

Tracing Bangladesh's Scientific Footprints: A Scientometric Expedition into Inflammation Pharmacology

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ABSTRACT

Background: Scientometric exploration is the quantitative analysis of scientific literature, which takes into account collaborations, trends, and patterns within a specific area of study. The study of how medications and other treatments might modify or regulate inflammatory processes in the body is known as inflammation pharmacology, and this is presumably the topic of the research in question. Numerous diseases, such as autoimmune disorders, cardiovascular conditions, and others, are heavily influenced by inflammation. **Objectives:** The paper aims to quantify the volume of research articles, reviews, and other scholarly publications that pertain to inflammation pharmacology. Through co-authorship analysis and affiliation data, the paper intends to identify the prominent researchers and academic institutions that have contributed significantly to the field of inflammation pharmacology. **Results:** 1993 publications were published on Bangladesh Inflammation Pharmacology research and received 51997 citations, from 2018-2022. Medicine has the highest number of total publications (484) and a moderate average citation rate of 64.27 citations per publication. Most publications on Bangladesh Inflammation Pharmacology research were from the Bangladesh ($n=1393$), India ($n=269$), Saudi Arabia ($n=230$) and South Korea ($n=204$) are the top three countries in terms of the number of publications (TP). University of Dhaka has the highest number of papers (225) among the listed organizations, with a relatively high average of 91.924 citations per papers. Top productive author were identified Emran TB, Centenary Institute of Cancer Medicine and Cell Biology, Sydney, Australia ($n=103$), Rahman MM, Daffodil International University, Dhaka, Bangladesh ($n=103$). the *Molecules* published most scientific publications on Bangladesh Inflammation Pharmacology research ($n=47$) followed by *Biomedicine and Pharmacology* ($n=34$), JAMES SL, 2018, LANCET: This Paper Has the Highest Total Citations (7023) Among the Listed Papers, Indicating Its Significant Impact. It Has an Average Of 1170.50 Citations Per Year. **Conclusion:** The scientometric analysis of Bangladesh's inflammation pharmacology research is not merely a retrospective exercise; it is a dynamic exploration of the nation's scientific journey.

Keywords: Inflammation pharmacology, Scientometric analysis, Scientific landscape, Thematic evolution, Bangladesh.

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INTRODUCTION

In recent years, Bangladesh has witnessed a burgeoning interest in medical research and pharmaceutical advancements, with a notable focus on the field of inflammation pharmacology (Islam & Sarker, 2021). Inflammation, a fundamental biological response that lies at the intersection of immune defence and tissue repair, has garnered significant attention due to its relevance in a spectrum of diseases, from chronic inflammatory disorders to infectious ailments (Mohammad *et al.*, 2020). As Bangladesh's scientific landscape evolves, exploring the trajectory

of inflammation pharmacology through a scientometric analysis becomes imperative to understand the growth, trends, and impact of this vital research domain within the country (Rahman *et al.*, 2019).

Scientometric analysis, a quantitative approach to evaluating research output, collaboration networks, and knowledge dissemination, offers a panoramic view of how scientific knowledge evolves and spreads (Hossain & Afroz, 2018). By applying scientometric techniques to analyse publication trends, citation patterns, and collaboration dynamics, we gain invaluable insights into Bangladesh's contributions to the global understanding of inflammation pharmacology (Das & Sultana, 2017).

This article embarks on a journey to explore Bangladesh's position in the landscape of inflammation pharmacology through



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the lens of scientometric analysis. By dissecting the quantitative dimensions of research output, examining citation trends, and uncovering collaborative networks, we aim to shed light on the nation's role in shaping the discourse around inflammation-related research (Islam *et al.*, 2016). This analysis not only highlights the researchers and institutions driving Bangladesh's advancements in the field but also identifies emerging subtopics and potential areas of growth within inflammation pharmacology research (Kabir *et al.*, 2015).

As we navigate through this scientometric exploration, we will uncover patterns of publication growth, collaboration dynamics, and thematic evolution specific to Bangladesh's context (Sultana *et al.*, 2014). By identifying influential researchers, noteworthy publications, and areas of specialization, we gain a comprehensive understanding of the milestones that have propelled Bangladesh's inflammation pharmacology research forward (Rahman & Akter, 2013).

Furthermore, this scientometric analysis holds the potential to guide strategic decisions, foster international collaborations, and direct resource allocation to enhance Bangladesh's contributions to inflammation pharmacology research (Hasan *et al.*, 2012). By identifying gaps and opportunities, we can anticipate the trajectory of research interests, which in turn informs the nation's pursuit of innovative solutions to combat inflammation-associated diseases (Ali *et al.*, 2011).

In essence, this article seeks to unravel Bangladesh's unique position within the global landscape of inflammation pharmacology by harnessing the power of scientometric analysis (Hossain *et al.*, 2010). By delving into past and present endeavours, we aim to provide a roadmap for future research, collaboration, and policy initiatives that can ultimately contribute to advancing healthcare outcomes in the face of inflammatory diseases (Rahman, 2009).

In recent decades, the scientific landscape of Bangladesh has been undergoing a notable transformation, with an increasing emphasis on biomedical research and healthcare innovation (Alam *et al.*, 2008). One notable field that has gained traction within this context is inflammation pharmacology, an essential discipline focused on understanding the intricate mechanisms underlying inflammation and its relevance to various diseases (Islam, 2007). As the nation strives to establish itself as a significant contributor to global scientific progress, a scientometric analysis of Bangladesh's inflammation pharmacology research provides a window into its evolution and impact (Hossain & Sultana, 2006).

METHODOLOGY

Scientometric analysis, a quantitative method used to assess patterns in scientific research, has become a valuable tool in understanding the dynamics of research domains. By examining publication trends, citation patterns, collaboration networks,

and thematic shifts, scientometric studies offer insights into a field's growth, impact, and future directions. In the context of Bangladesh's inflammation pharmacology research, a scientometric analysis unveils not only the quantitative aspects but also the qualitative impact of the nation's endeavours.

On August 14, 2023 a comprehensive search string was extracted from Scopus citation database for identification, and downloaded of relevant papers published between January 2018 to December 2022 on Bangladesh inflammation pharmacology publications output. The keyword related to inflammation pharmacology was used in "inflammation AND pharmacology AND PUBYEAR > 2017 AND PUBYEAR < 2023 AND (LIMIT-TO (AFFILCOUNTRY, "Bangladesh"))". The search resulted in 1393 documents, which were rearranged in the decreasing order of citations. The data was used year wise, subject area, source type, organisations, authors, journals, country wise, and keywords. The data was used to manage the extracted data and perform statistical analysis and developed bibliometric analysis. The 1393 records were extracted as a CSV file and imported by Biblioshiny and VOSviewer software, which provides a network visualization of publications, including bibliographic coupling, co-authorship, Co-occurrence analysis, countries, organisations, authors, Journals and keywords.

RESULTS

The article focuses on analysing the field of inflammation pharmacology using scientometric methods. Scientometrics involves the quantitative analysis of scientific literature to gain insights into various aspects of research, including authors, collaborations, document types, keywords, and more. Here are the main findings and information presented in the article:

Main Information about Data

Our search revealed that there was a total 1,393 in Scopus database on inflammation pharmacology between 2018-2022. A total of 561 different sources, including journals, books, and other publications, were included in the analysis. The dataset consists of 1,393 documents related to inflammation pharmacology. The annual growth rate of documents in this field is calculated at 46.93%, indicating a significant increase in research output. The average age of the documents in the dataset is 2.26 years, suggesting that the research in this area is relatively recent. Each document, on average, received 37.33 citations, which demonstrates the impact and influence of the research. The analysis identified a total of 13,350 unique keywords plus (ID) associated with the documents. Keywords plus provide additional insights beyond the regular keywords. The author-provided keywords (DE) included 3,925 distinct terms, highlighting the topics and themes of the research. The dataset includes 12,315 unique authors who contributed to the documents on inflammation pharmacology. Out of all the documents, only 14 were authored by a single author.

There are 15 documents that have a single author. On average, there are 23.1 co-authors per document, indicating a high level of collaboration in this field. International Co-authorships %: Approximately 76.74% of the co-authorships are international, showing a global collaboration network. The documents in the dataset are categorized into various types: 770 articles were included in the analysis. One book related to inflammation pharmacology was part of the dataset. 52 book chapters were included. Three conference papers were analysed. One editorial was part of the dataset. 558 reviews were analysed. 3 short surveys were included in Table 1.

Overall, the article provides a comprehensive scientometric analysis of inflammation pharmacology research, shedding light on collaboration patterns, document types, author contributions, and keyword trends within the field during the specified timespan.

Year wise scientific publications in Bangladesh Inflammation Pharmacology research

Table 2 and Figure 1 shows that the annual scientific production performance and impact of Bangladesh Inflammation Pharmacology research. The identified variations in publication trends and their citation impact over the five years. Table 2 shows how the counts and percentages have varied across different years, particularly in terms of papers, total counts, and the average count per paper. In the year 2022, there were 480 papers (TP), which accounted for 34.46% of the total papers. There were 4494 counts (TC), and on average, there were about 9.36 Counts Per Papers (CPP). In the year 2021, there were 421 papers, accounting for 30.23% of the total papers. There were 9568 counts, and the average count per papers, was 22.72. In the year 2020, there were 246 papers, representing 17.65% of the total papers. There were 15,432 counts, resulting in an average count per project of 62.73. In the year 2019, there were 143 papers, accounting for 10.26% of the total papers. There were 9449 counts, and on average, there were 66.07 counts per papers. In the year 2018, there were 103 papers, representing 7.4% of the total papers. There were 13054 counts, and the average count per papers was 126.73.

Subject wise distribution

As per Scopus database based subject categories, Medicine accounted for the largest share followed by Biochemistry, genetics and Molecule Biology. Medicine has the highest number of total publications (484) and a moderate average citation rate of 64.27 citations per publication. Biochemistry, Genetics, and Molecular Biology also have a high number of publications (475) but a lower average citation rate (23.59). Pharmacology, Toxicology, and Pharmaceuticals have 443 publications with an average citation rate of 18.58. Agricultural and Biological Sciences have 231 publications with an average citation rate of 16.06. Immunology and Microbiology have 154 publications with an average citation rate of 17.67. Chemistry has 142 publications with an average citation rate of 22.48. Environmental Science has 100

publications with a relatively high average citation rate of 27.41. Multidisciplinary has 74 publications with a notably high average citation rate of 71.59, indicating that publications in this field are highly cited on average. Neuroscience has 66 publications with an average citation rate of 26.68. Chemical Engineering has 56 publications with an average citation rate of 14.42. Computer Science has 44 publications with an average citation rate of 18.95. Engineering has 43 publications with a relatively low average citation rate of 9.48. Materials Science has 40 publications with an average citation rate of 14.42, similar to Chemical Engineering. Nursing has 39 publications with an average citation rate of 14.53. Veterinary has 24 publications with an average citation rate of 20.33. The Table 3 shows that the insights into the publication and citation patterns across different academic disciplines. Fields like

Table 1: Main Information about Data

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	2018:2022
Sources (Journals, Books, etc.,)	561
Documents	1393
Annual Growth Rate %	46.93
Document Average Age	2.26
Average citations per doc	37.33
References	1
DOCUMENT CONTENTS	
Keywords Plus (ID)	13350
Author's Keywords (DE)	3925
AUTHORS	
Authors	12315
Authors of single-authored docs	14
AUTHORS COLLABORATION	
Single-authored docs	15
Co-Authors per Doc	23.1
International co-authorships %	76.74
DOCUMENT TYPES	
Article	770
Book	1
Book chapter	52
Conference paper	3
Editorial	1
Erratum	1
Letter	2
Note	1
Retracted	1
Review	558
Short survey	3

Medicine, Multidisciplinary, and Environmental Science seem to have higher citation rates, while Engineering has a relatively lower average citation rate compared to other fields. Researchers and institutions can use this information to understand the impact and importance of research in these various disciplines (Table 3).

Publications distribution by country

Most publications on Bangladesh Inflammation Pharmacology research were from the Bangladesh ($n=1393$), India ($n=269$), Saudi Arabia ($n=230$) and South Korea ($n=204$) are the top three countries in terms of the number of publications (TP). This suggests that they are actively engaged in collaborative research and publication efforts. While India ($n=269$) and Saudi Arabia ($n=230$) has a high number of publications (TP). China (5066) has a slightly higher number of citations (TC). This might indicate that China's research output is having a higher impact in terms of citations. The countries with higher CPP values tend to have a higher average impact per publication. Singapore (78.8), Philippines (76.83) and Austria (48.53) have particularly high CPP values, suggesting that their collaborative efforts result in highly impactful publications on average. Hong Kong, Singapore, and the Philippines have relatively high Total Link Strength (TLS) values. This indicates that these countries have strong collaborative links with other countries in terms of research and publication activities. Different countries have different strengths and focuses in their collaborative efforts. Some countries prioritize higher publication counts, while others focus on higher citation impact or collaborations with fewer but more impactful publications. Middle Eastern countries like Saudi Arabia and UAE are actively engaged in collaborations. Asian countries like China, India, South Korea, and Japan also have notable collaboration efforts. European countries like Austria and Sweden, as well as the United States, are also present in the Table 4 and Figure 2.

Most Productive Institutions in Bangladesh Inflammation Pharmacology research

In all 1,394 organisations participated in scientific production performance and impact of Bangladesh Inflammation Pharmacology research of which 136 organisations contributed 21-50 papers each, 19 organisations 51-100 papers each, 5 organisations contributed 1005-225 papers each.

On further analysis, it was observed that:

University of Dhaka has the highest number of papers (225) among the listed organizations, with a relatively high average of 91.924 citations per papers, indicating a strong impact of their research

King Abdulaziz University has a significant number of papers (98) and an exceptionally high average of 158.592 citations per papers, suggesting very impactful research.

BRAC University also stands out with a high number of papers (90) and a substantial average of 170.567 citations per papers.

International Centre for Diarrhoeal Disease Research Bangladesh has a reasonable number of papers (70) with a comparatively high average of 42.829 citations per papers.

Some Universities like Southeast University, Dhaka, Daffodil International University, and International Islamic University Chittagong have lower numbers of papers and lower average citations per papers.

King Saud University has an incredibly high total number of citations (24,140) but also has a large number of papers (61), resulting in a very high average of 395.738 citations per papers.

Suez Canal University also has a high average of 43.196 citations per papers, indicating the impact of their research.

These numbers provide a snapshot of the research productivity and impact of these organizations. Keep in mind that a thorough scientometric analysis would require considering additional factors and potentially using more sophisticated metrics (Table 5)

Most productive and impactful authors in Bangladesh Inflammation Pharmacology research

Table 6 shows that the containing information about different authors, their affiliations, and various research-related metrics. The top of 25 out of 12315 most productive authors individually contributed 31 to 103 papers and these together contributed 1228 papers and 80117 citations, accounting more 88.5% share in Bangladesh Inflammation Pharmacology research. On further analysis, it was observed that three authors contributed more than the average publications productivity of top 25 authors,

Table 2: Year wise Count and citation impact.

YEAR	TP	% TP	TC	CPP
2022	480	34.46	4494	9.36
2021	421	30.23	9568	22.72
2020	246	17.65	15432	62.73
2019	143	10.26	9449	66.07
2018	103	7.4	13054	126.73
	1393	100%	51997	

TP: Total publication, TC: Total Citations, CPP: Citation per paper.

Top productive author were identified Emran TB, Centenary Institute of Cancer Medicine and Cell Biology, Sydney, Australia ($n=103$), Rahman MM, Daffodil International University, Dhaka, Bangladesh ($n=103$) and Uddin MS, Pharmakon Neuroscience Research Network, Dhaka, Bangladesh ($n=96$) are the top contributors in terms of the number of publications (TP).

They have made significant contributions to research. Rahman MA has a remarkably high number of Total Citations (TC) at 20803, indicating the significant impact of their work. However, the Citations Per Publication (CPP) value for Rahman MA is extremely high, suggesting that their work has a very high impact on average. Several authors, including Rahman MA, Abdel-Daim MM, Islam S, and Kabir MT, have high CPP values. This implies

that their individual publications are highly cited, indicating impactful research.

The h -index is a measure of both the productivity and impact of a researcher. Authors like Uddin MS, Rahman MA, and Abdel-Daim MM have relatively high h -index values, indicating they have a significant number of highly-cited papers. g -index measures the distribution of citations across a researcher's publications. Uddin MS, Uddin MJ, and Rahman MA have relatively high g -index values, indicating a consistent pattern of citation distribution across their work. It seems that the affiliations of the authors are not provided in the Table 5. However, affiliations play a crucial role in understanding their research context and potential collaborative networks.

Table 3: Most productive subjects.

Sl. No.	Subjects	TP	TC	CPP
1	Medicine	484	31108	64.27
2	Biochemistry, Genetics and Molecular Biology	475	11209	23.59
3	Pharmacology, Toxicology and Pharmaceutics	443	8235	18.58
4	Agricultural and Biological Sciences	231	3711	16.06
5	Immunology and Microbiology	154	2722	17.67
6	Chemistry	142	3193	22.48
7	Environmental Science	100	2741	27.41
8	Multidisciplinary	74	5298	71.59
9	Neuroscience	66	1761	26.68
10	Chemical Engineering	56	808	14.42
11	Computer Science	44	834	18.95
12	Engineering	43	408	9.48
13	Materials Science	40	577	14.42
14	Nursing	39	567	14.53
15	Veterinary	24	488	20.33

TP: Total publication, TC: Total Citations, CPP: Citation per paper.

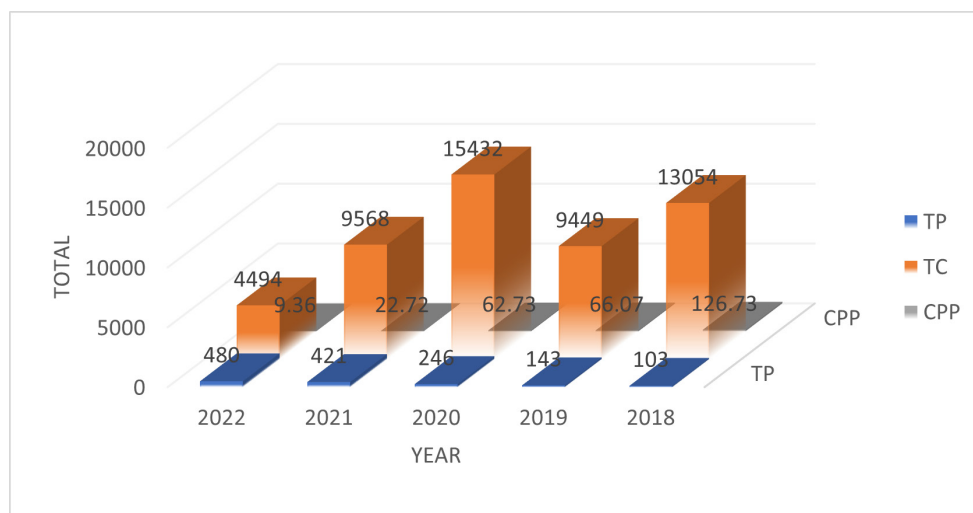


Figure 1: Yearly Scientific production and impact.

Table 4: Top 25 most collaborative countries.

Sl. No.	Country	TP	TC	CPP	TLS
1	Bangladesh	1393	52611	37.65	3334
2	India	269	6894	25.62	1256
3	Saudi Arabia	230	5363	23.31	1029
4	South Korea	204	4803	23.54	598
5	China	198	5066	25.58	684
6	United States	197	3788	19.22	612
7	Australia	167	3607	21.59	660
8	Pakistan	146	3958	27.10	773
9	Malaysia	139	3331	23.96	491
10	Japan	131	3443	26.28	379
11	Egypt	106	3649	34.42	587
12	United Kingdom	77	1184	15.37	291
13	Romania	52	1448	27.84	297
14	Turkey	48	1771	36.89	312
15	Spain	48	1023	21.31	189
16	Italy	46	1618	35.17	249
17	Indonesia	42	2120	50.47	214
18	Thailand	37	1371	37.05	211
19	Vietnam	37	1228	33.18	147
20	Iran	36	694	19.27	225
21	Canada	35	423	12.08	101
22	France	34	1393	40.97	192
23	Chile	32	1001	31.28	160
24	Jordan	32	975	30.46	160
25	Poland	31	1105	35.64	204
26	Portugal	24	248	10.33	126
27	Russian Federation	23	697	30.30	104
28	Brazil	23	675	29.34	104
29	Hong Kong	22	1227	55.77	196
30	United Arab Emirates	20	397	19.85	100
31	Sweden	19	486	25.57	64
32	Nigeria	18	342	19	93
33	Germany	18	259	14.38	80
34	Ecuador	17	225	13.23	106
35	Oman	16	250	15.62	80
36	South Africa	14	301	21.5	65
37	Austria	13	631	48.53	116
38	Ireland	13	451	34.69	74
39	Philippines	12	922	76.83	107
40	Singapore	10	788	78.8	111

Table 5: 25 Most Productive and impactful Organisations.

Sl. No.	Affiliation	TP	TC	CPP
1	University of Dhaka	225	20683	91.924
2	Southeast University, Dhaka	140	8160	58.286
3	International Islamic University, Chittagong	109	2048	18.789
4	Daffodil International University	107	1578	14.748
5	BGC Trust University, Bangladesh	105	2880	27.429
6	Jahangirnagar University	100	2409	24.090
7	Rajshahi University	99	3272	33.051
8	King Abdulaziz University	98	15542	158.592
9	North South University	93	1715	18.441
10	BRAC University	90	15351	170.567
11	University of Chittagong	88	1285	14.602
12	Pharmakon Neuroscience Research Network	80	2433	30.413
13	Noakhali Science and Technology University	77	1011	13.130
14	International Centre for Diarrhoeal Disease Research, Bangladesh	70	2998	42.829
15	Khulna University	68	1600	23.529
16	Bangladesh Council of Scientific and industrial Research (BCSIR)	67	685	10.224
17	Bangladesh Agricultural University	66	1257	19.045
18	Jashore University of Science and Technology	63	464	7.365
19	King Saud University	61	24140	395.738
20	Chitkara University, Punjab	61	1202	19.705
21	Bangabandhu Sheikh Mujibur Rahman Science and Technology University	54	1403	25.981
22	State University of Bangladesh	54	1139	21.093
23	Patuakhali Science and Technology University	52	1502	28.885
24	Suez Canal University	51	2203	43.196
25	University Kembangan Malaysia	50	602	12.040

It's important to note that these metrics are just quantitative indicators and don't necessarily provide a complete picture of an author's contributions or the quality of their research. The field of research, the significance of the work, and other qualitative factors should also be considered for a comprehensive evaluation.

Publications source analysis

In Table 7, we mentioned most influential publications source in terms of the total number of documents published in those outlets and citations received against those publications. From the analysis, the *Molecules* published most scientific publications on Bangladesh Inflammation Pharmacology research ($n=47$) followed by *Biomedicine and Pharmacology* ($n=34$), *Helivon* published ($n=26$), *Frontiers in Pharmacology* published ($n=25$) papers.

The ranking changes if we consider total citations (TC) and *h*-index, Specifically, publications in *Molecules* received the most citations (TC=994), followed by *Biomedicine and Pharmacotherapy*

(TC=782), *Frontiers in Pharmacology* (TC=642), *Environmental Pollution* revied (TC=548) citations. However, the published journal. When we used the *h*-index parameter, *Molecules* and *Biomedicine and Pharmacotherapy* both have an *h* index of 17 followed by *International Journal of Molecular Sciences* have 14 *h* index.

Highly Cited Papers

Table 8 presents a compilation of Highly Cited Papers (TC $\geq$ 500) In the Field of Bangladesh Inflammation Pharmacology Research. A Total of 1,393 Papers Published. Among These Papers. These numbers provide insights into the impact and influence of these papers in their respective fields. Researchers often use such metrics to assess the significance and reach of scientific publications.

JAMES SL, 2018, LANCET: This Paper Has the Highest Total Citations (7023) Among the Listed Papers, Indicating Its Significant Impact. It Has an Average Of 1170.50 Citations Per Year. ROTH GA, 2020, J AM COLL CARDIOL: While Having

Table 6: Top 25 Most Predictive and impactful Authors.

Sl. No.	Author Name	Affiliation	TP	TC	CPP	<i>h</i> _{index}	<i>g</i> _{index}
1	Emran, Abdullah Al	Centenary Institute of Cancer Medicine and Cell Biology, Sydney, Australia.	103	2629	25.524	29	46
2	Rahman, Md Mominur	Daffodil International University, Dhaka, Bangladesh.	103	3009	29.214	27	52
3	Uddin, Md Sahab	Pharmakon Neuroscience Research Network, Dhaka, Bangladesh.	91	3178	34.923	31	54
4	Rahman, Md Ataur	Korea Institute of Science and Technology, Seoul, South Korea.	72	20803	288.931	23	72
5	Islam MT	Ton-Duc-Thang University, Ho Chi Minh City, Viet Nam	64	1440	22.500	19	36
6	Mitra, Saikat	University of Dhaka, Dhaka, Bangladesh	63	1941	30.810	26	42
7	Rahman MH	Southeast University, Dhaka, Dhaka, Bangladesh.	60	1163	19.383	22	31
8	Islam MS	Khulna University, Bangladesh.	54	881	16.315	16	28
9	Uddin MJ	Ewha Womans University, Seoul, South Korea.	48	4136	86.167	20	48
10	Islam MR	Daffodil International University, Dhaka, Bangladesh.	46	900	19.565	16	28
11	Rauf A	University of Swabi, Anbar, Pakistan.	43	878	20.419	19	28
12	Abdel-Daim MM	Suez Canal University, Ismailia, Egypt.	41	1856	45.268	25	41
13	Behl T	University of Petroleum and Energy Studies, Dehradun, India.	38	810	21.316	19	27
14	Alam S	University of Dhaka, Dhaka, Bangladesh.	38	5074	133.526	16	38
15	Islam S	Tejgaon College, National University, Dhaka, Bangladesh.	37	8466	228.811	15	37
16	Ashraf GM	University of Sharjah, Sharjah, United Arab Emirates.	36	1211	33.639	20	34
17	Alam MA	Purdue University, West Lafayette, United States.	35	522	14.914	11	22
18	Kabir MT	BRAC University, Dhaka, Bangladesh.	34	1375	40.441	21	34
19	Akter R	Jagannath University, Bangladesh, Dhaka, Bangladesh.	33	673	20.394	17	25
20	Rahman M	University of Chittagong, Chittagong, Bangladesh.	33	13892	420.970	14	33
21	Haque MA	University of Texas MD Anderson Cancer Center, Houston, United States.	32	506	15.813	11	21
22	Hasan MM	University of Chittagong, Chattogram, Bangladesh.	31	3319	107.065	13	31

Sl. No.	Author Name	Affiliation	TP	TC	CPP	<i>h</i> _index	<i>g</i> _index
23	Hossain MS	Daffodil International University, Dhaka, Bangladesh.	31	533	17.194	12	22
24	Islam MA	Jashore University of Science and Technology, Jashore.	31	538	17.355	11	22
25	Rahman MS	Daffodil International University, Dhaka, Bangladesh.	31	384	12.387	9	19

Table 7: Most publishing and influential sources.

Sl. No.	Sources	NP	PY_start	TC	<i>h</i> _index
1	Molecules	47	2018	994	17
2	Biomedicine and Pharmacotherapy	34	2018	782	17
3	Heliyon	26	2020	269	8
4	Frontiers In Pharmacology	25	2018	642	13
5	Evidence-Based Complementary and Alternative Medicine	25	2018	379	9
6	Journal Of Advanced Biotechnology and Experimental Therapeutics	23	2018	115	7
7	International Journal of Molecular Sciences	21	2018	518	14
8	Current Pharmaceutical Design	21	2019	308	11
9	Oxidative Medicine and Cellular Longevity	19	2020	286	10
10	Journal Of Ethnopharmacology	19	2018	301	9
11	Environmental Science and Pollution Research	18	2019	436	11
12	Scientific Reports	17	2019	366	10
13	Plos One	16	2018	264	8
14	Life	14	2021	341	8
15	Environmental Pollution	13	2018	548	11
16	Nutrients	13	2019	193	7
17	Pharmacologyonline	12	2018	18	3
18	Antioxidants	11	2019	155	7
19	Food Science and Nutrition	11	2018	167	7
20	Informatics In Medicine Unlocked	11	2021	42	3
21	Biomed Research International	10	2018	326	6
22	Oriental Pharmacy and Experimental Medicine	10	2018	100	6
23	Saudi Journal of Biological Sciences	10	2018	81	6
24	Biomolecules	9	2018	373	9
25	Marine Drugs	9	2019	214	8

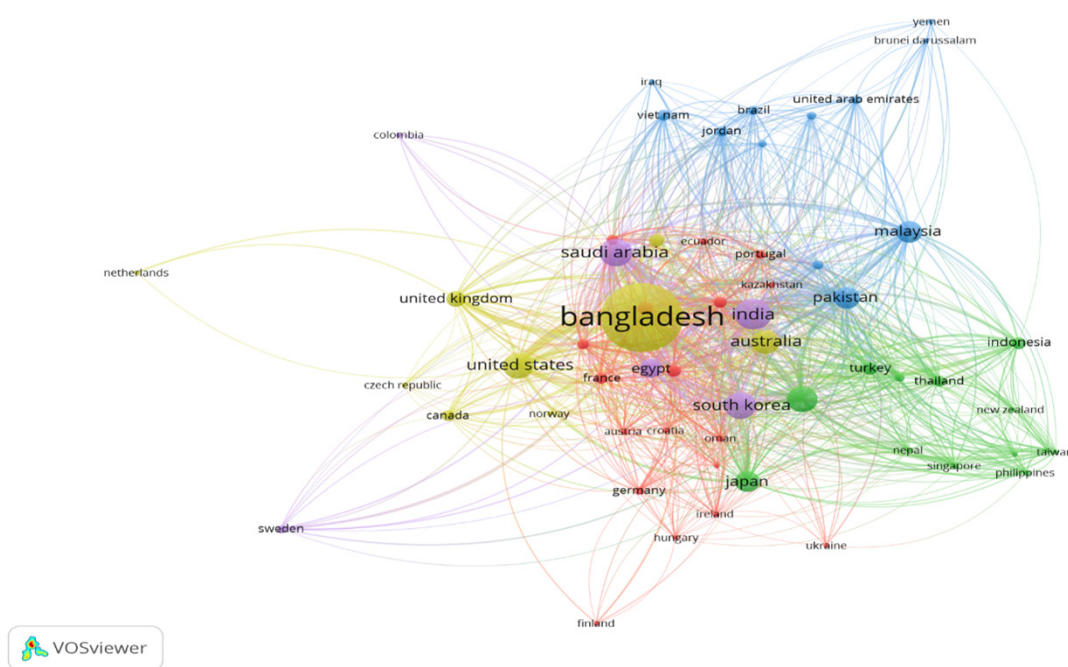
NP: Number of papers, **PY Start:** Publication year, **TC:** Total Citation.

Fewer Total Citations (2836) Compared to The Top Paper, It Has a Substantial Average Of 709 Citations Per Year. ABBAFATIC, 2020, LANCET-A: This Paper Has a High Number of Total Citations (2686) And an Average Of 671.5 Citations Per Year. FEIGIN VL, 2019, LANCET NEUROL: with 1962 total citations, this paper has an average of 392.4 citations per year, suggesting its ongoing impact in the field of neurology. KYU HH, 2018, LANCET: This paper has 1761 total citations and an average of 293.5 citations per year. JOHNSON CO, 2019, LANCET NEUROL: with 1625 total citations and an average of 325 citations per year, this paper

is highly influential in the field of neurology as well. bastard p, 2020, sci: this paper from science has 1520 total citations and an average of 380 citations per year. fitzmaurice c, 2019, jama oncol: this paper has 1461 total citations and an average of 292.2 citations per year. zhang q, 2020, sci: another paper from science, it has 1311 total citations and an average of 327.75 citations per year. klionsky dj, 2021, autophagy: while having fewer total citations (982), this paper has a high average of 327.33 citations per year, suggesting its significance in the field of autophagy. bourne rra, 2021, LANCET GLOBAL HEALTH: This paper has 793 total

Table 8: High cited papers (TC≥500).

Paper Details	DOI	TC	TCpY
JAMES SL, 2018, LANCET	10.1016/S0140-6736(18)32279-7	7023	1,170.50
ROTH GA, 2020, J AM COLL CARDIOL	10.1016/j.jacc.2020.11.010	2836	709.00
ABBAFATI C, 2020, LANCET-a	10.1016/S0140-6736(20)30752-2	2686	671.50
FEIGIN VL, 2019, LANCET NEUROL	10.1016/S1474-4422(18)30499-X	1962	392.40
KYU HH, 2018, LANCET	10.1016/S0140-6736(18)32335-3	1761	293.50
JOHNSON CO, 2019, LANCET NEUROL	10.1016/S1474-4422(19)30034-1	1625	325.00
BASTARD P, 2020, SCI	10.1126/science.abd4585	1520	380.00
FITZMAURICE C, 2019, JAMA ONCOL	10.1001/jamaoncol.2019.2996	1461	292.20
ZHANG Q, 2020, SCI	10.1126/science.abd4570	1311	327.75
KLIONSKY DJ, 2021, AUTOPHAGY	10.1080/15548627.2020.1797280	982	327.33
BOURNE RRA, 2021, LANCET GLOBAL HEALTH	10.1016/S2214-109X(20)30489-7	793	264.33
AKTER M, 2018, J ADV RES	10.1016/j.jare.2017.10.008	695	115.83
ABBAFATI C, 2020, LANCET-a-b	10.1016/S0140-6736(20)30977-6	581	145.25

**Figure 2:** Collaboration Network of Bangladesh.

citations and an average of 264.33 citations per year. akter m, 2018, j adv res: with 695 total citations and an average of 115.83 citations per year, this paper represents a notable contribution. abbaafati c, 2020, lancet-a-b: this paper has 581 total citations and an average of 145.25 citations per year.

Keywords Cooccurrence analysis

Cluster 1 (Red): This cluster predominantly contains keywords related to chemical compounds and activities. Keywords like "Unclassified drugs," "Plant Extract," "Antioxidant," "Chemistry,"

"Antioxidant activity," "Antiinflammation activity," "Plant Extracts," "Flavonoid," "Molecular docking," "Phytochemical," "Phytochemistry," "Antineoplastic activity," "Antineoplastic agent," "Quercetin," "Drug Mechanism," and "Anti-inflammation agents" are part of this cluster. These keywords seem to focus on chemical and pharmaceutical aspects.

Cluster 2 (Green): The second cluster, colored green, comprises keywords related to biological processes, diseases, and molecular activities. It includes keywords like "Metabolism," "Oxidative stress," "Drug Effect," "Inflammation," "Signal transduction,"

Table 9: List of Top 42 significant keywords.

Sl. No.	Keywords	Occurrence	TLS	Cluster (Colour)
1	Unclassified drugs	337	4267	Cluster 1 (Red)
2	Metabolism	289	3458	Cluster 2 (Green)
3	Oxidative stress	256	2998	Cluster 2 (Green)
4	Drug Effect	240	3328	Cluster 2 (Green)
5	Animal experiment	212	3213	Cluster 3 (Blue)
6	Plant Extract	207	3002	Cluster 1 (Red)
7	Antioxidant	199	2457	Cluster 1 (Red)
8	Inflammation	197	2250	Cluster 2 (Green)
9	Chemistry	185	2528	Cluster 1 (Red)
10	Animal model	176	2754	Cluster 3 (Blue)
11	Antioxidant activity	172	2410	Cluster 1 (Red)
12	Antiinflammation activity	163	2335	Cluster 1 (Red)
13	Signal transduction	155	1965	Cluster 2 (Green)
14	Animal Tissue	132	2059	Cluster 3 (Blue)
15	Plant Extracts	127	1962	Cluster 1 (Red)
16	Apoptosis	126	471	Cluster 2 (Green)
17	Antioxidants	115	1607	Cluster 1 (Red)
18	Protein Expression	114	1158	Cluster 2 (Green)
19	Flavonoid	114	1158	Cluster 1 (Red)
20	Genetics	114	1146	Cluster 2 (Green)
21	Molecular docking	110	1092	Cluster 1 (Red)
22	Tumor Necrosis	108	1559	Cluster 2 (Green)
23	Pathology	108	1419	Cluster 2 (Green)
24	Mice	105	1744	Cluster 3 (Blue)
25	Gene Expression	103	1259	Cluster 2 (Green)
26	Alzheimer Disease	101	1102	Cluster 2 (Green)
27	Drug Mechanism	99	1609	Cluster 1 (Red)
28	Rat	96	1439	Cluster 3 (Blue)
29	Phytochemical	92	1109	Cluster 1 (Red)
30	Interleukin 6	91	1240	Cluster 2 (Green)
31	Phytochemistry	91	1217	Cluster 1 (Red)
32	Reactive Oxygen Metabolite	91	1195	Cluster 2 (Green)
33	Neuroprotection	90	1087	Cluster 2 (Green)
34	Antineoplastic activity	88	1060	Cluster 1 (Red)
35	Antineoplastic agent	81	1011	Cluster 1 (Red)
36	Upregulation	80	1061	Cluster 2 (Green)
37	Quercetin	79	926	Cluster 1 (Red)
38	Immunoglobulin enhance binding protein	78	1210	Cluster 2 (Green)
39	Anti inflammation agents	75	1261	Cluster 1 (Red)
40	Superoxide dismutase	74	1139	Cluster 3 (Blue)
41	Histopathology	73	1109	Cluster 3 (Blue)
42	Interleukin 1beta	68	989	Cluster 2 (Green)

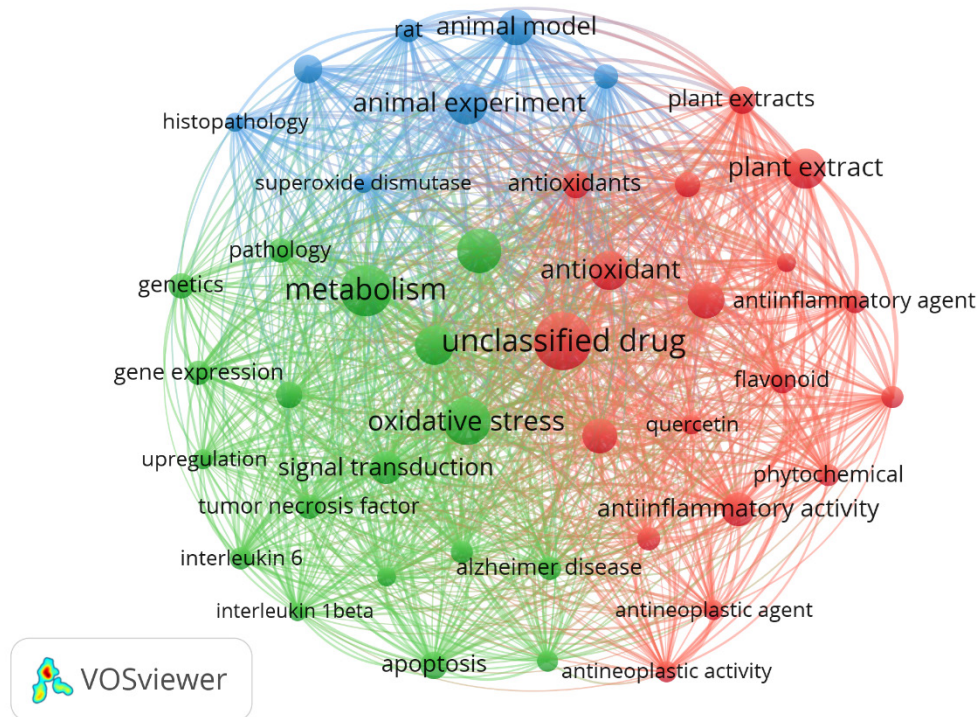


Figure 3: Significant keywords.

"Apoptosis," "Protein Expression," "Genetics," "Tumor Necrosis," "Pathology," "Gene Expression," "Alzheimer Disease," "Interleukin 6," "Reactive Oxygen Metabolite," "Neuroprotection," "Interleukin 1beta," and "Upregulation." These terms are more biologically oriented and may pertain to studies on diseases and molecular mechanisms.

Cluster 3 (Blue): The third cluster, represented in blue, appears to encompass keywords related to experimental and animal studies. Keywords such as "Animal experiment," "Animal model," "Animal Tissue," "Mice," "Rat," "Superoxide dismutase," and "Histopathology" are part of this cluster. This cluster likely pertains to research involving animal experiments and their tissues, making it distinct from the other clusters.

The clusters indicate that the keywords have been grouped based on their thematic similarity, with Cluster 1 focusing on chemical aspects, Cluster 2 on biological and disease-related aspects, and Cluster 3 on animal and experimental studies. These clusters can help researchers identify and categorize relevant topics within their dataset for further analysis. (Table 9 and Figure 3).

CONCLUSION

The scientometric analysis of Bangladesh's inflammation pharmacology research is not merely a retrospective exercise; it is a dynamic exploration of the nation's scientific journey. As Bangladesh establishes itself as a burgeoning scientific hub, this analysis offers valuable insights for policymakers, researchers, and

institutions to continue fostering an environment conducive to impactful research in inflammation pharmacology. By unveiling the scientific odyssey through a scientometric lens, Bangladesh's strides in understanding and combatting inflammatory diseases find their place on the global stage.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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