

Global Research Trend on Allergic Skin Disorders: A Bibliometric Analysis from 2001 to 2020

Abstract

Background: Allergic skin disorders constitute a variety of inflammatory skin disorders with increasing incidence. Bibliometric studies involve a statistical analysis of academic literature to assess the current research trend and identify knowledge gaps. There is a dearth of such studies concerning allergic skin disorders. **Aim:** To perform a bibliometric analysis of global research concerning allergic skin disorders from 2001 to 2020. **Materials and Methods:** We obtained all data from the Web of Science using the keywords “atopic dermatitis,” “contact dermatitis,” “skin allergy,” “urticaria,” “food allergy,” and “drug allergy.” Only articles in English language were included. Subsequent analysis revealed the total number of publications, top journals, institutions, and countries, thus highlighting the overall research trend. **Results:** Overall 76,764 articles were published on allergic skin disorders from 2001 to 2020 (original articles > review articles). The United States of America (USA) contributed maximum publications (26.1%) followed by Germany (9.6%), Japan (8.2%), and England (8.1%). The Allergy is the most preferred journal for publishing skin allergy research. Most research concentrated on atopic dermatitis, pathomechanisms of allergic disorders, and their primary prevention. **Conclusion:** This study evaluates the current landscape of skin allergy research. There has been a consistent increase in the number of publications concerning allergic skin disorders over the years. However, majority of the research publications are from developed countries. Hence, skin allergy-related research publication should be increased for diverse and enriched literary evidences.

Keywords: Allergic skin disorders, bibliometry, global, research

Introduction

The term “allergy” refers to an immunologically mediated exaggerated hypersensitivity reaction to usually harmless environmental antigens, called “allergens”.^[1] This phenomenon occurs in genetically susceptible individuals as a result of complex gene–environment interactions, at the interface of body and environment. They are clinically classified as respiratory or cutaneous, with frequent overlapping at later stages. The term “atopy” refers to a hereditary predisposition to produce IgE antibodies. Atopic dermatitis, allergic rhinitis, and asthma are examples of allergic diseases brought on by an inherited propensity to develop IgE antibodies against common environmental allergens. However, other allergic diseases use IgE-independent pathways, such as contact dermatitis and hypersensitivity pneumonitis. Thus, allergic diseases can

be classified into two categories based on the underlying immunology—“atopic” and “non-atopic”.^[1]

Globally, researchers have been reporting a dramatic increase in the occurrence of allergic disorders over the past two to three decades, especially in low- and middle-income countries.^[2] Although more evident in the case of respiratory allergies such as asthma and allergic rhinitis, cutaneous allergic disorders such as atopic dermatitis, food allergy, drug allergy, contact dermatitis, and urticaria are also showing a steep rise.^[2] Worldwide lifestyle modifications due to modernization may be regarded as the most important contributory factor, and such changes include increased rates of cesarean delivery, reduced breastfeeding, indiscriminate and early use of antibiotics, a Westernized diet and the resultant obesity, and changes in indoor and outdoor lifestyle and activity patterns.^[3] All these lifestyle changes affect our exposure

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

**Indrashis Podder,
Himel Mondal¹,
Rintu K. Gayen²**

Department of Dermatology, Venereology and Leprosy, College of Medicine and Sagore Dutta Hospital, Kolkata, West Bengal, ¹Department of Physiology, All India Institute of Medical Sciences, Deoghar, Jharkhand, ²Department of Electronics and Communication Engineering, Institute of Engineering and Management, Kolkata, West Bengal, India

Address for correspondence:

*Dr. Himel Mondal,
Department of Physiology,
All India Institute of Medical
Sciences, Deoghar - 814 142,
Jharkhand, India.
E-mail: himelmkg@gmail.com*

Access this article online

Website: www.idoj.in

DOI: 10.4103/idoj.idoj_481_22

Quick Response Code:



How to cite this article: Podder I, Mondal H, Gayen RK. Global research trend on allergic skin disorders: A bibliometric analysis from 2001 to 2020. Indian Dermatol Online J 2023;14:342-6.

Received: 10-Sep-2022. **Revised:** 26-Dec-2022.

Accepted: 31-Dec-2022. **Published:** 27-Apr-2023.

to a diverse microbial environment, subsequently resulting in loss of microbial diversity or dysbiosis. Microbial alteration (both gut and skin) possibly increases the risk of allergies as it hinders the proper development and education of the immune system.^[3,4]

Bibliometric studies provide a statistical analysis of scientific literature and generate an idea about the current state of research on any topic. As we are witnessing a rapid rise in allergy cases worldwide, it is crucial to know whether commensurate research work is being conducted on this important topic of global health, especially cutaneous allergies. Thus, the present study aims to provide a comprehensive overview of the status of global research concerning skin allergy focusing on scientific production and exchanges. We presume that the information in this article would help to identify knowledge gaps in this area and facilitate planning and policy-making.

Materials and Methods

Ethics

This study involves audit of data from Web of Science, an online bibliographic database. As there was no involvement of human or animal in the study, clearance from the Ethics Committee is not required as per current local guidelines.

Search method and keywords

We considered Web of Science (WOS) as our primary database as it includes both Science Citation index and Social Sciences Citation index. We searched the database on August 23, 2021. The keywords were selected according to the Medical Subject Heading. The date range was customized from 2001 to 2020. The following keyword terms were searched: “TS = (Atopic dermatitis) OR TS = (Contact dermatitis) OR TS = (skin allergy) OR TS = (Urticaria) OR TS = (Food Allergy) OR TS = (Drug allergy)”. All types of documents in English were searched. We did not use any filter to screen the article for selection. Hence, all publications, irrespective of the status of the patch test, were included. We have selected the following keywords—“urticaria,” “contact dermatitis,” and “atopic dermatitis” as they are the most commonly encountered allergic skin disorders.^[5,6] The “skin allergy,” “food allergy,” and “drug allergy” are commonly used non-specific terminologies.

Calculation and statistical analysis

We collected the data of top 20 of any category (e.g., top 20 countries). The chronology is based on the number and there was no qualitative check for designating the “top”. We included only top 20 as further addition would increase the length beyond interest of the readers. The raw data were collected and stored in a spreadsheet for

further analysis. The data were expressed as numbers and percentage. For calculating the percentage, we considered total of top 20 and total publications as denominator. The distribution of number in those top 20 data was compared by Chi-square test. Pearson’s correlation was used to find correlation between two variables. Kruskal–Wallis test was used to compare continuous variables in more than two groups. All the statistical tests were carried out in Microsoft Excel 2010 (Microsoft Corporation, USA) and GraphPad Prism 6.01 (GraphPad Software, California, USA). For statistical significance, we fixed the *P* value to be < 0.05.

Results

From 2001 to 2020, a total of 76,764 articles were published globally concerning allergic skin disorders. Year-wise total number of publications is shown in Figure 1. Mean total publication was 3838.2 ± 1361.59 (range 2051–6223). Among the total publications, original articles were 2415.5 ± 721.73 (range 1414–3552), review articles were 507.15 ± 289.52 (range 163–1168), and other articles were 1045.6 ± 373.93 (range 499–1669) (Kruskal–Wallis test $P < 0.0001$).

Year-wise publications in 100% stacked bar chart is shown in Figure 2. The relative percentage of original article (e.g., in 2001, original 70.18%, review 7.34%, and other 22.48% versus in 2020, original 55.59%, review 18.28%, and other 26.12%, Chi-square $P < 0.0001$) has been reduced, and there was rise in review and other articles.

Country-wise distribution of publications is shown in Figure 3. The major share of the publication is from USA (24.14% among the top 20 countries and 26.12% of total publications). India contributes about 1.83% among the top 20 contributing countries and 1.98% of total publications (Chi-square $P < 0.0001$).

Table 1 shows the top 20 journals publishing allergy research. The journal Allergy, with an impact factor (IF) of 13.146, tops the list and has 15.51% publications in top 20 journals and 6.20% of all the publications. Along with

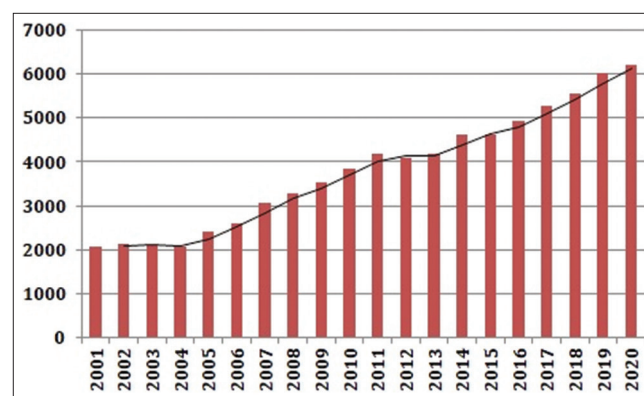


Figure 1: Year-wise global publications of allergy research from 2001 to 2020

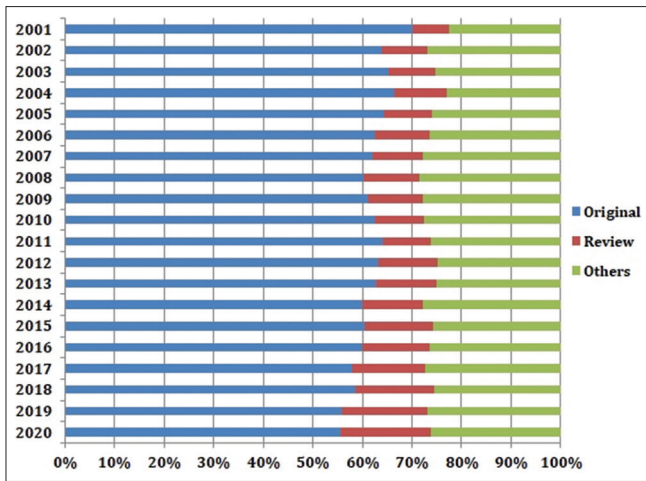


Figure 2: Relative percentage of original, review, and other global publications of allergy research from 2001 to 2020

the IF, we are providing the website and access option of those journals for ease of access by the readers. Among the top 20 journals, three are of full open-access policy, and others are having hybrid model (i.e., having a combination of open-access and paywalled articles).

Table 2 shows the top 20 institutions publishing allergy research. With a hefty number of publications (1991), the University of California System contributes 8.88% in top 20 and 2.59% in total publications. We are providing the websites of the universities for ease of access.

Discussion

There was a gradual increase in the number of articles, pertaining to allergic skin disorders, being published over the last 20 years. There was a slight reduction in the number of articles in 2012 and 2013, but after that, a consistent rise in research output has been noted. We found a total of 76,764 publications concerning allergic skin disorders over 20 years, much lower compared to bronchial asthma (77,118 publications in 10 years),^[7] and allergic rhinitis (average 357 original articles per year compared to 121 original articles on allergic skin disorders per year).^[8] Thus, the total research output is low for allergic skin disorders related to respiratory allergies; however, our analysis shows a gradual increase in skin allergy research over the last two decades, which was sustained. Notably, 8327 articles were found for “food allergy” (2001–2014),^[9] 37,283 articles for “contact dermatitis” (1988–2017),^[10] and 180 randomized controlled trials (RCTs) for urticaria (2009–2019);^[11] we included all these conditions under the umbrella term “skin allergy”. The underlying reason for the rise in publication may be multifactorial. There may be gradual rise of research, more number of publications, higher availability of digital journals, or even rise in number of cases that encouraged the researchers to conduct more

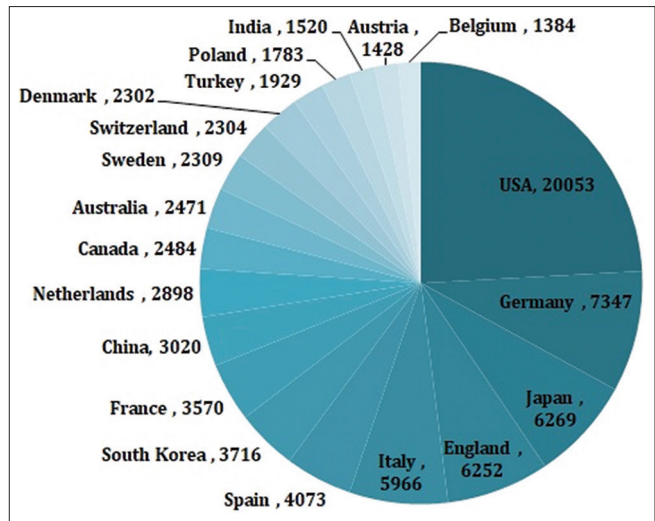


Figure 3: Country-wise number of publications of allergy research from 2001 to 2020

researches. However, finding the exact reason was beyond the scope of the study.

The USA made the maximum contribution to “skin allergy” research, followed by Germany, Japan, England, and Italy accounting for 26.12%, 9.6%, 8.2%, 8.1%, and 7.8% of the total published articles, respectively. We observed a similar pattern for the top 5 contributing countries in other bibliometric studies—food allergy (USA > Germany > Italy > France > UK) and contact dermatitis (USA > Germany > UK > Japan > France).^[9,10]

Interestingly, all the countries in the list are developed countries, according to the United Nations (UN) ranking. The possible reasons may be the increased prevalence of allergic diseases in Western countries and the availability of better screening and research facilities. Thus, more sensitization is needed regarding allergic disorders, especially skin allergies, in developing countries along with better research infrastructure. However, in the case of other disorders such as Behcet disease (Turkey) and leishmaniasis (Brazil),^[12,13] developing countries are at the forefront as these places record the maximum prevalence of these conditions.

Limitations

We obtained all data from a single source, “Web of Science”, as it is widely regarded as the most reliable database in academic literature providing a holistic analysis.^[14]

Conclusion

Our bibliometric analysis reveals that research and publications on allergic skin disorders have been steadily increasing over the years, with maximum emphasis on their pathomechanisms and primary prevention.

Table 1: Top 20 journals publishing skin allergy research.

Rank	Journal title	Website	Access option*	Number	Percentage (in top 20)	Percentage (in total publications)	Impact factor [†]
1	Allergy	https://onlinelibrary.wiley.com/journal/13989995	Hybrid	4,763	15.51	6.20	13.146
2	Journal of Allergy and Clinical Immunology	https://www.journals.elsevier.com/journal-of-allergy-and-clinical-immunology	Hybrid	4,038	13.15	5.26	10.793
3	Contact Dermatitis	https://onlinelibrary.wiley.com/journal/16000536		3,542	11.54	4.61	6.6
4	Journal of Investigative Dermatology	https://www.journals.elsevier.com/journal-of-investigative-dermatology	Hybrid	2,183	7.11	2.84	8.551
5	British Journal of Dermatology	https://onlinelibrary.wiley.com/journal/13652133	Hybrid	1,978	6.44	2.58	9.302
6	Annals of Allergy Asthma Immunology	https://www.journals.elsevier.com/annals-of-allergy-asthma-and-immunology	Hybrid	1,961	6.39	2.55	6.347
7	Clinical and Experimental Allergy	https://onlinelibrary.wiley.com/journal/13652222	Hybrid	1,514	4.93	1.97	5.018
8	Journal of the American Academy of Dermatology	https://www.journals.elsevier.com/journal-of-the-american-academy-of-dermatology	Hybrid	1,324	4.31	1.72	11.527
9	Pediatric Allergy and Immunology	https://onlinelibrary.wiley.com/journal/13993038	Hybrid	1,108	3.61	1.44	6.377
10	International Archives of Allergy and Immunology	https://www.karger.com/Journal/Home/224161	Hybrid	933	3.04	1.22	2.749
11	Journal of Allergy and Clinical Immunology: In Practice	https://www.journals.elsevier.com/the-journal-of-allergy-and-clinical-immunology-in-practice	Hybrid	924	3.01	1.20	8.861
12	EFSA Journal	https://efsa.onlinelibrary.wiley.com/journal/18314732	Open Access	903	2.94	1.18	3.336
13	Journal of the European Academy of Dermatology and Venereology	https://onlinelibrary.wiley.com/journal/14683083	Hybrid	857	2.79	1.12	6.116
14	Dermatitis	https://journals.lww.com/dermatitis/pages/default.aspx	Hybrid	811	2.64	1.06	4.845
15	Acta Dermato-Venereologica	https://www.medicaljournals.se/acta/	Open Access	754	2.46	0.98	4.437
16	Journal of Investigational Allergology and Clinical Immunology	http://www.jiaci.org/	Open Access	733	2.39	0.95	5.172
17	Experimental Dermatology	https://onlinelibrary.wiley.com/journal/16000625	Hybrid	723	2.35	0.94	3.96
18	Current Opinion in Allergy and Clinical Immunology	https://journals.lww.com/co-allergy/pages/default.aspx	Hybrid	564	1.84	0.73	3.142
19	Journal of Dermatology	https://onlinelibrary.wiley.com/journal/13468138	Hybrid	547	1.78	0.71	4.005
20	PLOS One	https://journals.plos.org/plosone/	Open Access	546	1.78	0.71	3.24

Chi-square $P < 0.0001$, EFSA: European Food Safety Authority, PLOS: The Public Library of Science, *Hybrid indicates some articles are open access and some are paywalled. [†]Impact factor (IF) is scientometric index provided by Clarivate™

However, maximum research is contributed by developed countries accounting for >50% of the available literature; thus, researchers from developing and least developed countries should be supported to generate more research output. This would create diverse and enriched literary collection for further progress of the skin allergy-related research.

Acknowledgement

The second author would like to thank Sarika Mondal and Ahana Aarshi for their help during preparation of this manuscript.

Financial support and sponsorship

Nil

Table 2: Top 20 institutions in skin allergy research publication.

Rank	Name of institution	Website	Number	Percentage (in top 20)	Percentage (in total publications)
1	University of California System	https://www.universityofcalifornia.edu/uc-system	1,991	8.88	2.59
2	Harvard University	https://www.harvard.edu/	1,667	7.44	2.17
3	University of London	https://london.ac.uk/	1,557	6.95	2.03
4	Free University of Berlin	https://www.fu-berlin.de/	1,476	6.59	1.92
5	Humboldt University of Berlin	https://www.hu-berlin.de/en	1,438	6.42	1.87
6	Charite Medical University of Berlin	https://www.charite.de/en/	1,423	6.35	1.85
7	Icahn School of Medicine at Mount Sinai	https://icahn.mssm.edu/	1,356	6.05	1.77
8	University of Copenhagen	https://www.ku.dk/english/	1,255	5.60	1.63
9	Northwestern University	https://www.northwestern.edu/	1,048	4.68	1.37
10	Institut National De La Sante Et De La Recherche Medicale Inserm	https://www.inserm.fr/en/home/	995	4.44	1.30
11	Karolinska Institutet	https://ki.se/en	958	4.27	1.25
12	King's College London	https://www.kcl.ac.uk/	930	4.15	1.21
13	Feinberg School of Medicine	https://www.feinberg.northwestern.edu/	883	3.94	1.15
14	Utrecht University	https://www.uu.nl/en	863	3.85	1.12
15	Johns Hopkins University	https://www.jhu.edu/	855	3.82	1.11
16	University of California San Francisco	https://www.ucsf.edu/	762	3.40	0.99
17	Guy's St Thomas' NHS Foundation Trust	https://www.guysandstthomas.nhs.uk/Home.aspx	756	3.37	0.98
18	University of Munich	https://www.lmu.de/en/index.html	754	3.36	0.98
19	University of Colorado System	https://www.cu.edu/	728	3.25	0.95
20	Imperial College London	https://www.imperial.ac.uk/	715	3.19	0.93

Chi-square $P < 0.0001$, NHS: National Health Service

Conflicts of interest

There are no conflicts of interest.

References

- Kay AB. Allergy and allergic diseases. First of two parts. *N Engl J Med* 2001;344:30-7.
- Pawankar R. Allergic diseases and asthma: A global public health concern and a call to action. *World Allergy Organ J* 2014;7:12.
- Renz H, Skevaki C. Early life microbial exposures and allergy risks: Opportunities for prevention. *Nat Rev Immunol* 2021;21:177-91.
- Mezouar S, Chantran Y, Michel J, Fabre A, Dubus JC, Leone M, *et al.* Microbiome and the immune system: From a healthy steady-state to allergy associated disruption. *Human Microbiome Journal* 2018;10:11-20.
- Incorvaia C, Frati F, Verna N, D'Alò S, Motolese A, Pucci S. Allergy and the skin. *Clin Exp Immunol* 2008;153(Suppl 1):27-9.
- Fonacier LS, Dreskin SC, Leung DYM. Allergic skin diseases. *J Allergy Clin Immunol* 2010;125 (2 Suppl 2):S138-49.
- Gupta BM, Kaur J, Baidwan K, Gupta R. Global asthma research with special reference to India: A scientometric assessment of publication output during 2007-16. *J Pulmon Respir Sci* 2018;3:1-1.
- Wu Q, Zheng R, Wang W, Qiu H, Huang X, Yang Q. The top 100 most influential articles in allergic rhinitis from 1970 to 2018: A bibliometric analysis. *J Int Med Res* 2019;47:6315-36.
- Vanga SK, Singh A, Vagadia BH, Raghavan V. Global food allergy research trend: A bibliometric analysis *Scientometrics* 2015;105:203-13.
- Senel E. The last three decades of contact dermatitis: A bibliometric analysis of global publications on contact dermatitis. *Dermatol Nurs* 2020;12:223-31.
- Patil AD. Randomized clinical trials related to urticaria: Bibliometric analysis from 2009 to 2019. *Natl J Physiol Pharm Pharmacol* 2020;10:116-21.
- Şenel E, Demir E, Alkan RM. Bibliometric analysis on global Behçet disease publications during 1980-2014: Is there a Silk Road in the literature? *J Eur Acad Dermatol Venereol* 2017;31:518-22.
- Soosaraei M, Khasseh AA, Fakhar M, Hezarjaribi HZ. A decade bibliometric analysis of global research on leishmaniasis in Web of Science database. *Ann Med Surg (Lond)* 2018;26:30-7.
- Kendall S. Lib Guides: PubMed, Web of Science, or Google Scholar? A behind-the-scenes guide for life scientists. Which one is best: PubMed, Web of Science, or Google Scholar? Available from: <https://libguides.lib.msu.edu/c.php?g=96972&p=627295> [Last accessed on 2022 Aug 25].