number of Q2 journals in the same period is seen.

Figure 2 shows comparison of journal impact factor quartiles between 2019 and 2023.
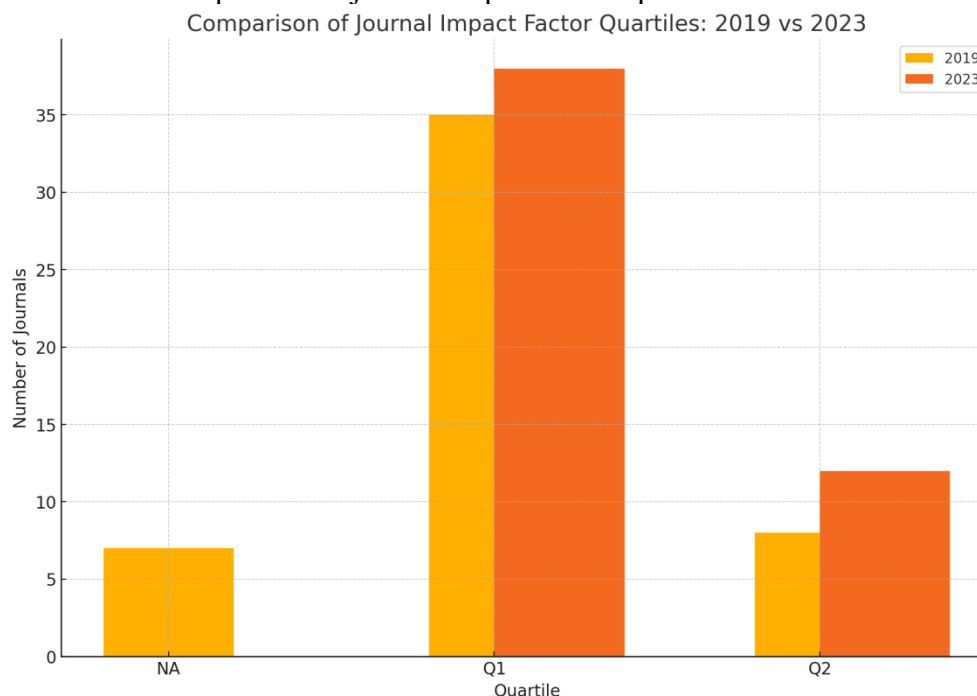
*NA – Denotes the quartiles of new entrant journals in the year 2023 whose 2019 data was not extracted.

On analysing the individual journals, the following observations were made. **Table 3** shows changes in Journal Impact Factor Quartiles (2019-2023). The quartiles of journals not mentioned in the table below have remained unchanged between 2019-2023.

Table 3 : Changes in Journal Impact Factor Quartiles (2019-2023)

Category	Journal Name	2019 Quartile	2023 Quartile
Improved	Respiratory Medicine	Q2	Q1
	European Journal of Cardio-thoracic Surgery	Q2	Q1
Fell	Annals of Allergy, Asthma and Immunology	Q1	Q2
	Journal of Asthma and Allergy (Open Access)	Q1	Q2
	International Journal of COPD (Open Access)	Q1	Q2
	International Journal of Tuberculosis and Lung Disease (Open Access)	Q1	Q2
	Allergy, Asthma and Immunology Research (Open Access)	Q1	Q2
New Entrants	Paediatric Respiratory Reviews	NA	Q1
	JTO Clinical and Research Reports (Open Access)		
	Lung		
	Annals of Thoracic Surgery		
	Therapeutic Advances in Respiratory Disease (Open Access)		
	Chronic Obstructive Pulmonary Diseases		Q2
	Seminars in Respiratory and Critical Care Medicine		

CiteScore trends

In 2023, the mean CiteScore of the journals was 11.95, with a standard deviation of 13.118. This is an increase compared to the mean score of 7.78 observed in 2019, where the standard deviation was 4.966. The improvement in CiteScores in 2023 suggests that the journals have had a higher impact and gained greater recognition within their respective fields over the years. The **Figure 3** depicts Component bar chart comparing CiteScores of journals between 2019 and 2023.

Figure 3: Component bar chart comparing CiteScores of journals between 2019 and 2023.

CiteScore of Journals - 2019 and 2023
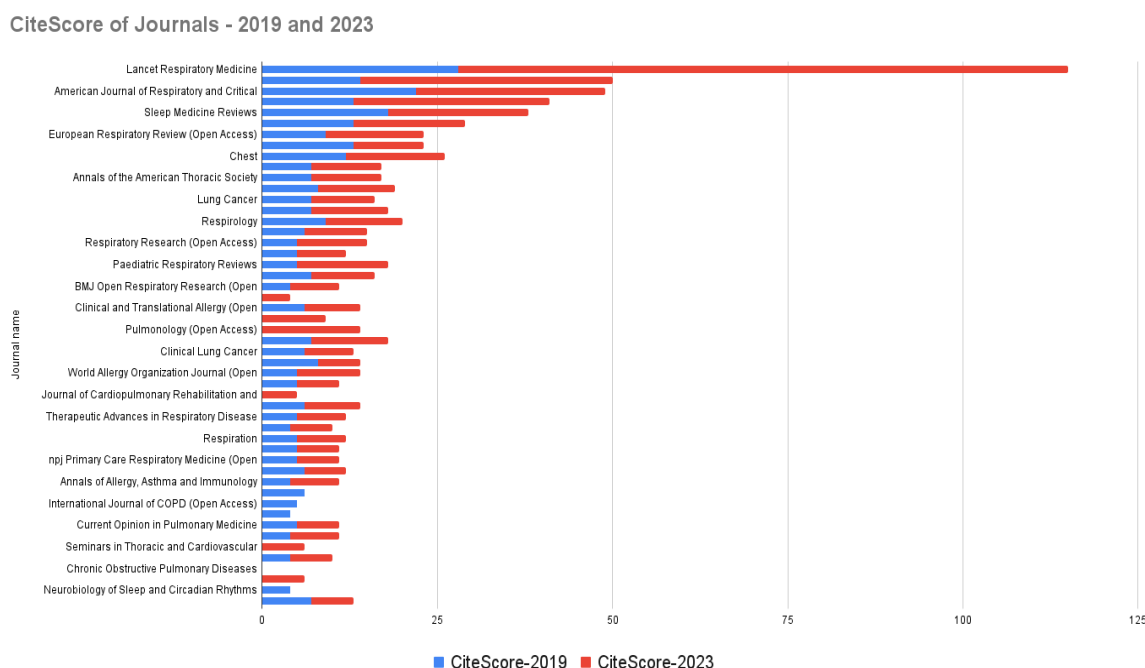
*Absent bars denote CiteScores for the specified year/years was not available.

Discussion

Journals like Chest, ERJ Open Research, and BMJ Open Respiratory Research saw significant increases in publication volume in recent years. This surge can be attributed to the high demand for disseminating COVID-19-related research, reflecting these journals' responsibility to explore and address relevant issues during the pandemic.

The Journal of Thoracic Oncology saw a significant improvement in its rank and SJR, likely due to an increased focus on COVID-19's impact on cancer patients and related respiratory complications. In contrast, the Journal of Heart and Lung Transplantation experienced a drop, possibly due to a shift in research priorities and fewer transplant-related studies during the pandemic.

Journals such as The Lancet Respiratory Medicine and Journal of Cystic Fibrosis benefited from high citation rates. The urgency and global relevance of pandemic-related studies could have led to frequent citations, boosting these journals' SJR and overall impact.

The inclusion of journals like Paediatric Respiratory Reviews and JTO Clinical and Research Reports in the top 50 rankings in 2023 shows the rising interest in research on COVID-19's impact on specific populations, emphasizing the need for specialized knowledge.

Some journals moved to higher quartiles, indicating improved impact and recognition. For example, Respiratory Medicine and European Journal of Cardio-thoracic Surgery improved to Q1. This could be due to publishing high-impact COVID-19 studies that were widely cited, enhancing their value.[13]

The mean CiteScore of the top 50 journals increased from 7.78 in 2019 to 11.95 in 2023. This rise could be attributed to the high citation impact of COVID-19-related research published during the years following the pandemic.

Despite some journals seeing increased publication volume, the median number of publications across the top 50 journals decreased from 803 (2016-2019) to 717 (2020-2023). This indicates that the pandemic initially disrupted research activities, followed by a subsequent increase in publications. To fully understand this trend, it would be beneficial to analyze the publication output of journals in each year individually following the pandemic.

Limitations

This bibliometric study has several limitations. Firstly, descriptive analysis of journal metrics may not fully reflect evolving impacts such as COVID-19, leading to temporary skewness in metrics. Secondly, descriptive measures may not differentiate between quantity and quality of published articles, as higher publication volume doesn't always correlate with increased quality. Thirdly, COVID-19's impact on citation practices and publishing patterns can vary widely across different fields within pulmonary medicine. Our study used CiteScore, which averages citations across all document types, limiting our ability to explore theses nuances compared to SNIP (Source Normalized Impact per Paper), which considers field-specific citation practices and impacts.

Conclusion

This bibliometric review highlights significant shifts in the field of top pulmonology journals from 2019 to 2023, possibly largely driven by the COVID-19 pandemic. The analysis reveals notable changes in journal rankings, with journals like the Journal of Thoracic Oncology experiencing remarkable improvements in SJR, while others, such as the Journal of Heart and Lung Transplantation, saw declines. The rise in publication volumes for journals like Chest and ERJ Open Research highlights the pandemic's role in accelerating dissemination of research. The increase in mean CiteScore indicates a heightened impact and recognition of published research. Despite a reduction in the median number of publications across top journals, the overall trends reflect a period of rapid adaptation and response to emergent respiratory health challenges. Research field mapping based on network analyses would be required to further explore the publication landscape of these journals over these years. This review highlights the dynamics of publishing metrics and provides an overview of how the field of pulmonary research may have evolved in response to the COVID-19 pandemic.

Declarations:

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