

Mapping the Spatial Distribution of Clinical Biochemistry Research: A Regional Analysis of Contributions

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ABSTRACT

Mapping of clinical biochemistry research gives real-world analysis of clinical biochemistry research by region which gives a clear picture of geographical distribution of medical research. The aim of the study was to perform scientometric analysis of research articles published in Indian Journal of Clinical Biochemistry over the period of 2001 to 2025.

The journal has published 1816 articles during the study period. The highest numbers of articles were published in the year 2014 and lowest numbers of articles were published in the year 2002. Out of which 1429 articles were from Indian origin and 341 articles were from foreign origin. The lowest numbers of articles of Indian origin were published in the year 2002 and highest numbers of articles of Indian origin were published in the year 2008. The lowest number of articles of foreign origin published in the year 2009 and highest number of articles of foreign origin were published in the year 2014. The country-wise highest contributions of articles were from Iran and lowest contribution of article was from Srilanka and Yugoslavia respectively. The state-wise highest contributions of articles were from Delhi and lowest contribution of article was from Jharkhand and Tripura respectively.

KEYWORDS: Mapping, Spatial Distribution, Clinical Biochemistry Research, Scientometric analysis, Geographic distribution, Research articles.

INTRODUCTION

The Scientometric analysis is quantitative study of scientific mapping of academic knowledge and contributions within a field through statistical techniques, and indicators. It is used to identify trends and patterns in scientific literature (1). It was introduced in 1966 by Vasily Nalimov and established by Derek J. de Solla Price and Eugene Garfield.

In the modern era of knowledge, scientific literature plays important role in academic progress and institutional excellence. Over the past few decades, the Library and Information Science (LIS) has increasingly utilised

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quantitative methodologies such as bibliometrics, scientometrics, and informetrics to evaluate research publications, identify emerging research trends, and examine the demographical scientific collaboration.(2,3)

In India, the Indian Journal of Clinical Biochemistry (IJCB) is the main scientific journal where research progress in the field of biomedical science is shared and promoted. As a peer-reviewed journal that includes both national and international research over many years. The IJCB gives an overview of medical research in South Asia. Studying the history of this journal helps to understand how clinical biochemistry research has evolved, which areas and regions are leading contributors of scientific community in this field.(4)

Even though more scientometric studies are being conducted in different medical fields, there is not much research on the geographical distribution of journals focused on laboratory science, especially within specific regions(5,6). Most existing studies in scientometrics look at broad comparisons between countries or continents, often missing the finer details of how research productivity is affected at the local, state, or institutional level within a single country. To fill this gap, this study uses spatial bibliometric mapping techniques to look at where authors are based and how different regions contribute to the IJCB.

Considering IJCB as a scientific community, this research has two main goals: It provides a real-world analysis of clinical biochemistry research by region, helping government officials, funding organizations for proper funding support and the Association of Clinical Biochemists of India (ACBI) to focus areas that need more attention. It aids to LIS studies by showing how Geographic Information Systems (GIS) and spatial analysis can be combined with traditional bibliometric tools to give a more complete picture of domestic medical research.

REVIEW OF RELATED LITERATURE

For the present study, adequate reviews of related literature by different researchers published in various journals were considered. Some of them have been taken to show the outcome of the present research.

Priya Suradkar et al (2019) studied the scientometric analysis of 10 quarterly health science e-journals from 2001 to 2013. Their research found that there were a total of 20,724 research papers across these journals. They noted that the highest number of publications was recorded in 2011. Also, they found that 45.71% of the research articles were co-authored by more than three people. The journal with the most citations was the Journal of Internal Medicine. The study also mentioned that five e-journals were part of the Health Science consortium in Nashik from January 2001 to December 2013.(7)

Minxi Wang et al (2020) conducted a scientometric analysis of the knowledge structure and field of global health research. They pointed out that global health is becoming increasingly important. Research related to global health has a wide range of potential to improve public health. The study aimed to evaluate the structure of knowledge, the domain of knowledge, and the trends in global health research. They retrieved 14,692 documents and did a visual analysis of global health research, focusing on scientific output features, research collaboration networks, keywords, and highly cited literature. The results showed that interest of scholars in global health is rising in developed countries such as the USA, England, and Canada. The study offers useful guidelines, directions, and practical insights for global Health research(8).

Zeinab Jozi et al (2022) studied research papers and patents in pathology and forensic medicine indexed in the Scopus database. Data was collected from the SciVal citation database, and annual growth rate and relative growth rate were analyzed. They looked at the number of research papers and patents, as well as citations for these. The results showed poor collaboration between academia and industry in pathology and forensic medicine. The average growth of research articles and patents was observed. Authors concluded that the research process in these fields is not effective, and the relationship between citations of articles and patents is weak. They suggest strengthening the research collaboration between academia and industry in pathology and forensic medicine.(9)

Daitian Zheng et al (2022) performed a scientometric study on research trends related to emerging contaminants in the field of cancer. They used data from the Web of Science and did a scientometric analysis of annual citations, publications, famous journals and authors, the most productive countries and organizations. The study found that the publication trend was gradually increasing. The United States and China had the most publications in environmental research and science. Choi KC was the most productive author with the highest citation index among all authors (10).

Seyed Peyman Mirghaderi et al (2022) did a scientometric analysis of the top 50 most-cited joint arthroplasty articles from the Scopus database, focusing on knee and hip replacements. They analyzed journal impact factors, first author H-index, and keywords to find correlations and research trends (11).

Qiu-Qiong Shi et al (2023) did a scientometric analysis and visualization of research on prosthetic feet. They included 1827 original articles, reviews, conference proceedings, and meeting abstracts from the Clarivate Analytics Web of Science Core database. The US was the top country. Their findings are based on a detailed analysis of prosthetic foot literature, which gives guidance for both clinicians and researchers to study more (12).

Ningayya et al (2025) wrote about how scientometrics can be used to analyze research trends, authorship patterns, and the impact of research. They looked at metrics like publication count, citation index, Impact Factor, h-index, and author productivity. They concluded that scientometrics is useful for quantitative analysis, citation analysis, and journal rankings(13).

Saeid Shirshahi et al (2025) did a scientometric review of health data quality, focusing on disease management. They analyzed data from Web of Science using Excel 2019. They found that the US, England, and Australia had the highest levels of scientific output. They concluded that accuracy, coverage, and completeness are key factors in the management of disease outbreaks, prevention, and reducing mortality.(14)

AIM AND OBJECTIVES OF THE STUDY

The primary aim of the study is A scientometric analysis of research articles published in Indian Journal of Clinical Biochemistry and to quantitatively evaluate the research articles published in Indian Journal of Clinical Biochemistry over the period of 2001 to 2025. Following are the objectives of the study:

1. To find out year-wise distribution of research articles.
2. To analyse the volume-wise & issue-wise distribution of research articles.
3. To determine the geographic distribution of research articles.
4. To evaluate country-wise & state-wise distribution of research articles.

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Scope of the Study

The scope of the present study is to map the research output at national and international levels. Extracts publication data exclusively from IJCB indexed in Scopus, PubMed Central, Web of Science database. Analyzes articles published within a time period from 2001- 2025 to assess country-wise and state-wise trends. Evaluates specific quantitative indicators, such as publication volume, issues, number of articles etc.

Limitations of the Study:

The study is limited to single database of Indian Journal of Clinical Biochemistry Journal indexed in Scopus, PubMed Central, Web of Science and published articles in English language.

Materials and Methods:

The Indian Journal of Clinical Biochemistry (IJCB) started publication from 1986 as official journal of Association of Clinical Biochemists of India. The publication was taken over by Springer Nature Publishing Group and Association of Clinical Biochemistry. IJCB has impact factor 1.6 and is indexed in major database such as Scopus, PubMed Central, Web of Science. As there is continuous research and innovation, new information is generated and published in this scientific journal. The present study is descriptive Scientometric study. The secondary data from IJCB Website database were collected from 2001 to 2025 and analysed.

RESULTS AND DISCUSSION:

Table No. 1: Chronological distribution of Journal Volumes & Issues

Sr No	Year	Serial No of Volumes	Total Volumes Published	Total Issues Published	Percentage of Issues Published
1	2001	16	1	2	2.33
2	2002	17	1	2	2.33
3	2003	18	1	2	2.33
4	2004	19	1	2	2.33
5	2005	20	1	2	2.33
6	2006	21	1	2	2.33
7	2007	22	1	2	2.33
8	2008	23	1	4	4.65
9	2009	24	1	4	4.65
10	2010	25	1	4	4.65
11	2011	26	1	4	4.65
12	2012	27	1	4	4.65
13	2013	28	1	4	4.65
14	2014	29	1	4	4.65
15	2015	30	1	4	4.65
16	2016	31	1	4	4.65

17	2017	32	1	4	4.65
18	2018	33	1	4	4.65
19	2019	34	1	4	4.65
20	2020	35	1	4	4.65
21	2021	36	1	4	4.65
22	2022	37	1	4	4.65
23	2023	38	1	4	4.65
24	2024	39	1	4	4.65
25	2025	40	1	4	4.65
Total			25	86	100

Table no 1 shows there was marked increase in publication frequency was observed from 2008 onwards, when the journal transitioned from biannual (2 issues/year) to quarterly publication (4 issues/year)

Table No 2: Year-wise & Volume-wise Published Articles

Sr No	Year	Serial No of Volumes	Number of Articles Published	Percentage of Articles Published
1	2001	16	48	2.64
2	2002	17	38	2.1
3	2003	18	55	3.02
4	2004	19	69	3.8
5	2005	20	79	4.35
6	2006	21	80	4.41
7	2007	22	66	3.63
8	2008	23	90	4.95
9	2009	24	78	4.3
10	2010	25	75	4.13
11	2011	26	79	4.35
12	2012	27	78	4.3
13	2013	28	79	4.35
14	2014	29	92	5.07
15	2015	30	78	4.3
16	2016	31	72	3.97
17	2017	32	78	4.3
18	2018	33	78	4.3
19	2019	34	74	4.07
20	2020	35	70	3.85
21	2021	36	76	4.18
22	2022	37	74	4.06

23	2023	38	67	3.7
24	2024	39	72	3.96
25	2025	40	71	3.91
Total			1816	

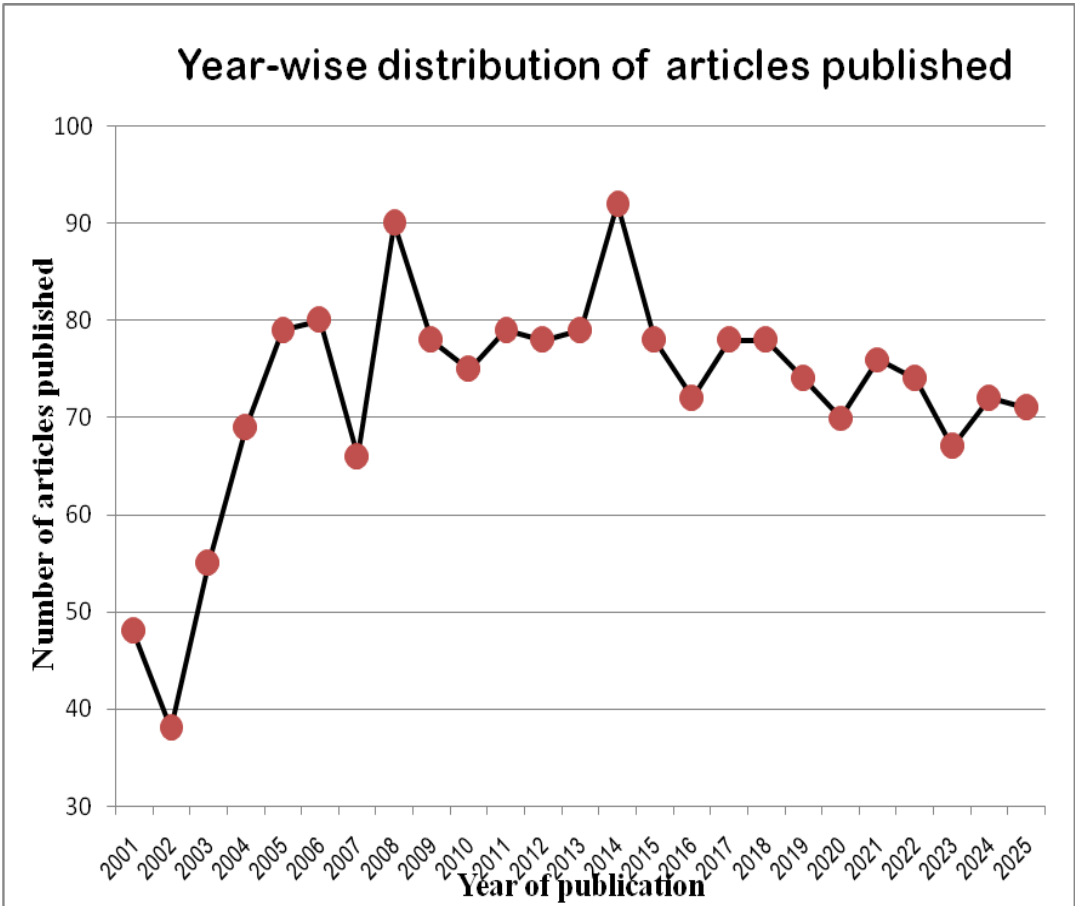


Figure no 1: Year-wise percentage of articles published

Table no 2 & Figure no 1 shows that year-wise percentage of articles published in the journal varies from 2.1% to 5.07%

Table No 3: Average Articles per Issues

Sr No	Year	Issues Published	Total Articles Published	Average Articles Per Issues
1	2001	2	48	24
2	2002	2	38	19
3	2003	2	55	27.5
4	2004	2	69	34.5
5	2005	2	79	39.5
6	2006	2	80	40
7	2007	2	66	33
8	2008	4	90	22.5
9	2009	4	78	19.5
10	2010	4	75	18.75
11	2011	4	79	19.75
12	2012	4	78	19.5
13	2013	4	79	19.75
14	2014	4	92	23
15	2015	4	78	19.5
16	2016	4	72	18
17	2017	4	78	19.5
18	2018	4	78	19.5
19	2019	4	74	18.5
20	2020	4	70	17.5
21	2021	4	76	19
22	2022	4	74	18.5
23	2023	4	67	16.75
24	2024	4	72	18
25	2025	4	71	17.75
Total		86	1816	
		Mean $\pm$ SD	72.64 $\pm$ 13.02	

Table no 3 shows the highest number of articles was published in 2014 (n=92), followed by 2008 (n=90) and 2006 (n=80). The lowest publication output was observed in 2002 (n=38). The mean annual publication output is 72.64 articles (SD = 13.02), with a median of 75 articles. The average article per issue were ranges from 18 to 40.

Table No. 4: Geographical Distribution of Articles

Sr No	Year	Number of Articles from Indian origin	%	Number of Articles from Foreign origin	%
1	2001	44	3.08	4	1.17
2	2002	35	2.45	3	0.88
3	2003	53	3.71	2	0.59
4	2004	64	4.48	5	1.47

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5	2005	69	4.83	10	2.93
6	2006	73	5.11	7	2.05
7	2007	55	3.85	11	3.23
8	2008	77	5.39	13	3.81
9	2009	70	4.9	0	0
10	2010	66	4.62	9	2.64
11	2011	64	4.48	15	4.4
12	2012	61	4.27	17	4.99
13	2013	56	3.92	23	6.74
14	2014	62	4.34	30	8.8
15	2015	58	4.06	20	5.87
16	2016	58	4.06	10	2.93
17	2017	63	4.41	14	4.11
18	2018	47	3.29	21	6.16
19	2019	43	3.01	22	6.45
20	2020	37	2.59	19	5.57
21	2021	62	4.34	14	4.11
22	2022	65	4.55	9	2.64
23	2023	54	3.78	13	3.81
24	2024	49	3.43	23	6.74
25	2025	44	3.08	27	7.92
Total		1429		341	

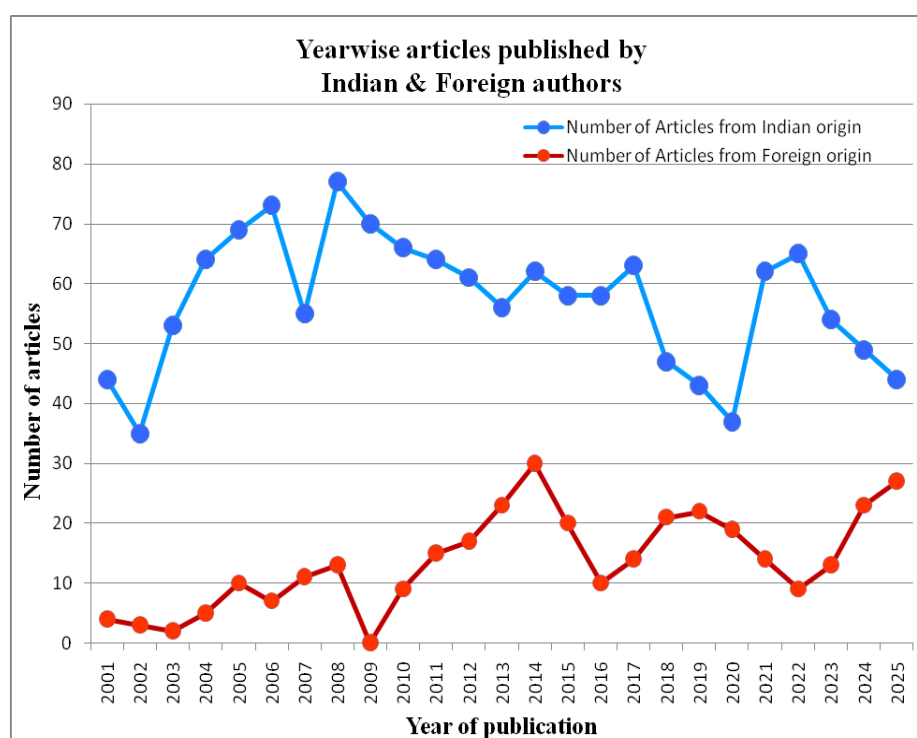


Figure no 2: Year-wise geographical distribution of articles

Table no 4 & figure no 2 shows the geographical distribution of articles shows that, the total number of articles from Indian origin are 1429 and ranges from 35 (2.45%) to 77 (5.39%). The geographical distribution of articles shows that, the total number of articles from foreign origin are 341 and ranges from zero (0%) to 30 (8.8%)

Table no 5 : Country-wise distribution of Articles

Sr No	Name of Country	Number of Articles	Percentage of Article Published
1	Africa	7	2.05
2	Australia	9	2.64
3	Bhutan	2	0.59
4	Bolivia	2	0.59
5	China	7	2.05
6	Egypt	62	18.18
7	Ethiopia	2	0.59
8	Germany	2	0.59
9	Ghana	4	1.27
10	Iran	83	24.34
11	Iraq	5	1.47
12	Italy	2	0.59
13	Jamaica	2	0.59
14	Japan	10	2.93
15	Keniya	2	0.59
16	Lebnon	2	0.59
17	Malasiya	21	6.16
18	Nepal	8	2.35
19	Nigeria	28	8.21
20	Oman	2	0.59
21	Pakisthan	7	2.05
22	Poland	2	0.59
23	Saudi Arabia	12	3.52
24	Serbia	3	0.88
25	Srilanka	1	0.29
26	Slovakia	2	0.59
27	South Koria	2	0.59
28	Srilanka	3	0.88
29	Sydney	2	0.59
30	Taiwan	2	0.59
31	Tanzania	2	0.59
32	Thiland	12	3.52
33	Turkey	9	2.64

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34	United Kingdom	9	2.64
35	United States of America	10	2.93
36	Yugoslavia	1	0.29
Total		341	

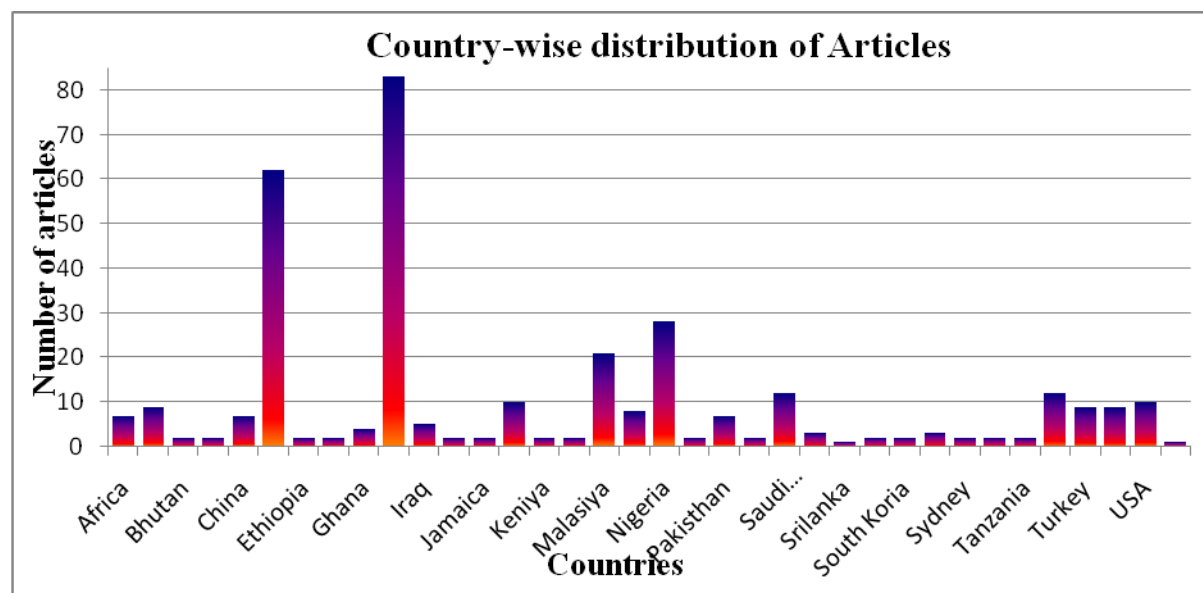


Figure no 3: Country-wise distribution of articles

Table no 5 & figure no 3 shows Iran (n=83) had highest number of articles published followed by Egypt (62).

Table no 6: Contributions of Top 10 Countries

Sr No	Name of Country	Number of Contributors	Percentage of Contributors
1	Iran	83	24.34
2	Egypt	62	18.18
3	Nigeria	28	8.21
4	Malaysia	21	6.16
5	Saudi Arabia	12	3.52
6	Thiland	12	3.52
7	Japan	10	2.93
8	United States of America	10	2.93
9	Australia	9	2.64
10	Turkey	9	2.64

Figure no 4: Contribution of Top 10 Countries

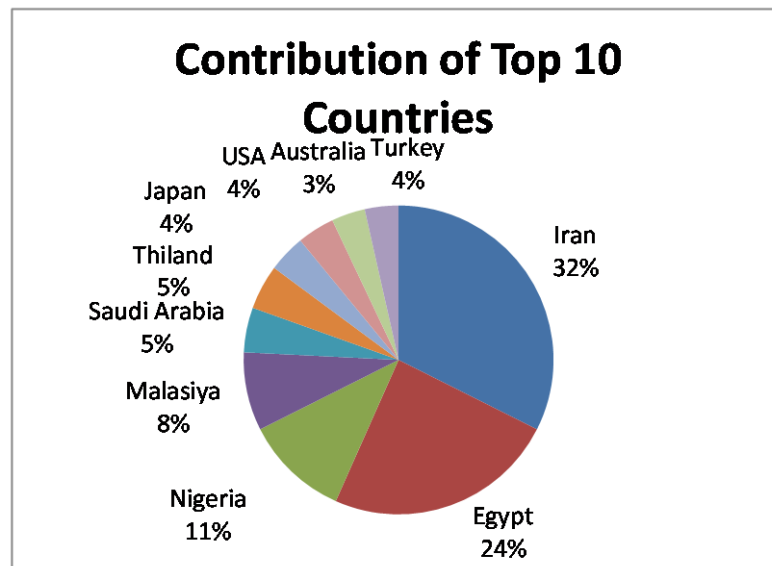


Table No. 7: State-wise distribution of Authors

Sr No	State	Number of Articles Published by Indian Authors	Percentage of Indian Authors
1	Assam	13	0.91
2	Andrapradesh	76	5.32
3	Bihar	11	0.77
4	Chattisgarh	5	0.35
5	Delhi	178	12.45
6	Gujrat	42	2.94
7	Haryana	41	2.87
8	Himachapradesh	4	0.28
9	J&K	13	0.91
10	Jharkhand	1	0.07
11	Karnataka	171	11.97
12	Kerala	49	3.43
13	West Bengal	66	4.62
14	Maharashtra	168	11.75
15	Manipur	2	0.14
16	Madhyapradesh	28	1.96
17	Odhisia	23	1.61
18	Panjab	91	6.37
19	Pondecherry	23	1.61
20	Rajasthan	105	7.35
21	Sikkim	6	0.42
22	Tamilnadu	115	8.05
23	Telangana	10	0.7
24	Tripura	1	0.07
25	Uttarpradesh	177	12.38
26	Uttarakhand	10	0.7
Total		1429	100

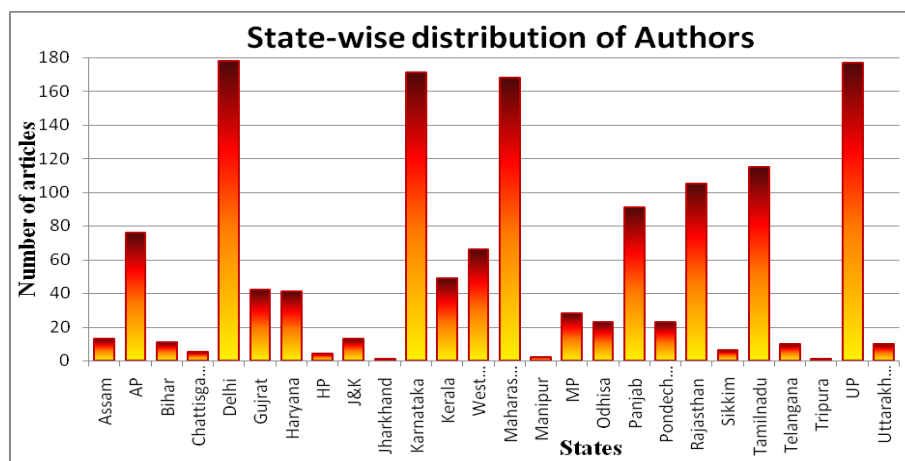


Figure no 5: State-wise distribution of authors

Table no 7 & figure no 5 shows state-wise distribution of authors in which highest contributions of articles were 178 from Delhi followed by Uttarpradesh, karnakata & Maharashtra and lowest contribution of article was 01 (0.07%) from Jharkhand and Tripura respectively.

Table no 8: Contribution of Top 10 States

Sr No	Name of State	Number of Contributors	Percentage of Contributors
1	Delhi	178	12.45
2	Uttarpradesh	177	12.38
3	Karnataka	171	11.97
4	Maharashtra	168	11.75
5	Tamilnadu	115	8.05
6	Rajasthan	105	7.35
7	Panjab	91	6.37
8	Andrapradesh	76	5.32
9	West Bengal	66	4.62
10	Kerala	49	3.43

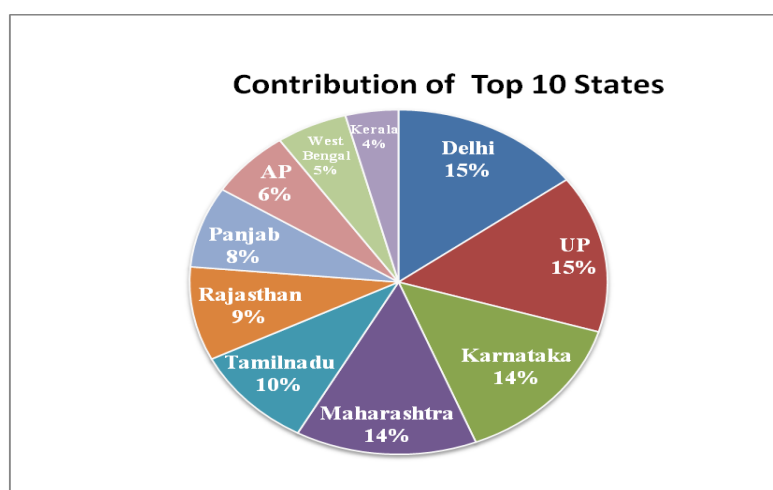


Figure no 6: Contribution of Top 10 States

Table no 8 & figure no 6 indicates contribution of Delhi and UP were found highest during the study period.

FINDING

1. Indian Journal of Clinical Biochemistry Journal was taken for the scientometric analysis for the period of selected twenty-five years i.e. from 2001-2025.
2. During the course of study for the selected period, the journal has published 25 volumes and 86 issues. From 2001 to 2007 two issues were published and from 2008 to 2025 four issues were published per year.
3. During the course of study for the selected period, the journal has published 1816 articles.
4. As per the findings, the highest number of articles were 92 (5.07%) published in the year 2014 and lowest number of articles were 38 (2.1%) published in the year 2002.
5. During the course of study for the selected period, the journal has published 1816 articles. Out of which 1429 (68.69%) articles were from Indian origin and 341(18.78%) articles were from foreign origin.
6. The lowest numbers of articles of Indian origin were 35, published in the year 2002 and highest numbers of articles of Indian origin were 77, published in the year 2008.
7. The lowest number of articles of foreign origin was zero, published in the year 2009 and highest numbers of articles of foreign origin were 30, published in the year 2014.
8. The country-wise highest contributions of articles were 83 (24.34%), from Iran and lowest contribution of article was 01(0.29%) from Srilanka and Yugoslavia respectively.
9. The state-wise highest contributions of articles were 178 (12.45%) from Delhi and lowest contribution of article was 01 (0.07%) from Jharkhand and Tripura respectively.
10. The states such as Delhi, UP, Karnataka, Maharashtra, Tamilnadu shows more number of active researchers.

CONCLUSION

1. The findings of the study indicate that country with highest research articles gives an indication of higher number of research organisations and researchers. It also shows greater facilities and financial support available for research work in those countries. The countries having lowest research articles may have poor research infrastructure and poor approach to the journal.
2. The states such as Delhi, UP, Karnataka, Maharashtra and Tamilnadu having higher research articles reflects greater number of research centres and more active research work. The state such as Tripura, Jharkhand, Manipur, Himachalpradesh and Chattisghad may have deficient research facilities. They may require to pay more attention for development of research infrastructure and manpower.

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