

Authorship And Collaborative Pattern In The Field Of Nephrology: A Scientometric Study

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Abstract

The purpose of this study was to measure the number of contributions and highlight the contributions made by the researchers in the field of Nephrology and published on the Web of Science database during 2012-2021 using scientometric analysis. The data was interpreted by using software such as Bibexcel and Vosviewer and tabulated using MS Excel. The results indicated that 7539 papers were published during 2012-2021 and the highest number of publications, 1166 (15.4%) was produced in 2020. For ten years journals were the major channel of communication used by researchers. The trends in multi-authored papers have tremendously increased (90.16%) compared to (9.84%) single-authored papers. The degrees of collaboration (0.90%) are noted significantly and the highest number of papers 967 (12.8%) was contributed by the collaboration of two authors. It also noted that the value of the highest degree of collaboration was (0.94%) in 2021. The publication behavior of researchers shows that they are highly selective in publishing the research results in specialized articles. The collaborative index (6.47%) was produced in 2021 and also, collaborative co-efficient papers have increased (0.75%) in 2021.

Keywords: Nephrology, Authorship pattern, Collaborative Index, Degree of Collaboration.

1. INTRODUCTION

Scientometric is an area of research in Library and Information Science Subject, which has received considerable attention from the researchers all over the world for past decades. "This could include identifying emerging areas of scientific research, examining the development of research over time or geographic and organizational distributions of research" (Glossary of Thompson, 2008). Scientometric aims to analyze and evaluate science, technology and innovation. Major research includes measuring the impact of the authors, publications, journals, institutes, citations, highly cited works and countries as referenced to sets of scientific publications such as articles and patents. "Nephrology is the adult and paediatric study of the kidneys and its diseases. The nephrologist deals with the diagnosis and management of kidney disease. The kidneys are vital for maintaining normal fluid and electrolyte balance in the body." (Gomathi & Victoria)

2. OBJECTIVES OF THE STUDY

- To assess the distribution of nephrology research by year.
- To determine the citations and H-index of the study period.
- To find out the year-wise authorship pattern of publications.
- To analyze the degree of collaboration.
- To investigate the collaborative index and co-efficient.

3. RESEARCH METHODOLOGY

The data was collected from the Web of Science database on the topic Nephrology and timespan 2012-2021. The total number of articles retrieved was 7539. The retrieved articles were analyzed using Bibexcel software. Further analysis was done using MS Excel and VoS Viewer software. Further analysis was done using MS Excel and VoS Viewer software.

4. LITERATURE REVIEW

Velmurugan, C., & Radhakrishnan, N. (2017) they used a scientometric method to quantitatively analyze the research publications on nephrology that were published by Indian Scientists during 2010-2015. The information was gathered from the Web of Science (WoS) core collection database. A total of 2622 scholarly publications with 11993 global citations were found for analysis. This paper focuses on the various bibliographic forms of Nephrology literature, including articles, reviews, article-based proceedings paper, corrections and editorial materials. This paper deals with

authorship patterns, single versus joint authored research publications, the ranking of core journals, documents and geographically distribution.

Victoria & Gomathi (2021) this study evaluates the number of contributions and highlights made by the researchers in the field of leprosy and published on the Web of Science database during 2010-2020 using scientometric analysis. The data was interpreted by using software such as Bibexcel and Vosviewer and tabulated using MS- Excel. The results indicated that 4544 papers were published during 2010-2020 and the highest number of publications, 456 (10.03%), was produced in 2020. The trends in multi authored papers have trends papers have tremendously increased (89.28%) compared to (10.72%) single-authored papers. The relative growth rate (3.13) and degree of collaboration (0.89) are noted significantly and the highest number of papers (12.50%) was contributed by the collaboration of four authors. Source-wise, most of the records were published in an article in 3063. It also noted that the value of the highest degree of collaboration was 0.92 in 2020.

5. DATA ANALYSIS AND INTERPRETATION

5.1 Year wise distribution of publication

Year	Records	Percentage
2012	472	6.2%
2013	513	6.8%
2014	476	6.3%
2015	546	7.2%
2016	739	9.8%
2017	722	9.5%
2018	871	11.5%
2019	874	11.5%
2020	1166	15.4%
2021	1160	15.3%
Total	7539	100%

Table 1: Year wise distribution of publication

Table 1 shows the distribution of articles published on Nephrology research during 2012-2021 (10 years), inclusive of 2012 and 2021. It can be observed that from 2012 to 2015, there was a frequent change, an increase and a decrease in publications. From 2012 to 2015, there has been a gradual increase in Nephrology publication from (7.2%) to (15.3%). The maximum number of articles was published in 2020 with 1166 (15.4%) records; the next highest publications could be observed in the year 2021 with 1160 (15.3%) records. The least number of articles was observed in the year 2012 with 472 (6.2%) records.

5.2 Document Type with H-Index

h-index	Unit	Citations sum within h-core	All citations	All articles
90	Articles	15521	72780	4951
65	Review	11408	22936	963
25	Editorial Material	3189	6414	972
13	Letter	442	786	192
10	Proceedings Paper	216	415	83
6	Book Chapter	208	218	14
5	Reprint	230	232	8
5	Early Access	53	78	33
3	News Item	56	70	14
2	Correction	6	11	26
2	Book Review	7	7	2
2	Meeting Abstract	11	44	371
1	Biographical Item	1	1	12

Table 2: Document Type with H-index

Table 2 shows the distribution distribution of document and articles with H-index and citations published on Nephrology research during 2012-2021 (ten years). There was a frequent change in the H-index and citations. The maximum number of H-index (90) and citations (15521) in Articles. The Biographical item had the fewest H-index (1) and citations (1).

5.3 Year- wise Authorship Pattern

Year	1*	2*	3*	4*	5*	6*	7*	8*	9*	10*	10+*	Total
2012	57	64	65	50	40	40	38	37	19	14	48	472
2013	87	72	55	47	54	52	27	24	13	19	63	513
2014	52	48	60	40	51	49	41	25	20	13	77	476
2015	55	80	56	46	61	51	38	44	27	17	71	546
2016	85	87	97	71	67	69	60	49	31	22	101	739
2017	72	101	84	79	68	61	39	38	37	28	115	722
2018	95	116	90	83	76	69	56	48	51	19	168	871
2019	80	110	67	78	63	70	54	68	43	33	208	874
2020	94	149	107	109	106	95	89	76	55	52	234	1166
2021	65	140	94	102	106	99	89	73	60	43	289	1160
Total	742	967	775	705	692	655	531	482	356	260	1374	7539

Table 3: Year wise Authorship Pattern

1* Single Author, 2* Two Author, 3* Three Author 4* Four Author, 5* Five Author, 8* Eight Author, 9* Nine Author, 10* Ten Author, 10+* Above Ten Author.

Table 3 shows the authorship pattern of publications by year based on collaborative research. The extended authors are explained under authorship pattern table 4 and indicate that out of 7539 articles, the maximum number of articles is 1374 , which were published by the above ten authors and the lowest number of articles, 260 were published by the ten authors.

5.4 Authorship Pattern of Publications

Authorship Pattern	Records	Percentage
One Authors	742	9.54
Two Authors	967	12.82
Three Authors	775	10.27
Four Authors	705	9.35
Five Authors	692	9.17
Six Authors	655	8.68
Seven Authors	531	7.04
Eight Authors	482	6.39
Nine Authors	356	4.72
Ten Authors	260	3.44
Above Ten Authors	1374	18.22
Total	7539	100

Table 4: Authorship Pattern of Publication

5.5 Single Author versus Multi-Authors

Authorship Pattern	Records	Percentage
Single Authored Papers	742	9.84%
Multi Authored Papers	6797	90.16%
Total	7539	100%

Table 5: Single Author versus Multi-Authors

Table 5 shows the contributions of a single author and multiple authors of Nephrology research during the period 2012 to 2021. Single authors had contributed 742 (9.84%) publications and multiple authors had contributed 6797 (90.16%) publications out of 7539 publications. Hence, it is inferred that the majority of the articles were published by multiple authors.

5.6 Collaborative Index

Year	1*	2*	3*	4*	5*	6*	7*	8*	9*	10*	10+*	Total	CI
2012	57	64	65	50	40	40	38	37	19	14	48	472	5.129
2013	87	72	55	47	54	52	27	24	13	19	63	513	4.964
2014	52	48	60	40	51	49	41	25	20	13	77	476	5.632
2015	55	80	56	46	61	51	38	44	27	17	71	546	5.476
2016	85	87	97	71	67	69	60	49	31	22	101	739	5.419
2017	72	101	84	79	68	61	39	38	37	28	115	722	5.544
2018	95	116	90	83	76	69	56	48	51	19	168	871	5.735
2019	80	110	67	78	63	70	54	68	43	33	208	874	6.264
2020	94	149	107	109	106	95	89	76	55	52	234	1166	6.062
2021	65	140	94	102	106	99	89	73	60	43	289	1160	6.478

Total	742	967	775	705	692	655	531	482	356	260	1374	7539	5.796
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Table 6: Collaborative index

1* Single Author, 2* Two Author, 3* Three Author, 4* Four Author, 5* Five Author, 6* Six Author, 7* Seven Author, 8* Eight Author, 9* Nine Author, 10* Ten Author, 10+* Above Ten Author, CI Collaborative Index.

Table 6 shows the authorship pattern and Collaborative Index (CI) in Nephrology over the study period of ten years (2012-2021). The Collaborative index, 5.12 in 2012 has increased to 6.47 in 2012 and 2021. The average CI was 5.79 during the study period. The distribution of the year-wise collaboration index has been presented the table. It is seen from table 6 that the value for the collaboration index has been calculated with a minimum of 5.12 in 2012 and a maximum of 6.47 in 2021, with an average of 5.79.

5.7 Collaborative Co efficient

Year	1*	2*	3*	4*	5*	6*	7*	8*	9*	10*	10+*	Total	CC+
2012	57	64	65	50	40	40	38	37	19	14	48	472	0.669
2013	87	72	55	47	54	52	27	24	13	19	63	513	0.632
2014	52	48	60	40	51	49	41	25	20	13	77	476	0.697
2015	55	80	56	46	61	51	38	44	27	17	71	546	0.692
2016	85	87	97	71	67	69	60	49	31	22	101	739	0.684
2017	72	101	84	79	68	61	39	38	37	28	115	722	0.692
2018	95	116	90	83	76	69	56	48	51	19	168	871	0.693
2019	80	110	67	78	63	70	54	68	43	33	208	874	0.720
2020	94	149	107	109	106	95	89	76	55	52	234	1166	0.722
2021	65	140	94	102	106	99	89	73	60	43	289	1160	0.751
Total	742	967	775	705	692	655	531	482	356	260	1374	7539	0.703

Table 7: Collaborative Co efficient

1* Single Author, 2* Two Author, 3* Three Author, 4* Four Author, 5* Five Author, 6* Six Author, 7* Seven Author, 8* Eight Author, 9* Nine Author, 10* Ten Author, 10+* Above Ten Author, CC* Collaborative Co Efficient

Table 7 Shows that the collaborative co-efficiency has increased from 0.66 in 2012 to 0.75 in 2021, indicating that research among scientists is fairly collaborative with an average CC of 0.70. There is a constant increase in CC from 2012-2021. The overall collaborative coefficient is 0.70%. This table shows the high degree of collaboration observed in Nephrology.

5.8 Degree of Collaboration

Year	Single Authors (NS)	Multi Authors (NM)	Total (NS+NM)	DC=NM/NS+NM
2012	57	415	472	0.87
2013	87	426	513	0.83
2014	52	424	476	0.89
2015	55	491	546	0.89
2016	85	654	739	0.88
2017	72	650	722	0.90
2018	95	776	871	0.89
2019	80	794	874	0.90
2020	94	1072	1166	0.91
2021	65	1095	1160	0.94
Total	742	6797	7539	0.90

Table 8: Degree of Collaboration

This table amounts to calculating the degree of collaboration in Nephrology research by using the formula given by K. Subramanyam in 1982 which was,

$$C = \frac{NM}{NS + NM}$$

Where, C- The degree of collaboration

NM- No. of multi-authored papers.

NS- No. of single authored papers.

The degree of collaboration varied from 0.87 to 0.94 for the duration of the study. The average mean value was 0.90, suggesting an increase of collaborative research in Nephrology.

5.9 Prolific Author wise Distribution

Author	Records	Percentage
Segev DL	71	0.94

Levin A.	67	0.88
Schaefer F	64	0.84
Jha V.	63	0.83
Tong A.	61	0.80
Johnson DW	60	0.79
Craig JC	60	0.79
Kalantar-Zadeh K.	59	0.78
Jager KJ	52	0.68
Anonymous	49	0.64
Zoccali C.	48	0.63
Piccoli GB	45	0.59
Bello AK	43	0.57
Tonelli M	42	0.55
De Nicola L.	42	0.55

Table 9: Prolific Author wise Distribution

The top 15 prolific authors were recognized in Nephrology research. They have published 42 or more papers during 2012-2021. The identified top 15 authors had published about 826 (55.0%) papers. Segev DL became the most productive author, contributing 71 (0.94) articles, followed by Levin A. with 61(0.88%) articles.

6. FINDINGS

- A total of 7539 records were found during the research period. In the year 2020, there were a total of 1166 articles published. In 2012, there were 472 records published.
- In this research, it was observed that the highest number of citations (72780) and H-Index (90) were indexed by articles. The least number of citations is 1 citation and 1 H-Index indexed by Biographical item.
- Out of 7539 records, the above ten authors have contributed the greatest number of papers (1374) published on this research, followed by two authors who published 967 records and a single author who published 742 papers.
- A single author has contributed to 742 (9.84%) records. 6797 (90.16%) records were contributed by multi-author.
- The degree of collaboration ranges from 0.83 to 0.94. The average degree of collaboration is 0.90

7. CONCLUSION

This study has been distributed on the research productivity of Indian scientists in Nephrology from 2012 to 2021. The information was collected from a web of science database by using the document search provision with in the Science Citation index and analyzed through Bibexcel software. The most important findings and results are listed above. This study has focused on authorship pattern, single author Vs multi-author relationships, degree of collaboration, pattern of co-authorship index and collaborative research on Nephrology and related features like document wise distribution and prolific authors during the period of research.

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